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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 85 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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Section 1

Food and Chemical Technology

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1. Use of beta-glucan as a functional ingredient in food products

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Introduction. Great interests in studying functional food are those polysaccharides that can cross the gastrointestinal tract unchanged and could induce beneficial health effects. One of this polysaccharide is representing by beta-glucan who can gradually pass the gut and may induce several modification such as: lowers cholesterol, change the glycemic response, stimulate the immunity and reduce inflammation. The objective of this paper is to determine which is the most suitable food for incorporating beta-glucan to achieve an expected biologically effect.

Materials and methods. In order to obtain β -glucan, a brewery yeast of the *Saccharomyces cerevisiae* strain was subjected to an alkali-acidic extraction. Mineral content and trace elements were determined with inductively coupled plasma mass spectrometer (Agilent Technologies 7500 Series, USA). The biological properties described in the literature can be quantified only if, after extraction the product is dried at a temperature of 55°C to rearrange the tridimensional configuration responsible to induce bioactive effects.

Discussion. The extraction of beta-glucans was achieved with a yield of 16% recovery. Results of the analyzes carried out with ICP-MS showed that macro minerals Na, Mg, Ca of beta-glucan decreased 2, 20 and 3 times respectively compared with raw yeast and heavy metals such as Fe, Co, Zn, and Pb in final extract were under the limit of detection.

Due to its rheological properties of beta-glucans in solutions, they can be used in a broad spectrum of foods from ice-cream, yoghurt, mayonnaise, sauces, beverages, soups to tortillas, bread, pasta and couscous. Depending on molecular fraction and source of extraction, beta-glucan have different behavior in food matrices. Yeast glucan with an approximately 240kDa would form a soft gel which can perfectly fit in formulation of refrigerated foods.

Conclusions. Given that is a non digestible polysaccharide, beside rheological properties to increase viscosity in solution, beta-glucan acts like a dietary fiber having a prebiotic potential promoting the growth of the beneficial bacteria. The most suitable choice for embed beta-glucan into food products is its use in fermented dairy products. This can lead to a symbiotic effect in combination with lactic bacteria present in yoghurt improving the health benefits.

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2. Theoretical study on the opportunity to exploit the vine-growing by-products in order to extract resveratrol

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Introduction. Resveratrol (3,5,4'-trihydroxystilbene) is a polyphenolic microconstituent that is formed in the grains of grapes in response to *Botrytis cinerea* attack, acting as a phytoalexin. Resveratrol is found in two isomeric, *trans* and *cis* forms, *trans*-resveratrol is the active form, which under the action of light is irreversibly transformed into the *cis*-isomer. With glucose, resveratrol forms two glycosidic isomers: *trans*-resveratrol glycoside and *cis*-resveratrol glucoside. It has ultraviolet and fluorescence spectroscopic properties characteristic (Țirdea, 2007).

Results and discussion. Our work focuses on the study of literature to channel research the methods of extracting the resveratrol from various by-products of the viticulture, because its antioxidant properties are a valuable product for the human body, and green mass is a possible value-added industrial source: Reduces tumor cell viability and DNA synthesis from these cells, thus exerting an anticancer effect (Bavaresco et al. 2012), it possesses anti-inflammatory properties and canals prevent cardiovascular disease (Li et al. 2012). Reduces the level of lipids in the blood and attenuates the effect of linoleic acid on breast cancer (Fernández-Mar et al. 2012). Interacts with serum proteins, especially albumin, through the bonds that make them with fatty acids (Jeannin et al., 2002).

Agricultural biomass waste represents a largely ignored source of high-value phytochemicals which become value-added industrial products that could contribute to sustainability objectives (Rayne et al. 2008) as it is the case of cane pruning (Çetin et al. 2011). During this process considerable amount of green mass (portions of shoots, leaves, tendrils) is removed. *Trans*-Resveratrol and piceid were found in certain abundance in grape seeds, shoots and leaves (Lachman et al. 2004; Liu et al. 2013). The highest concentration of *trans*-resveratrol was reported in branches (specifically in the phloem tissue) and lower concentration in leaves (Wang et al. 2010).

Conclusions. In conclusion, we can say that by-products are raw materials available on a cheap scale and a valuable source of resveratrol. Value to be highlighted and effectively extracted.

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3. Effects of thermal treatments on the biochemical characteristics of spinach and broccoli

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The main objective of this project was to evaluate the effect of blanching by using thermal treatments on biochemical characteristics of two vegetables: spinach and broccoli, and determination of content of bioactive compounds.

The steamed, refrigerated and raw vegetables were analyzed for total polyphenol content (TP) using Folin-Ciocalteu methods. The samples were also evaluated for ascorbic acid content by HPLC and protein through Kjeldahl method, respectively.

The data shows the difference in the vegetables before and after the blanching and refrigerating, also shows the stability of the total polyphenol content to blanching. These changes must be taken into account when assessing the value nutrition of vegetables, but also in their preparation. Thus, the effects of blanching / freezing were studied industrial and conservation of bioactive compounds in the two vegetables: broccoli and spinach. The content in food and mineral fibers was not strongly inflated by the processing heat. However, phenolic antioxidants were much more sensitive and was observed decreases in vitamin C. The results of this research can be used by processing industry and vegetables in the choice of raw materials, the development of procedures and the production of healthy herbal foods.

In conclusion, we determined how the effect of blanching and freezing affect spinach and broccoli, to determine an optimal period of consumption in relation to the benefits they bring to human health through consumption

4. Effect of ultrasound treatment during osmotic dehydration on the main quality properties of wild blueberries (*Vaccinium arctostaphylos* L.)

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Introduction. Wild blueberries (*Vaccinium arctostaphylos* L.) – a unique crop species native to eastern North America, is an economically important fruit crop (Yarborough, 2016). Lowbush blueberries is another name for wild blueberries, while highbush refers to farm grown blueberry plants developed from the wild varieties in the 20th century. Over the last decade, there has been a considerable increase in demand for blueberries, especially for the lowbush ones due to their bioactivity, unique flavor and high nutritional value (Correia et al., 2017, Drózdź et al., 2017, Khalid et al., 2017). Lowbush blueberries contain 83-89% water, 0.4% ash, 4.8-9.4% sugars (fructose and glucose), 0.14-0.6% pectic substances, 1.2% organic acids (lactic, citric, malic, succinic, oxalic and quinic) and 2.2% fiber [2]. Wild blueberries are rich in active substances (vitamin P, C, PP, A, B1, B2). The quality of blueberries can be determined by measuring the antioxidants [1]. Thus, the aim of this study was to investigate the effect of ultrasound treatment during osmotic dehydration on wild blueberries mass and quality parameters (dry matter, water activity, colour). In particular, flavonoids, anthocyanins, polyphenols content and antioxidant activity were analysed.

Materials and methods. Wild blueberries were used in the experiments. The fruits were frozen and at -18°C and was thawed at room temperature ($20\pm 1^{\circ}\text{C}$) before the investigation. Box-Behnken design was used to investigate the effect of process variables (ultrasonic frequency, temperature and time) on physicochemical parameters. A standard solution $61.5\pm 0.2\%$ of sucrose was used for osmotic treatment. The mass transfer was evaluated in terms of weight reduction, water loss and solid gain. Water activity was determined using the device Water Activity Meter AquaLab LITE (Decagon) and colour was analysed using a Chroma Meter CR-400 (Konica Minolta, INC.). Flavonoids, anthocyanins, total phenolic content and antioxidant activity were analysed using chemical and spectrophotometrical methods.

Results and discussion. The ultrasound treatment had a major influence on the main quality parameters (dry matter content, mass transfer parameters, colour, flavonoids, anthocyanins, total phenolic content and antioxidant activity). The results showed that for bioactive compounds extraction the optimal condition were obtained at 40°C , 60 minutes and 100% amplitude.

Conclusions. The amplitude, temperature and extraction time had a positive influence on dry matter content, mass transfer parameters and bioactive compounds.

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5. Analysis of children's nutritional status in the educational institutions of Moldova Republic

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Introduction. Nutrition is the basis for the formation of a healthy generation. The harmonious growth and development of the child is influenced by both: endogenous (hereditary) and exogenous factors (environmental). Among the exogenous factors, rational and balanced nutrition has a decisive role, ensuring good health and contributing to the formation of proper eating habits for the rest of life.

According to the National Food and Nutrition Program for 2014-2020, compliance with the principles of rational and balanced nutrition is a simple and effective remedy for enhancing and maintaining health as well as preventing non-communicable diseases related to diet, malnutrition and nutritional deficiencies. The purpose of this paper is to study and analyze the nutritional status of children and to present food recommendations, prohibitions and model regimes for pre-school children in educational institutions in the Republic of Moldova.

Material and methods. For the researches there have been analyzed the daily rations of 5 pre-school institutions from Chisinau municipality. It was determined the energy value and the content of main macro and micronutrients. It has been determined the content of mineral elements, which have a decisive role in ensuring the proper functioning of the children's body. Their daily intake ensures the efficient functioning of all organs. Thus, the biological value of food products has been estimated, which varies according to the heat treatment and the storage conditions and rationally combining food.

Results and discussions. As a result of the carried out researches it has been established that the contribution of the mineral elements to the daily rates for the preschool institutions analyzed in comparison with the physiological norms is unbalanced, the bioavailability of these elements is low and therefore their assimilation by the body is difficult.

The average iron intake calculated from children's ratios is 17.2 mg Fe / day, which is 95.6% of the recommended intake. But the average total iron content is only 9.66 mg Fe / day, which covers only 53.7% of the recommended standard. Similar research for Ca showed that the mean intake is 661.7 mg Ca/day, which represents 55.14% of the recommended standard. The energetic value rates correspond to the recommended requirements, but the protein / carbohydrate / lipid ratio is unbalanced.

Conclusions. As a result of the analysis of menus from the preschool institutions, optimized food rations were proposed, which would meet the daily needs of Fe and Ca for pre-school children. The Protein/Lipid/Carbohydrate ratio was normalized by modifying some menu preparations, thereby obtaining the required amount of Ca per day, which consisted of 924.6 mg.

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6. Potential Functional Properties of *Curcubita Moschata* and *Curcubita Maxima*

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Introduction. Pumpkins belong to the family *Cucurbitaceae*, a medicinally and economically important plant group [1]. Pumpkins are an important source of fiber and pectic substances, carotenoids, mineral salts (especially potassium) and have low energy value [2]. The purpose of the paper is to analyze the physico-chemical, technological and nutritional potential of pumpkins in order to develop a wide range of functional food products.

Materials and methods. Two varieties of pumpkin – *Curcubita Moschata* and *Curcubita Maxima* from the 2018 harvest were used in the research. The international standard methods of analysis (HPLC, atomic absorption spectrometry, UV/Vis spectroscopy) have been applied for the determination of chemical composition, physico-chemical, technological and nutrition properties of study objects.

Results and discussions. As a result of the researches, the content of pectic substances in two varieties of pumpkin pulp was determined. The pectin content is 0,21% for both pumpkin varieties, but the protopectin value differs for *Curcubita Moschata* (0,25%) and *Curcubita Moschata* (0,54%). Within the mineral composition analyzes of pumpkin pulp, it was determined the content of mineral compounds such as potassium (2,63-6,60 g/kg), zinc (0,77-0,81 mg/kg), copper (0,71-1,86 mg/kg), iron (2,95-13,5 mg/kg), sodium (10,5-80,8 mg/kg), magnesium (132,7-146,5 mg/kg), calcium (211,3-319,0 mg/kg), phosphates (0,183-1,03 g/kg). The study of carotenoids fractional composition in the pulp of analyzed pumpkin varieties showed that the content of β -carotene is 7,33-7,92 mg/100g, lycopene – 8,47-8,89 mg/100g, and zeaxantina – 8,55-8,87 mg/100g. The physicochemical, technological and nutritional properties of *Curcubita Moschata* and *Curcubita Maxima* were investigated, too.

Conclusions. These studies show that pumpkins nutritional content considerably varies in dependence of their growing medium, species and component parts. The results offer the scientific data of chemical composition, technological and nutrition properties of two pumpkin varieties cultivated in the Republic of Moldova and demonstrate the high potential and positive view of pumpkin functional food production. Thus, this research line discovers new interesting possibilities for food industry and requires the application of advanced technologies in agreement with the current demand of healthy products.

Acknowledgments

This work was done in the framework of the Young Researchers Project **06/26.10.18A** "*Functional products obtained by using natural texture agents and carotenoids*", founded by the National Agency for Research and Development of the Republic of Moldova and cofounded by Technical University of Moldova.

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7. PFONATEC Project Design and Interfaces

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Project aim. The development and deepening of fundamental and applied researches with a major impact on food technology, using agri-food sources as natural texture agents and carotenoids obtained by innovative extraction methods in order to apply them in product diversification. The elaboration of "functional foods" with beneficial effects on human body.

Project objectives:

- The obtaining and characterization of natural texture agents and carotenoids from vegetable sources using innovative techniques;
- The functional potential testing of natural texture agents and carotenoids on the quality and shelf life of developed functional products;
- The technology development of functional products assortment producing. Production recipes and technological flow that maintain the native and curative-nutritive characteristics of functional compounds;
- The quality characteristics evaluation of food products obtained by the improvement of their composition with natural texture agents and carotenoids. Safety indices and harmlessness;
- The determination of functional products shelf life. The methodology of shelf life specification;
- The training of young specialists/researchers in the field of biotechnology, technological engineering, food quality and safety by the elaboration of PhD theses.

Methods. Technological, physico-chemical, chemical, biochemical and microbiological methods according to International Standards. Statistical methods, including the analysis of experimental data by means of control charts X-R, S², and other methods.

Expected results. The physico-chemical characteristics of agri-food sources investigated in order to obtain functional compounds. The innovative methods, technological schemes of functional compounds production from local agri-food sources. The samples of functional compounds obtained at a pilot plant. The characteristics of the nutritional, antioxidant and functional potential of obtained samples. Scientific justified production processes and recipes of food products with an improved functional potential. The methods of the shelf-life evaluation of elaborated functional food products.

Relevance. The innovative methods of producing the functional products with natural texture agents and carotenoids. The chemical composition and functional potential of bioactive compounds. Scientific justified processes and recipes for the production of the new assortment of functional products.

Acknowledgments. This work was done in the framework of the Young Researchers Project **06/26.10.18A** "*Functional products obtained by using natural texture agents and carotenoids*", founded by the National Agency for Research and Development of the Republic of Moldova and cofounded by Technical University of Moldova.

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8. Challenge in Diet–Cancer Research

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Cancer is a growing health challenge around the world particularly with increasing urbanization and the subsequent changes in environmental conditions. Cancer is designated as a lifestyle disease because of its association with types of food, nutrition, and body weight. Preclinical and clinical evidences indicate that dietary factors can contribute to human cancer risk and as such many of the cancers common in the developing countries and the western world [2]. Foods causing cancer are refined sugar, canned foods, hydrogenated oils, genetically modified foods, salted, pickled and smoked foods; farmed fish, grilled red meat; soda and carbonated beverages, and white flour. Not only may food components be associated with cancer risk, but cooking methods, the direct impact of food on the human gastrointestinal mucosa, and individual susceptibility to dietary carcinogens can significantly increase cancer risk [1].

American Institute of Cancer Research (AICR) report found evidence that cancer survivors should follow the plant-based diet and physical activity recommendations for reducing risk of cancer. The use of naturally occurring agents with antioxidant and anti-inflammatory properties have been projected globally as rational and pragmatic approach to interfere with the multi-stage processes involved in carcinogenesis [4].

Having a healthy weight creates a biochemical status or “anticancer” environment that discourages cancer growth. A healthy diet rich in whole grains, beans, and a variety of vegetables, fruits; and low in red and processed meat can fight cancer. This type of diet provides vitamins, minerals, and naturally occurring phytochemicals and defends the body against cancer and other diseases. Recently nutraceuticals have emerged as potential cancer preventive natural sources from food that may lead to reduced cell damage, reduced necrosis, cell proliferation. However, the reduced cancer incidence due to phytochemicals and nutraceuticals seems to be hype [3].

The specific role of dietary components, including supplements and chemoprevention, in cancer prevention/protection remains unclear. General recommendations include maintaining a healthy weight, eating fruits and vegetables, whole grains, and limiting consumption of refined carbohydrates and processed and red meats. Potential cancer preventive food-related components should be further researched in clinical trials on different models for their effectiveness and toxicological documentation. Furthermore, extensive research work should be carried out on these components to evaluate their possible applications, toxicological and particular genotoxic profile against a wide range of cancer in both either in-vitro or in-vivo.

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9. Studies regarding the development of an innovative gluten-free black beer

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Introduction. Beer is one of most popular alcoholic beverages around the world. In order to produce it the base ingredients are malt from barley or wheat which can cause problems for persons who suffer from celiac disease [1]. In order to offer the possibility for these persons to consume beer it may be replaced malt from barley or wheat with other gluten-free cereals, such as rice, corn, sorghum, pseudocereals (buckwheat, amaranth and quinoa), cassava, teff, and other carbohydrate-rich ingredients [2,3]. The main objective of this study was to use the acorn flour and Jerusalem artichoke, a non gluten flours in order to obtain beer similar in aroma, taste and mouthfeel to black beer obtained through traditional ingredients.

Materials and methods. Under laboratory conditions, black beer was obtained according to a conventional method used for obtaining brown beer. In the manufacturing recipe, brown malt has been replaced with acorn flour and Jerusalem artichoke flour. It is also been used in our recipe a 10% molasses content of 50% sucrose to increase the raw beer extract. For fermentation was used of 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 process, the beer was analyzed from the sensorial and physicochemical point of view in accordance with the standard EBC-methods.

Results and discussion. Several variants of the finished products have been developed in order to optimize the sensory and physico-chemical characteristics of the samples. The biggest problem in our technological process was the mash filtration in order to obtain the wort. The mash filtration problem encountered may be resolved by using of novel combinations of industrial visco-enzyme preparations [4]. Colour, pH, viscosity, total soluble nitrogen, free amino nitrogen, apparent fermentability and alcohol concentration of beer samples analyzed using the EBC – methods were in the standard values for black beer. The sensory analysis were unexpected ones, the non gluten beers obtained being very well appreciated, the panelists preferring them over classical black beers made from traditional ingredients.

Conclusions. The gluten-free flours such as acorn and Jerusalem artichoke flour were suitable as raw materials for the manufacture of black beer which is recommended for people suffering from celiac disease. The objective of this study to develop innovative black beers made from acorn and Jerusalem artichoke flours was achieved. The analytical data for the black beers obtained with the acorn and Jerusalem artichoke flours were comparable to classical black beers, which acted as a control sample in our study.

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10. Use of industrial hemp seeds

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Introduction. Thanks to the natural composition the industrial hemp seeds are considered a source of a huge number of valuable elements, minerals, vitamins and essential fatty acids. Hemp seed contains 30,2-38,3% lipids, 17,6-25,1% protein, 13,8-26,9% cellulose, 2,5-6,8% ash. The main value is the presence of polyunsaturated fatty acids such as linoleic Ω -6 (54.31-57.20%) and linolenic Ω -3 (12.09-14.75%) in the ideal ratio for human body. These substances are not synthesized in the body, but come only from food.

Materials and methods. Analysis, synthesis and systematization of the results of the own scientific research and scientific-technical and patent bases in relation to the existing ways of industrial hemp seeds use.

Results. Until recently, the main product of hemp seeds was an oil that has a special color and taste. Hemp oil is consumed both in pure form and in the manufacture of various food products (sauces, pastes), cosmetic (soap, creams, masks), technical (drying oil, paint) products, etc. The benefit to humans is only the first cold spray oil - a method that ensures the preservation of all nutrients, fatty acids, microelements. The oil obtained in this way is also called "raw" because it quickly spoils.

After squeezing from the grain of the oil, an accompanying product is enriched with protein and fiber - an oil cake, from which, in the process of further processing (shredding, separation), flour, bran, and protein are produced.

The prevalence of eating a shelled hemp seeds (hemp hearts) is being spread. The product in the form of a shelled core is interesting in that it is easily absorbed by the body, does not contain digestible substances, characterized by rich content of nutrients, has a pleasant nutty taste.

Another way is the use of hemp seed in its natural form, as a rule, it is the use of seeds in food, fisheries, poultry farming.

The Institute of Bast Crops NAAS has developed a number of technologies for the processing of industrial hemp seed, which allows the product to be obtained in the form of oil and shelled seeds in accordance with technical requirements and standards. Due to the low level of initial investment, low labor input of the production process, wastefulness of production, these technologies will be of interest for farms that are beginning their development in the industry and are looking for ways of processing and using the seeds of the crop.

Conclusions. Due to its unique technological properties, the range of products from seeds of industrial hemp is expanding, and new non-traditional uses are emerging. Existing processing technologies, at the expense of waste production, allow to use hemp seeds with maximum efficiency.

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11. Perspectives of the use of red palm oil as a functional component

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Introduction. Fats are an integral part that should be present in everyday diet of each person. Palm oil - one of the most responsible types of oils in the food industry of the world. It is the basis for the production of many foods - margarine, mayonnaise, baby formula, ice cream, bakery and confectionery. In recent years, palm oil by volume of world production has taken the second place (25 million tons) after the soy oil (29 million tons), while there is a tendency to further develop its production.

Materials and methods. The purpose of the research was to assess the prospects and feasibility of using red palm oil for the production of food products. The object of the study is red palm oil, in particular "CAROTINO". In order to achieve this goal, the general scientific system approach, as well as the analytical method of research and the method of continuous sampling were used.

Results and discussion. African oil palm (*Elaeis guineensis*) is grown in Malaysia and Indonesia near the equator, and is a powerful tree with a thick trunk of 10-15 meters in height crocheted with arched pierced leaves 6-7 meters long. In its axils inflorescences are formed in the form of large bunches. Each inflorescence gives about 2000 fruits, which resemble a small plum in size. The weight of one such bunch is from 10 to 30 kg or more. The fruit of the oil palm is represented by a bone immersed in the pulp - mesocarp, the color - orange, purple.

In Malaysia, red palm oil is produced using a specially patented technology using physical methods for the processing of raw palm oil without chemical processing, which allows the preservation of biologically active matter (BAM).

The use of red palm oil as a food ingredient promotes the absorption of useful substances, activates liver enzymes, enhances the oxygen saturation of red blood cells, improves blood circulation and memory.

The feature of red palm oil is the presence of carotenoids in it, which are precursors of vitamin A, which is found only in animal fats. The provitamin A-carotenoids are concentrated near the fetal bone and carry antioxidant properties, protecting the human body from cancer and heart disease, and the accumulation of cholesterol on the walls of the vessels.

It is also marked by the content of the group of tocopherols and coenzyme Q10. Vitamin E plays an important role in the development of the immune system.

The CAROTINO red palm oil, which has a natural healing effect, is obtained from the pulp of the fruit surrounding the palm tree seeds by crystallization at a regulated temperature to obtain a liquid fraction of palm olein and solid palm stearin.

Note: * - the data is presented according to the manufacturer's information; ** - the data of scientific literary sources.

Conclusion. Thus, the use of red palm oil "CAROTINO", obtained by innovation technology, in the recipe composition of food products, in particular for health use, is appropriate in terms of providing preventive orientation and achieving a technological effect.

12. Introduction of germinated wheat seeds as enrichment of biological value

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Introduction. Changes in the structure of consumer demand due to socio-economic factors, the desire to minimize the time of cooking at enterprises of food and at home, the growth of demand for products of plant origin with a reduced amount of fat, sugar, but with high content of dietary fiber, vitamins, minerals and other biologically active substances are the main prerequisites for the development of functional food products and the search for new raw materials that meet current needs.

Materials and methods. The purpose of the conducted research was to assess the prospects and feasibility of using the biologically active substance of the plant cell. The object of the study is sprouted wheat grains. In order to achieve this goal, the general scientific system approach, as well as the analytical method of research and the method of continuous sampling was used.

Results and discussion. Much of our diet consists of seeds - these are cereals, beans and others. Seeds in their composition in significant quantities contain "building material" for future plants: mainly it is starch, proteins and fats. In the process of germination of seeds in them there are sharp changes: starch turns into malt sugar, proteins on amino acids, and fats in fatty acids. The same thing happens when digestion of food in the body. It turns out, most of the work in the sprouted seed has already been completed. Moreover, vitamins and other useful elements are synthesized, energy is accumulated, and all forces are mobilized to throw all this energy on the development of the plant.

Germinated wheat grains are considered one of the best natural and readily available additives. Specialists recommend the inclusion of germinated wheat in the diet, as it contributes to the strengthening of immunity, improves the functioning of the gastrointestinal tract, releases the body from slags and toxins. This is supported by a unique chemical composition.

Wheat sprouted contains: vitamins E, C, D, PP, B, fatty acids, 8 essential amino acids and 12 substitutes, soluble and insoluble edible fibers, minerals (potassium, magnesium, silicon phosphorus, iodine, calcium, iron, chromium, manganese, selenium, zinc, copper, sodium). Grains with sprouts 1-2 mm contain the highest concentration of biologically active substances.

In comparison with ordinary (dry) wheat grains, sprouted grains have a more balanced and valuable composition:

Conclusion. Thus, sprouted grains of wheat, as well as of other grains, are a powerful stimulant of the vital functions of the body and of beneficial food. Using seedlings of plants, a person receives nutrients in the most accessible form, an active enzyme system of plants, macro- and trace elements and a huge amount of vitamins-antioxidants. All this complex of useful substances is organically built into the living tissue of the plant and is in balanced quantities and proportions. Such a rare combination of useful properties of a given product determines its ability to turn people into true health.

13. Junk food and students' eating habits

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Introduction. Students usually think little about their diets. They want to eat, have a rest and do it as quickly as possible. The fastest option for food is junk food. These are products high in calories, which have little or no biological value but do have plenty of fats and sugar. Simply said, a food that provides empty calories.

Materials and methods. A survey has been conducted among students. The survey questions have been focused on the determination of preferences, most commonly consumed foods and problems and their causes in the field of students' eating habits. The respondents also shared their thoughts and ideas on the topic.

Results and Discussion.

People have different ideas of what a proper diet is. The notion of 'healthy' is perverted – in general, these are dietary regimens (certain dietary restrictions; often inadequate diets, which are used not to improve health but to reach some proper cosmetic or esthetic goals set by their advocates) or foods unaffordable for youth because of their cost.

Desserts, sweets, fast food, alcoholic beverages, salty snacks, sweet drinks - unhealthy food, which accounts for about 25% of the total calories consumed per day.

A few years ago, various social media have initiated latent promotion of healthy lifestyle with the greatest emphasis made on the diet. After watching a video, photo, or reading text on the topic of proper and healthy eating, the majority people think "maybe I should try it also?" Usually, the first thing to start with is the search for healthy recipes or places where you can eat such foods. It is much easier every year to find a catering facility with menu offering healthy dishes. Catering establishments in Ukraine have started to develop; there have been opened many new cafes and restaurants focused on the improvement of eating habits of Ukrainians.

Up to 90-100% of all dishes served in student canteens are unhealthy. If you want to have a snack – there is a wide variety of pies, sandwiches, cakes. There are many kiosks nearby educational buildings, which offer fatty and high in calories foods. All such kiosks aim at getting regular customers, drawing their attention with great taste and "illusive" nutrition. Consumption of these types of foods can subsequently lead to the critical increase in body mass index and cause various health problems.

Due to a lack of time for cooking, students buy ready-to-eat food, which only needs to be defrosted, heated or can be consumed immediately. Defrosted foods have less nutritional value and decay rather than digest well.

Commercials contribute to heightened interest to unhealthy foods. We are offered to buy ready meals. This strategy is beneficial for food producers: they gain big profits with high demand for their products.

Conclusions. The fast pace of modern living and various factors prompt young people to eat foods, which have no nutritional value. Such eating habits are associated with many detrimental health effects, but at the same time, they are convenient, as one can have a snack on the run and save time and energy for cooking; that is why the preference is given to unhealthy foods. The impact of lifestyle and food is invaluable. Social media, opinion leaders, advertising are driving forces in shaping the attitude of youth to health.

14. Nutrition problems of Ukrainians and recommendations for preventing them

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Introduction. The health situation in our country becomes worse every year. The death rate is increasing, while birthrate decreases. It is influenced by some factors, such as ecology, economy and development perspective in the country, the condition of the environment and others. Unfortunately, we are unable to influence for biggest part of these, but there is one thing that everybody can control and this thing is in the worst condition. It's our nutrition.

Materials and methods. According to the Ministry of Health of Ukraine, human health depends for 70% from the nutrition. Scientists proved that irrational nutrition significantly influences for lifespan causes to appearance of non-infectious diseases: cardiovascular, oncological, diabetes, metabolic disorders. Unfortunately, today this problem has become the main challenge for the Health Care System in Ukraine. Diabetes, cancer, cardiovascular diseases, chronic respiratory diseases cause more than 2/3 of the total diseases and near 86% of deaths in Ukraine.

Results and discussion. Below you can see the results of deterioration of the food habits for the last 10 years. Significant excess of daily food norm: oil – 176%, potato – 148%, bread – 123%, sugar – 130.5%. Low consumption of animal origin products: meat – 37% , milk – 34%, fish – 80% (lower than norm). Increasing of the fat components for 40 – 48%, which is causes to cardiovascular diseases. The lack of microelements in a daily ration is called microelementosis. According to physicians, the population of Ukraine feels deficiency of elements, such as iodine, iron, calcium fluoride, selenium.

First of all, you need to reduce the using of fat food, food with a lot of sugar, cereal products. Also, you have to consume enough vitamins and minerals. It's important to provide enough proteins, fats and carbs. Daily norm of protein is 1-3 grams per body weight kilogram, carbs are 2-4 grams, fats are 0.5 – 1.5 grams. A very important parameter is the level of water and the level of pH in human body. Because of this a lot of people have weak immunity, bowel diseases and even cancer. The norm of pH in the blood plasma is 7.4. For escaping a dozen of diseases you have to consume more fresh vegetables and fruits, but they mustn't be heat treated.

Conclusions. The problem of nutrition is very important and we have to solve it, because it can turn into the problem of a state scale. A lot of people suffer from difficult diseases, but the main problem is caused by their nutrition habits. The society has to know about this problem and understand the ways of it's solution. The life of each person and our country depends on it.

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15. Study regarding the mineral elements of *Choiromyces meandriformis*

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Introduction. *Choiromyces meandriformis* (syn. *Choiromyces venosus*, also called the white truffle) is an edible mushroom that is considered to be widely spread in the surrounding Carpathian Mountains. Gastronomic value of this truffle was considered differently through Europe as it is thought to be toxic in France and Italy but collected and used as valuable spice in Sweden, Germany, Russia and Hungary. Nutritionists do not recommend eating raw truffles, only cooked because of their acidity, that in some cases can cause stomach irritation.

Materials and methods. The *Choiromyces meandriformis* samples used in this study were harvested from a forest near Suceava, Romania in June 2018. The content of mineral elements was performed with a mass spectrometer with inductively coupled plasma, (ICP-MS) Agilent Technologies 7500 Series (Agilent, USA). Also was determined the ash content of the samples by igniting previously dried sample in a muffle furnace at 600°C for 6 hours.

Results and discussion. The aim of this study was to determine the mineral elements from the *Choiromyces meandriformis* and the content of total ash to determine if the toxicology of this truffle comes from the content of mineral substances.

The mineral composition resulted in this study is similar to the majority of mushrooms. The high quantity of sodium (226.54 mg/kg), magnesium (197.08 mg/kg) and calcium (155.34 mg/kg) together with other essential elements like copper (51.52 mg/kg), manganese (9.12 mg/kg), and zinc (12,5 mg/kg) allow us to consider that these are an excellent source of bioelements.

Concentrations of some other microelements such as Cd, Al, Cr, As, Pb, Hg and Sr are under 1 mg/kg or under the detectable limits, that it has no toxicological risk for us.

Ash content for the truffle samples were relatively low 1.49%, respectively 1,72% reported on the other studies.

Conclusions. The results obtained in this study demonstrated that the samples analyzed of truffle *Choiromyces meandriformis* have not toxicological risk for the human body and in the future will study another compounds and their influence on the human health.

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16. Influence of sugar profile in texture of honey

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Introduction. Honey is a sweet substance, naturally produced by the transformation and processing of the nectar of the bees or dew, which are stored in the cells of the honeycombs.

Materials and methods. Different honey assortments, from different areas, purchased from authorized local producers were analyzed. Reagents used were purely analytical from Chempur, Chimreactiv, Fluka, Lachner, Merck, Scharlau, Sigma-Aldrich. The methods of analysis used are part of the quality standards in force.

Discussion. Honey is a complex of compounds. Of these components, an important place is occupied by the carbohydrates due to the fact that it is in the highest quantity compared to others components as the water, amino-acids, mineral substances etc. Honey is a supersaturated solution of sugars that exceed 70% while water is less than 20%. The two main sugars, fructose (30-44%) and glucose (25-40%), which together exceed 70%, influence the ability of honey to crystallize through their ratio. Glucose tends to crystallize due to its low water solubility (909g / l at 25°C), while fructose is 4.4 times more water soluble (4000g / 25°C) and dissolves in solution.

Conclusions. The parameter values resulting from the research study are in accordance with the legislation in force. The results obtained from the statistical analysis show that the sugar content of honey directly influences the texture characteristics.

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17. Determination of moisture honey with a refractometer

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Introduction. Optical methods are a powerful tool for food research. Humidity is one of the most important parameters of the quality of bee honey. Without determining the humidity of honey it is difficult to determine mature honey or not.

Materials and methods. In this paper, a method for determining the moisture content of honey through the use of a portable refractometer is illuminated. For analysis, samples of honey were obtained on an apiary located in the Kyiv-Svyatoshinsky district, Kyiv region, during June-August 2018.

Results and discussion. Honey is an extremely valuable and health-improving product. Honey is well known and popular in many countries of the world. It is widely used not only as a food product, but also in medicine and cosmetology.

Honey is the substance that bees produce on the basis of nectar. Making honey is a very complicated process that is performed only by bees. The essence of this process is the harvesting and processing of nectar. The process of honey production includes the evaporation of moisture and the processing of nectar by enzymes. Most of the water evaporates on the first day. In a laboratory or in a production environment, the water content is determined by the refractometric method, or by means of a pycnometer, an aerometer, and sometimes by drying.

An important characteristic of honey is hygroscopicity - the ability to absorb and retain water. Hygroscopicity of honey depends on its maturity, humidity and storage conditions. In a damp room, its upper layers absorb moisture well, and then retain it. When stored under such conditions, the honey begins to acidulous. The water content significantly influences the quality of honey. An increase in the proportion of water more than norm causes the activity of yeast and stimulates the processes of fermentation. In the process of fermentation of glucose and fructose in honey under the action of yeast decompose, forming alcohol and carbon dioxide. Subsequently, the alcohol is oxidized to acetic acid. This process necessarily leads to a significant deterioration of taste and causes an unpleasant smell. According to international quality standards, moisture content of honey should not exceed 21%.

Beekeepers often determine honey moisture using a portable or laboratory refractometer. In the case of a portable refractometer, a honey sample is taken from the hive using a glass or plastic stick directly in the apiary while collecting the honey. A few drops of honey are placed on the main prism of the device. Then the beekeeper closes the prism with a protective glass so that the surface of the prism is evenly covered with honey. After half a minute, the refractive index is measured.

In this work, honey was studied in a laboratory using a refractometer by measuring the refractive index of the fluid. It was found that in the case of the samples studied, the water content for acacia honey was 15.0%, for linden honey 16.2%, for polyphoric 16.6%. These figures confirmed the high quality of the food product obtained.

Conclusions. Investigations by refractometry of various samples of honey derived from the apiary placed in the Kyiv region during 2018 showed that the water content in them does not exceed 15 - 17%, which corresponds to high standards of quality.

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18. Influence of chemical parameters in honey crystallisation

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Introduction. Honey is one of the most important bee products of bees. The raw material they use for honey bees is spontaneous flora and that of culture. This diversity determine the variety of honeys which are on the market. Crystallization of honey is a natural process and guarantee of authenticity.

Materials and methods. More samples of honey of different floral origins were used for the physico-chemical and microscopic analysis. Reagents used were purely analytical from Chempur, Chimreactiv, Fluka, Lachner, Merck, Scharlau, Sigma-Aldrich. The methods of analysis used are part of the quality standards in force.

Discussion. Honey is a complex of compounds. Of these components, an important place is occupied by the carbohydrates due to the fact that it is in the highest quantity compared to others components as the water, amino-acids, mineral substances etc. In addition to carbohydrates, honey also contains water, enzymes, amino acids, vitamins, minerals, volatile substances, polyphenols and fatty acids. Dry substance of honey is composed of 95% carbohydrates, the most representative of which are glucose and fructose. Less glucose than fructose in honey makes honey to become liquid. The Fructose / glucose ratio is a quality index and shows the ability of honey to crystallize.

Conclusions. The parameter values resulting from the research study are in accordance with the legislation in force. Chemical composition and physical parameters such as the texture profile have influenced the crystallization process.

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19. Application of the method of differential scanning calorimetry in the oils and fats quality study

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Introduction. Differential scanning calorimetry (DSC) is an important part of the research methods for oils and fats. This method provides information on the temperature and heat of phase transitions, thermal and oxidative stability, and so on.

Materials and methods. The research used sunflower oil refined deodorized chilled and fried beef fat. Sunflower oil in its original form and its mixture with beef fat were investigated by the DSC method, the corresponding DSC-grams were obtained and thermal effects of phase transformations were determined using TA Universal Analysis software package.

Results. The individual sunflower oil and its mixture with beef fat (the concentration of beef fat is 20%) is investigated by DSC method. Thermal effects of melting and crystallization have been investigated in the temperature range (50 ... + 75) °C. The analysis of the obtained data shows that as a result of the introduction of beef fat into sunflower oil, significant changes are made in the parameters values of melting and crystallization. For example, the temperature of the maximum crystallization peak for the original oil is -18.76 °C, and for the mixture with a mass fraction of beef fat of 20% this value is -9.72 °C. This suggests that the DSC method can be used to determine the presence of certain impurities and, as a consequence, the facts of falsification of the products of the fat-and-oil industry. In this case, the difference in the melting and crystallization temperatures of the components of the mixture is used.

As it is known, fatty systems and their components differ in temperature behavior that can be monitored using DSC. For example, the DSC method allows you to set the start and end of the melting process of fat, which is extremely important for confectionery and margarine products. This approach can be used to detect the presence of certain components in oils or fats.

Conclusions. It has been determined that with the introduction of a foreign impurity to sunflower oil, the characteristics of melting and crystallization significantly change, which indicates the possibility of using the DSC in the study of oils and fats composition and quality.

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20. Creation of standardized, innovative drinks of therapeutic and prophylactic action with the addition of pectin

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Introduction. The beverage industry is demonstrating a constant increase in production, the appearance of new products on the market. In the assortment of soft drinks of therapeutic and prophylactic action, more attention is paid to beverages enriched with pectin substances.

Materials and methods. Technological recommendations have been developed using high-methoxylated fast pectin with DM (Degree of Methoxylation) more than 50%, and low methoxylated pectin with DM less than 50% in beverages with low juice content, as well as in beverages with sweeteners to restore the density and fibrous properties of beverages.

Results and discussion. As a result of research of raw materials for the production of pectins, namely citrus peel (lime, lemon, orange peel), it was established that the quantity and quality of pectins depends on ripening conditions, degree of ripeness and drying conditions of the peel. Extraction processes also affect the quality and quantity of pectin: extraction is a tradeoff between the total amount of extracted pectin and its quality.

Pectin is a water-soluble fiber that is added to the product to impart a sense of viscosity in the mouth, improve structure, fullness and enhance the taste, especially citrus drinks. Highly methoxylated pectin forms a gel at a high temperature and gives a quick cage. Because of these qualities, he received the name "fast pectin".

The main component of pectins is galacturonic acid, which belongs to the family of sugars. Several hundred molecules are joined together to form a long chain of polygalacturonic acid molecule. Parts of the galacturonic acid molecules are methoxylated and the number of methoxy groups affects the properties of pectin. The "degree of methoxylation" or DM (Degree of Methoxylation) is the average number of methoxy groups per 100 acid groups.

Pectin 70% DM is investigated - a product where 7 out of 10 acid molecules have a methoxy group. Like most hydrocolloids, it is very hygroscopic and therefore completely soluble in water in comparison with low methoxylated pectin, which dissolves in water longer and forms lumps. These lumps can be dry inside, and the outside is a swollen, hydrated shell that is not easily destroyed.

When using highly methoxylated pectin in a beverage technology, it is first dissolved in water using a stirrer at a high rotational speed, or the mixture of pectin and sugar is introduced with stirring into water at a temperature of 70-80 ° C, brought to a boil and cooled. Use pectin solution immediately and completely in order to avoid a subsequent decrease in the enzyme or chemical reaction. Storing a solution of pectin is not only economically disadvantageous, but also affects the quality of the finished product, reducing the resistance of the gel.

Conclusions. We propose to use high methoxylated pectin with DM in excess of 50% in the production of beverages, as compared with low methoxylated pectin it has a more transparent color of the solution, more dissolving time in the solution, but more expensive. Pectin is genetically unmodified. The results of clinical research also show the effectiveness of the use of pectins in diseases associated with impaired lipid and hydrocarbon metabolism: diabetes, gastrointestinal diseases, liver disease, etc.

21. New flour nutrient substrates for microorganisms of acid-forming liquid ferments in baking

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Introduction. The production of bread from rye flour and mixture of rye and wheat flour involves the use of acid-forming liquid ferments, which are based on a symbiotic growing biomass of yeast and lactic acid bacteria. Dynamics of development of these microorganisms, their qualitative and quantitative composition and activity play a leading role in the technological process of preparation of the finished product, the formation of the basic consumer properties (taste and aroma substances, structure, etc.).

Materials and Methods. Conventional methods for the baking industry have been used in research. Flour nutrient substrates were research materials.

Results. Currently, the bread-baking enterprises to obtain the necessary considered as the quantitative and qualitative composition of microbial biomass acid-forming liquid ferments used nutrient mixture. Their basis is the starchy flour raw material, which showed no significant change. This affects the formation of a certain amount of biomass of microorganisms only at the first stage of the process. In subsequent repeated preparation of the acid-forming liquid ferments, the use of such nutrient mixture leads to significant changes not only quantitative, but also qualitative composition of microorganisms, which affects consumer properties of the finished product. The situation is significantly exacerbated by permanently changing the cooking duration acid-forming liquid ferments, due to their technology, and a varied assortment of bread. This leads to the need of highly skilled operational reorientation of the technological process, otherwise an increasing proportion of defective products.

To get the biomass of yeast and lactic acid bacteria with a stable, predetermined output and activity needs to implement new approaches. The most effective and easily implemented this approach in the food industry include the targeted partial degradation of biopolymers of flour raw materials, incorporated into the nutrient mixture, with simultaneous or subsequent introduction of bioactive plant ingredients of natural origin.

Conclusions. Thus, the development of scientific approaches to optimization of structure and composition of the nutrient mixture will allow you to model the life cycle of microorganisms to obtain them with a set of quantitative and qualitative composition as needed. In practical implementations this will ensure the stability of the technological process of production of bread from rye flour and mixture of rye and wheat flour, will increase its consumer properties, enhance functional orientation, will reduce the consumption of raw materials, labor and energy.

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22. Effect of hemp flour addition on dough rheology and wheat bread quality

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Introduction. Bread is one of the most consumed food product from the world, being a fundamental source of the nutrients for the human body. Nowadays, it is an increasing demand of bread products enriched with different functional ingredients in order to obtain healthier products with a good quality from the technological point of view [1]. In the last few years, it has become very popular to obtain bakery products with different oilseeds, pulses, pseudo-cereals, e.g. addition [2]. One of these valuable ingredients is hemp flour (*Cannabis sativa L.*) which is a rich source of proteins with a high biological value. Also hemp flour is a rich source of polyphenols and minerals as phosphorus, potassium, magnesium, calcium, sodium, iron, sulfur and zinc [1,3]. For these reasons, the use of hemp flour as functional ingredient in bread at different substitution levels in wheat flour on dough rheological properties and bread quality were studied.

Materials and methods. White wheat flour of type 650 obtained from S.C. Mopan S.A. Company (Suceava, Romania) were used. The wheat flour was partially substituted by partial defatted hemp flour to a level of 0%, 5%, 10%, 15% and 20% addition. The dough mixing properties of the different wheat /hemp flour blends were studied using the Alveo-Consistograph device (Chopin, Tripette et Renaud, Paris, France) and the dynamic rheometer (Termo-HAAKE, Karlsruhe, Germany). The bread physical properties porosity, elasticity, loaf volume were determined according to Romanian standard SR 91:2007, the bread colour characteristics were analyzed with Konica Minolta CR-700 colorimeter, the textural properties were determined with the Perten TVT 6700 texture analyzer and the bread sensory characteristics were analyzed with a preferential method by a 9 point hedonic scale.

Results and discussion. From the rheological point of view, the dough samples with hemp flour addition presented higher viscoelastic solid properties. From the technological point of view the hemp flour influenced the color of the bread crumb make it darker and increased in a significant way the hardness value of the bread samples. At a high level, the addition of hemp flour decreased the loaf volume, porosity and elasticity whereas from the sensory point of view up to 10% hemp flour addition the bread samples were well accepted by the consumers.

Conclusions. Partially substitution of wheat flour with hemp flour leads to breads samples with a higher nutritional value, darker color, and good technological and sensory attributes which make them sustainable for bread making consumers.

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23. Empirical and dynamic rheological properties of wheat flour dough as influenced by grape peels addition

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Introduction. Grape peels are a high quality winemaking by-product in terms of nutrients and bioactive compounds which might be useful to enhance human nutrition and/or health. Due to their potential (Rondeau et al., 2013), grape peels can be used whole as ingredient or for food product development. In bread making, grape peels flour (GPF) can be added in mixture with white wheat flour (WWF) to improve the nutritional quality of the refined wheat flour. GPF addition influenced dough rheological properties and final product quality.

The aim of this study was to analyze the effects of GPF at the addition level of 3, 5, 7 and 9% and different particle sizes ($L > 500 \mu\text{m}$, $200 \mu\text{m} > M > 500 \mu\text{m}$ and $S < 200 \mu\text{m}$) on empirical and fundamental dough rheological properties of wheat flour.

Materials and methods. GPF from red grape pomace at different addition levels (3, 5, 7 and 9%) and different particle sizes ($L > 500 \mu\text{m}$, $200 \mu\text{m} > M > 500 \mu\text{m}$ and $S < 200 \mu\text{m}$) was blended with WWF of 480 type. Dough tenacity (P), extensibility (L), configuration ratio of the curve (P/L) and baking strength (W) were measured with the Alveograph and the dynamic rheological properties, in terms of storage (G') and loss (G'') moduli, and loss tangent ($\tan \delta$) were achieved with HAAKE MARS 40 rheometer. The dynamic rheological properties were determined within the linear viscoelastic region of wheat flour dough at a constant stress and during heating from 20°C to 100°C at the rate of 4°C.

Results and discussion. The results obtained for Alveograph parameters showed remarkable changes of the dough tenacity and of extensibility with GPF addition level and particle size increase. According to the data obtained for dough viscoelastic behavior during the temperature increase both moduli decreased initially and then increased up to gelatinization temperature after which they decreased again with a magnitude influenced by particle size and addition level.

Conclusion. Different levels and different particle sizes of GPF added as ingredient in bread dough varied remarkable the rheological properties, showing the presence of some interactions between compounds of GPF and WWF.

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24. Technology of hardtacks based on ancient wheat varieties

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Introduction. In recent years, the consumer demand for hardtacks is increasing, due to the growing popularity of these products, as universal snacks in the hectic city life. In connection with this the expansion of the range of such products with high nutritional value is relevant.

Materials and methods. The subject of the study were hardtacks based on dispersed hulled wheat grain and control samples based on dispersed modern cultivated wheat grain. In conducting the research, common methods for determining the quality of flour products were used [1].

Results. The literature review has shown the potential of the hulled wheat grain usage in the technology of the flour products with low moisture–hardtacks. Due to its specific chemical content this ancient wheat variety can be included in the recipe as a source of nutrients for enriching the composition of the baked goods. It is known that the hulled-based products are easily digestible and have slightly higher protein content than modern wheat, and can be tolerated by those with wheat allergies [2,3]. In the same time, the usage of whole cereal grains in the hardtack's technology with high nutritional value leads to the minimization of food waste.

The obtained results have shown that replacing modern cultivated wheat with ancient variety of wheat improves physical and chemical quality characteristics without changing the organoleptic indexes. It is found that the product's ability to water absorption for hulled wheat sample has increased by 10 % compared with the control. This is due, probably, to the higher gas production in yeast semi-finished products with ancient crop during the dough maturation (30 min). It is known that in a short period of yeast-containing dough's fermentation the usage of hulled wheat grain leads to the active progress of this process [2]. It is important to note the positive effect of proposed wheat variety on nutritional value of finished products. The results indicated that adding of dispersed hulled wheat grain in the recipe of hardtacks leads to the increasing of the protein content by 3,6 %, ash–12,1 % compared with control. The energy value of hardtacks based on ancient crop was decreased by 3 % due to the lower content of fast carbohydrates in its content.

Conclusions. Thus, the complete replacement of the modern cultivated wheat with ancient wheat variety – hulled wheat provides the development of the sustainable baked goods with low moisture content and high nutritional value at the same time.

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25. Use of food additive Shelfri Bakery in bread making

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Introduction. Bread is one of the most important staples belonging to the food with short-term storage. During its storage there occurs quality deterioration, which is due to the staling process and microbiological spoilage. One of the ways to avoid undesirable changes in bread quality during storage is to use food additives.

Materials and methods. Food additive Shelfri Bakery (Company Gelenova Group S.u.I., Italy) was used in the study. The object of the research was dough and wheat bakery products made by sponge dough and straight dough procedures. Quality assessment of dough and finished products was carried out using conventional methods in 3-5 replications.

Results. During the studies analysis was done in the composition of the food additives used at the baking enterprises of the Republic of Belarus to extend shelf life of the products. Natural ingredients in the composition of the food additive Shelfri Bakery were found to be its main distinguishing feature.

Food additive Shelfri Bakery was introduced into the dough in the dosage from 0.5 to 2% by flour weight with an interval of 0.5%. The results of the study showed that introduction of the food additive Shelfri Bakery in all samples increased dough acidity, while moisture content of the dough remained unchanged. The dough was characterized by good aeration, had a grid-like structure and sufficient volume.

It was also observed that by adding 1.5% of the food additive Shelfri Bakery to the weight of flour, organoleptic (appearance, color, taste, smell, crumb state) and physico-chemical (porosity, specific volume) indicators of the quality of the finished products were slightly improved compared to the check sample. It should be noted that the introduction of the food additive affected baking losses in the finished product which decreased 2 % against the check sample.

Wheat flour products were analyzed in terms of their shelf life. As for quality indicators (crumbling, swelling properties, amount of bound moisture), it was found that the introduction of the food additive Shelfri Bakery in the amount of 1.5% can increase the shelf life of wheat products by 1.5 times. The first signs of wheat products staling appeared on the 3rd day of storage (guaranteed shelf life of 36 hours). Wheat flour bakery products made with the introduction of the food additive Shelfri Bakery were not susceptible to molding (mold was not detected at visual examination) for 6-7 days.

Conclusion. According to the results of the studies there was found an optimal dosage of the food additive to be introduced. It amounts to 1.5% by flour weight. The results obtained make it possible to recommend the food additive Shelfri Bakery in the optimum dosage for making wheat flour products with long-term storage.

26. Optimization of grape seeds particle size and flour replacement in white wheat flour dough

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Introduction. Refined wheat flour has a lower nutritional value compared to whole wheat. Grape seeds, as rich source of nutrients (Mironeasa, 2017) can be added in white wheat flour (WWF) at different levels and particle sizes in order to improve their nutritional quality. Particle size and addition level are decisive parameters which influence inherent dough rheological properties which can be measured using as instrument the rheometer. Response surface methodology (RSM) is a statistical technique applied for formulations or processes optimization. The aim of this study was to establish the optimal particle size and addition level of grape seeds flour which can be added to WWF in order to obtain the best viscous and elastic character of composite flour dough expressed as storage (G') and loss (G'') moduli, complex shear modulus (G^*) and loss tangent ($\tan \delta$).

Materials and methods. WWF of 480 type was partially replaced with grape seeds flour (GSF) from white grape pomace at different addition levels (3, 5, 7 and 9%) and particle sizes ($L > 500 \mu\text{m}$; $200 \mu\text{m} > M < 500 \mu\text{m}$ and $S < 200 \mu\text{m}$). The rheological parameters were determined with a dynamic rheometer HAAKE MARS 40 (Thermo-Haake, Karlsruhe, Germany). The influence of the two factors, particle size (at 3 levels) and addition level (at 5 levels) on the response variables G' , G'' , G^* and $\tan \delta$, measured at 1Hz frequency in the linear viscoelastic region of dough, was investigated using the RSM and full factorial design through the Stat Ease Design Expert 7.0.0 software package (trial version).

Results and discussion. The factors and responses investigated were fitted to the polynomial response surface model. The obtained models were adequate due to the satisfactory level of R^2 . The optimization of multiple responses simultaneously by using Derringers desirability function (D) was carried out to obtain the optimum level of the independent variables. At the optimal GSF addition level of 4.24 % and of S ($< 200 \mu\text{m}$) particle size was obtained the desired responses.

Conclusion. RSM was an adequate statistic tool to model the influence of addition levels and particle sizes on dough behavior. The grape seed-wheat composite flour containing 4.24% GSF of S ($< 200 \mu\text{m}$) particle size is the best mixture to obtain good viscoelastic dough properties which are very important for the final product quality.

Acknowledgements

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27. Reducing the glycemic index of bakery products by using non-bakery flour

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Introduction. Human health largely depends on diet. The bakery products are main part of the nutrition population. In addition, the structure of nutrition is characterized by reduced consumption of most dietary products, while the use of a large number of simple carbohydrates increases with each passing year.

Materials and methods. The dough was made from whole grain rye flour, wheat flour, dry leave of Stevie, margarine, water extract of Stevie. To optimized recipe formula due to the glycemic index of bakery products, the central composite design was used in the study where three independent variables were selected. GI were calculated by formula. Sensor evaluation was made by experts. Analysis, optimization and response surface graph preparations were conducted with Design Expert 11 Software.

Results and discussion. Preparation of dough from whole grain rye flour is a demanding process since the protein substances of rye differ in their properties from wheat proteins. Recipe formula was improved by adding non-bakery flour (buckwheat, lentil and chickpea) in the range 5...20 %, dry gluten – 5...15 % and bran 1...6 %. Addition of dry wheat gluten to the recipe helped to reduce the glycemic index of products and increase protein content, and on the other hand to smooth the effect of pentosans, which resulted in the porosity of rusk plate increasing from 52 to 60% with an increase in dry gluten. At the same time, an increase in the dosage of whole grain rye flour increased the viscosity of the test.

Results showed that in case the dosage of flour of buckwheat, gluten, and bran was increased, the glycemic index was the lowest. In content of 12.5%, 18.4% and 3%, respectively above average taste scores - 7.4. In this case, the best for the sensor characteristic «taste» was a sample containing - 20%, 15%, 5%, with a calculated glycemic index in range 55...65.

As a result of studies and analyzed the obtained data, it was found that non-bakery flour such as flour of buckwheat, chickpea, and lentil can be used in the amount of 20%, 13.9%, 12.5% for the optimum ratio "glycemic index-taste" in bakery products with low moisture content.

It was found that the exclusion of the sugar formulation leads to a decrease in color intensity of rusks plates, indicating low level of Millard's reaction. However, this drawback leveled out when the rusk had been dried.

Conclusions. It is shown that due to lentil flour it is possible to reduce the glycemic index to a greater extent, but according to the taste characteristics, these products were less attractive compared with the products for which the flour of the other two crops was used. As a result of optimization, recipe compositions were identified, which further research will be conducted. At the same time when calculating the results with the help of software could be chosen more desirable criteria.

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28. Extrusion of cereals with the addition of mushrooms of the genus *Argaricus*

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Introduction. The production of extruded cereal products is becoming more widespread. Mushrooms are difficult to digest by human body, so it is necessary to find the optimal ratio of these components.

Materials and methods. The research used corn grits, rice, buckwheat, and mushrooms. Applied methods of experimental statistical modeling (ESM).

Results and discussion. The main factors influencing the quality of extruded mixtures are: x_1 - humidity of the mixture,%; x_2 - the content of salt of food,%, x_3 - the content of fungi of the genus *Argaricus*, mg. By the criterion of optimization Y is selected the technological indicator of finished products - coefficient of flutter (table).

Table - Results of PFE 2³

Mix number	Factor levels			Output variable, Y
	x_1 , %	x_2 , mg/100 g	x_3 , mg	
1	24,0	4,0	42	1,09
2	24,0	2,0	42	1,22
3	24,0	4,0	42	1,24
4	24,0	4,0	42	1,24
5	21,0	2,0	30	1,33
6	21,0	2,0	30	1,06
7	21,0	4,0	30	1,10
8	21,0	2,0	30	1,22

The regression equation in the codified expression after checking the significance of the coefficients using Student's criterion has the form:

$$Y = 1,188 - 0.035x_1x_3 + 0.033x_2x_3 - 0.0667x_1x_2x_3, (1)$$

and according to Fisher's criterion - adequately describes the process.

Conclusions The experiment was conducted in accordance with the matrix (tab.) and made the necessary statistical calculations, during which the regression equation in the encoded expression was obtained. The coefficient of flutter was the maximum in the fifth experiment and equaled 1,333. In order to find the optimal values of the selected factors, it is necessary to conduct experiments using the Boxes-Wilson method in the future.

29. Production of cereals to Ukraine

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Introduction. Cereals are the second largest and most grain crop processing product in Ukraine. The distinctive features of grain production include the variety of types of raw materials and products produced from it. In Ukraine almost all grain crops are grown, from which cereals are grown. Therefore, the prospects for the development of the grain market directly depend on the production and quality of crops, as well as the availability of grain supplies.

Materials and methods. Materials for research were oatmeal, buckwheat and millet. These theoretical studies were based on the analysis of Internet sources and scientific articles.

Results and discussion. According to research results, there is a dynamics of production of all the above types of cereals. The results of the studies are presented in the table.

Table - Production of main types of cereals in Ukraine in 2017-2018 marketing year

Month	Assortment of cereals		
	Oat cereals, thousand tons	Buckwheat cereals, thousand tons	Millet cereals, thousand tons
July	115	4412	276
August	667	4497	586
September	1229	6224	1307
October	1288	6141	2033
November	486	4665	1963
December	665	5852	2091
January	761	4972	1615
February	1844	5458	1009
March	1940	4867	1144
April	1111	4128	846
May	1044	3613	651
June	803	6130	392

There is a high demand in the world for organic and premium products. The production of oatmeal for the period increased by 2.3 times. However, the production of millet fell 11% due to the lack of millet. Ukrainian cereals are actively exported to Belarus, Poland, Germany and the Netherlands.

Conclusion. Increasing global competition and low profit margins in Ukraine are exacerbating export prospects. However, the introduction of new standards and quality management systems will help to optimize the range and master new markets, as there is a demand for organic and premium cereal products from the EU countries

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30. Comparative analysis of biscuits form barley (*Hordeum vulgare*) produced in the Republic of Bulgaria and the Republic of Croatia

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Introduction. The European Union combats the characteristic modern diseases of the modern age, such as obesity, osteoporosis, cancer, diabetes, allergies and dental problems. Functional foods are similar in appearance to ordinary foods. They provide the body with the right amount of vitamins, fats, proteins, carbohydrates, etc. needed for healthy eating. Biscuits are popular foods consumed by different age groups due to their varied flavor, long shelf life and relatively low costs.

Barley (*Hordeum vulgare*) is a major cereal, which is often used to produce bread and beverages. Some studies have shown that eating rich barley foods can reduce the risk of certain chronic diseases such as heart disease, type II diabetes and cancer.

Materials and methods. Biscuits were produced at the laboratory at the University of Ruse "Angel Kanchev" – branch Razgrad, Bulgaria in accordance with AACC Method 10-50D. The preparation of sample for next analysis it was in accordance with AACC Method 62-20A. Moisture in biscuits was in accordance ISO 6540. The ash we analyzed accordance ISO 5984:2002 method. Folin-Ciocalteu method was used to determine the total phenolic content. Antioxidant activity was analyzed with DPPH.

Results and discussion. The aim of this master thesis is to compare the quality of barley-made biscuits in two European countries (Bulgaria and Croatia). From the analyzes made, we have found that barley flour from the Republic of Bulgaria has higher moisture content, minerals, common polyphenols and antioxidant activity than barley flour produced in the Republic of Croatia. We have also found that by prolonging the biscuit time, their moisture decreases. Barley biscuits produced in the Republic of Bulgaria contain higher moisture content, ash content, total polyphenols, and antioxidant activity compared to barley biscuits from Republic of Croatia.

Conclusions. During the production of biscuits, the flour undergo certain changes in its physico-chemical composition. In addition, the amounts of low molecular biologically active compounds (common polyphenols and antioxidant activity) also change.

31. Study regarding the influence of fat content on the quality characteristics of muffins

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Introduction. The confectionery industry is associated with high-sugar foods, often referred to as cakes or sweets. The confectionery industry refers to the art of creating sugar-based desserts. Compared to other food sectors, the confectionery industry is a unique and diverse sector which involves a wide range of textures. To be competitive, manufacturers need to develop superior and innovative products and the unique tastes, colors and textural characteristics are what determine the novelty of those.

Materials and methods. In this study the samples analyzed were represented by muffins with different fat content (10%, 15%, 20%, 25%, 30%). The raw materials used to produce muffins samples were: butter, sugar, flour, baking powder, eggs and milk. To obtain the dough all the ingredients were mixed in a homogeneous composition and bake in trays of muffin cups for 15 minutes at 180 °C degrees.

The muffins sample with different fat content were analyzed by the texture profile analysis method using a Mark 10 Texture Analyzer (Mark 10 Corporation, USA), equipped with a 50 mm disc probe, the loading speed was 10 mm/min and fitted with an 100 N load cell. The samples had cylindrical shape with a diameter and height of 3 centimeters. The texture profile analysis method can offer a great number of texture parameters, as: hardness, viscosity, adhesion, cohesiveness, springiness, gumminess, fracturability and chewiness.

Results and discussion. The aim of this study was to evaluate the influence of added fat content on the primary and secondary texture parameters of muffins.

The TPA method was used to analyze the freshness of bakery and confectionery products, fruits, vegetables, fish or other similar food products.

In confectionery fats provides tenderness, "sensation of wetness" in the process of chewing, contribute to the structure, and helps to incorporate air in the composition.

Based on texture profile analysis, we can say that the hardness and gumminess of the analyzed samples showed higher values with the increase of fat content. The muffin samples with 30% fat presented the highest hardness values (14,2 N), while the muffin samples with the lowest fat content, 10%, presented a soft and light texture with the lowest hardness (4,6 N). The analyzed samples did not show fracturability and the springiness range between 1,07-0,42.

Conclusions. Based on the results obtained in this study we can say that the fat content has a positive influence on the texture parameters.

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32. Influence of beetroot juice addition on quality characteristics of fondant candies

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Introduction. Nowadays, manufacturers seek solutions for natural ingredients for the development of new products, particularly for products that are marketed as "better for consumption", so as costumers demand for healthy food, so does the use of natural colors. A research was performed in the matter of physical and chemical, antioxidant and nutritional properties of the fondants with beetroot juice addition.

Materials and methods. 3 samples of fondants with juice obtained from raw (1), boiled (2) and baked (3) beetroot were used in this study. Methods: sensory analysis with the help of 15 subjects, the antioxidant activity assessment through DPPH method, and the chemical test, which refers to moisture, ash, mineral and reducing sugar determinations.

Results and discussions. Sample 1, which are fondant candies with juice obtained from fresh beetroot, was the most appreciated with a total ranking of 8,92, and sample III, fondant candies with juice obtained from baked beetroot, was the least appreciated with a result of 8,55. Sample II, fondant candies with juice obtained from boiled beetroot, had an overall assessment of 8,59.

Highest antioxidant capacity occurs in the case of fondant candies with red juice obtained from raw beetroots (sample 1), with an overall performance of 93,22%. A rather lower result had the sample 2 with 92,84%. Sample 3 showed the lowest result of 91,49%.

The highest results in the matter of moisture content (94,20%) and reducing sugars (14,20%) had the sample 3. On the contrary, the lowest results for both moisture content and reducing sugars was shown by sample 2 with 93,2% and 12,1%.

The highest value of ash content was shown by the sample with raw beetroot juice, 5,66%. Sample 3 had the lowest level of ash content, 1,18%, five times lower comparing to the first sample.

Conclusions. The highest moisture content and amount of reducing sugars was given by fondant candies with baked beetroot juice addition. The fondants obtained from raw beetroot juice had the most pronounced antioxidant capacity and the betaine content was almost double compared with other analysed samples.

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33. Investigation of physical and chemical laws electrochemical treatment of water on diaphragm electrolyzer «Emerald»

Pavlo Skoredov

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Introduction. Water is able to capture this effect, store energy and information factors of influence and transmit energy and information acquired factors are those systems that are designed by nature for their perception. Many examples of nonchemical modified (activated) water to improve food technologies, mainly chemical and microbiological. Most processed and scientifically grounded is a method of water treatment in the two-chamber electrochemical membrane electrolyzer.

Materials and methods. Tap water Shevchenko district of Kyiv treated in diaphragm electrolyzer «Emerald (KFTO)» at different rates of water and water contact time with the selective membrane in the contact chamber. A favorable factor for this is the presence in the troubled established research laboratory NUFT modular water treatment laboratory, which incorporates electrochemical diaphragm electrolyzer module «Emerald VFKT». For fixation of parameters used water following devices: ORP meter - Ezodo PCT-407, pH Meter - I-160M and TDS-meter - AD8000 ADWA. Research conducted at $t = 19 \pm 1^\circ\text{C}$.

Results and discussion. Study parameters treated water ORP conducted water sampling (after 3 minutes of electrolytic) at these speeds water flow (mg/min: 200, 300, 350, 480, 550, 600, 700, 750, 800), presented in Figure 1. Ultimate relaxation of water held since opening in a container cork cylinder, which was closed for 8 days after making catholyte. To install «Emerald» received a prototype electron donor 20 liters of water ORP = -180 mV and pH = 9,3. Pour in a bottle and crown cork closed. Research of water relaxation of the opening shown in Figure 2.

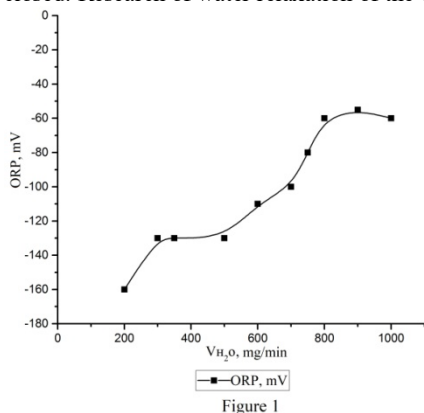


Figure 1. Dependence treated water ORP speed of water flow in the electrolyzer

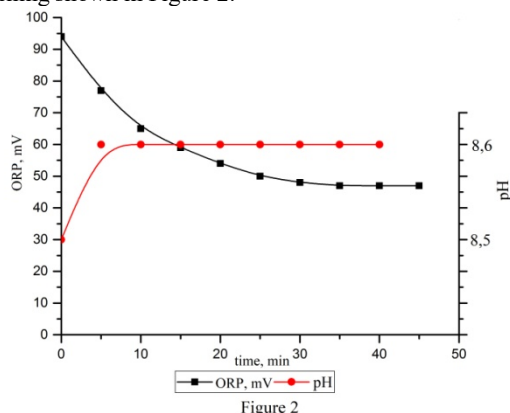


Figure 2. ORP and pH dependence of the relaxation time of water

The study relaxation of open water in bottles for 1 hour showed that after 8 days after opening the bottle ORP relaxed to +47 mV, pH 8.6, and ppm = 224. Thus, the supply of oxygen and carbon dioxide and acidified water displaces its ORP in the negative direction.

Conclusions. Decrease speed of water in the electrolytic reaction space, increases the number of products of electrochemical reactions at the cathode and anode, which allows obtaining activated solutions with predetermined redox state.

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34. Improvement of technology for the alcohol production from wheat with a high content of amylase

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Introduction. Previous studies [1] found that under the same conditions, the yield of alcohol from 1 ton of high-amylose wheat was higher compared to the fermentation of wort from conventional cultivars, which gave reason to continue the experiments.

Materials and methods. Mixes with water at ratio 1:3 were prepared from grinding durum spring wheat lines HAW with amylose content of about 70% [2] and control sample of winter bread wheat cultivar Kuyalnyk with typical amylose content of about 25%. The thermo-enzymatic treatment of the mash was carried out at the temperature of 85 °C for 3 hrs, and the saccharification - at the temperature of 55 °C for 0.5 hrs. The wort was fermented by the method of "fermentation test" at a temperature of 30 °C by the yeast *Saccharomyces cerevisiae* DO-16. The accumulation of impurities (aldehydes, acids, esters higher alcohols) in distillates of fermented wort was determined using gas chromatography.

Results and discussion. The results of the studies showed that in the case of a 2-fold decrease in the expense of glucoamylase enzyme preparation, which hydrolyzes alpha-1,6-glucosid bonds in starch, the amount of unfermented soluble carbohydrates in the distillates of fermented wort did not exceed the normative ones. This provides the basis for reducing the consumption of these enzyme preparations in industrial production.

It is shown that in the case of shortening the duration of wort fermentation by 1 day, the technological parameters of fermented wort of wheat with a high amount of amylose also correspond to the normative for both tests: standard expense of glucoamylase enzyme preparation and in case of decrease of glucoamylase enzyme expense.

In fermented wort from wheat with high amylose content, in the case of the duration of fermentation of the wort for 72 hrs there were 2 times less acetaldehyde and higher alcohols (by reducing of isoamylol concentration), 1.8 times less methanol, whereas the concentration of isopropanol increased in 2 times, the concentration of isobutanol - in 1.8 times, the concentration of isoamilacetate - almost 3 times compared to control. In fermented wort after 48 hrs of fermentation in the case of decreasing of glucoamylase enzyme preparation expense practically all volatile impurities of alcohol were formed less. This will reduce heat energy consumption during distillation and improve the quality of the finished product.

Conclusions The use of high-amylose cultivars of wheat can have a significant economic effect in alcohol production.

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35. Tasting evaluation of beer varieties obtained by the technology of dry hopping

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Introduction. Currently, in brewing practice for tasting the organoleptic parameters of beer made using the dry hopping technology, an advanced evaluation system is used that allows better understanding of the perception of the taste and aroma of the hops when using the beverage.

Materials and methods. Theoretical and experimental researches of application of the advanced system of estimation of organoleptic parameters of beer made on the technology of dry hopping.

Results. The use of hops is of great importance for brewing, because the substances contained in it not only make the characteristic taste of bitterness, but also can affect the aroma, microbiological stability, porosity and turbidity of beer. The addition of the aromatic and flavoring substances of hops in beer requires accurate evaluation not only at the analytical level, but also by means of organoleptic tests of intensity and quality of bitterness [1].

The evaluation of the hop flavor of beer in accordance with the terminology system EBC [2] was limited to the characteristics. The removal of new varieties of hops with a variety of aroma spectra, especially in combination with the use of dry hopping technology, has led to the need to expand and correct a set of descriptors used to assess the impact of hops on the organoleptic properties of beer.

Presented at the Drinktec 2013 in Munich exhibition by Hopsteiner, the terminology descriptor system includes the following eight groups of hops aromas [3], such as citrus, fruit, flower, herbs, spices, sweet, resinous, and others. Each group includes a variety of shades: mandarin or lemon (in a group of citrus aromas), melons or maracuias (in the group of fruits), pine or cedar resin (in the resin group), white wine or mint lollipops (in the group of others), and others. These shades are scored on a scale of intensity from zero to five. They are found in the hops and in the beer, depending on the time they are added. The estimation of the general influence of hops on the taste and aroma of beer is complemented by the quality of bitterness on a scale from zero to five.

A tasting evaluation of beer varieties made using the dry hopping technology using Amarillo

aromatic hop as allowed the use of a new terminological descriptor system to detect previously unknown shades of hop flavors.

Conclusions. Hop gives considerable opportunities to create light beer grades. These descriptors, in the terminology system Hopsteiner, are communication starting points, not only for skilled but also for untrained tasters when evaluating different beers.

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36. Investigation of dry yeast growth in spelt wort

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Introduction. Recently, spelt has begun to be widely used in the food industry. So far, there is little information on the use of spelt in the production of alcohol. Therefore, research on this problem is relevant.

Methods and techniques. Spelt wheat (*Triticum spelta* L.) were obtained from Ukrainian Research Institute of Selection. The studies used common wheat (*Triticum aestivum*) and commercial dry yeasts: Quickferm Super and Thermosacc DRY. Wheat wort (18-20% dry matter) was produced by enzymatic hydrolysis of pretreated wheat grains. Commercial enzymes: Amylex 5T (α -amylase), Diazym SSF (glucoamylase) and Laminex BG2 (source of cellulose) were used for its preparation. The spelt wort was inoculated to an initial amount of yeast of $20 \cdot 10^6$ viable cells / ml. The concentration of yeast cells was determined in a Goryaev chamber.

Results. The thermo-enzymatic treatment conditions of spelt were established: the temperature of batch preparation 46 ± 1 °C, the duration of liquefaction 2,5 hours at a temperature of 79 ± 1 °C, saccharification – 30 min at 56 ± 1 °C. Common wheat wort (control) was obtained under similar conditions. The increase in the number of yeast cells, yeast growth rate and physiological state of yeast cells during their generation in wort were studied. The largest number of yeast cells (16 - 20% more than control) was in spelt wort. Amount of yeast in spelt wort for 24 hours generation is higher as compared with the control (common wheat worts) sample on 19 - 20% for dry yeast preparations Thermosacc DRY. Yeast Thermosacc DRY has grown better in a wort than Quickferm Super dry yeast. The growth rate of yeast at the beginning of the process (4-8 hours) increased by 20-22% compared with control (Fig. 1).

It has been established that growing yeast in a spelt wort can increase their generative activity.

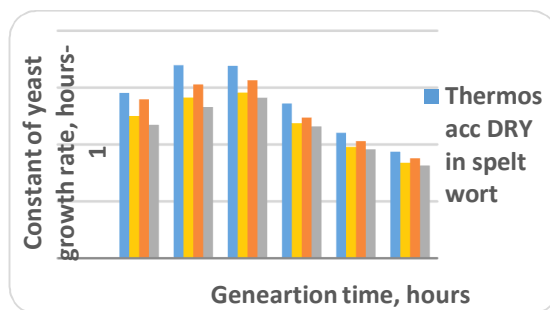


Fig. 1. Growth rate of yeast

The best experimental results of the study of the yeast growing in spelt wort compared to control can be explained that lysine is contained in more quantities in the spelt than in common wheat.

Conclusions. Results of this work demonstrates a new possibility to use spelt as a medium (spelt wort) for yeast growing and also further expands the market of alternative cereals in the alcohol production.

37. Deficiency of proteins and ways its solution

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Introduction. Consumption of the required amount of protein is a fundamental factor in human health. The protein needs can be met by the complex consumption of animal and plant foods [1]. Proteins of plant and animal origin contain essential amino acids in different amounts and ratios. For example, animal protein from blood plasma is valuable because it contains all the essential amino acids. Collagen proteins are inferior. Soy - balanced in terms of the amino acid composition of the reference protein, but have insufficient amounts of sulfur-containing amino acids.

Materials and methods. To improve the technology of cooked sausage products was used the developed and investigated functional composition containing protein (FCP) with a balanced amino acid composition in amount of 30% with red chicken meat in exchange of hydrated soy protein and emulsion on the basis of pig skins and part of fatty raw materials. The influence of FCP on the proteins amino acid composition of the manufactured product samples and its biological efficiency, which was determined by biological value (BV), comparative redundancy and coefficients of differentiation of the amino acid composition (CDAAC) and utility, was investigated.

Results. Comparing the obtained results on the study amino acid composition of the experimental cooked sausages samples with using the FCP and the control sample, it is possible to note increase the number of essential amino acids to the established level in accordance with needs of person and the balance of their amount, as evidenced by the indicator of CDAAC, which for the experimental sample is at 11,95% and decreases by 4.6% compared with the control. For this sample, in comparison with the control, the number of all essential amino acids is increased by an average of 67.2%. The increase in the amount of meat raw material due to introduction of red poultry meat and the use of developed FCP with a balanced amino acid composition greatly influenced on the results. In the experimental sample there was a significant increase in the amount of lysine in comparison with the control sample. It is due to the use of poultry meat, which is characterized by high content of this amino acid and FCP, which includes soy proteins. The analysis of calculated data on determination of utility and comparative redundancy the amino acid composition of product shows that the use of FCP in the amount of 30% in combination with red chicken meat increases the utilitarian utilization rate by 7.2% compared to the control sample and is 0.89 and reduces the redundancy by 42.8% to the level of 0.04.

Conclusions. Using developed FCP in recipes of cooked sausages increases and balances the amino acid composition of experimental samples (there is an increase in the content of all essential amino acids). The obtained results indicate that protein preparations should be used in the form of binary and multicomponent mixtures in certain ratios of components that provide enrichment with the amino acid composition and modification of functional and technological properties.

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38. Analysis of the market for delicatessen meat products

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Introduction. The issues of the establishment and development of the meat products market in Ukraine today have become especially urgent. In particular, it is vividly manifested in the market of sausage products and meat delicacies, which is very dynamic, as it plays a major role in the nutrition of the population, and their production is the most common method of processing meat and other products of slaughter of animals in the meat industry. At the same time, in conditions of increasing competition in the context of the globalization processes taking place in the economy, for any commodity producer, including in the area of production of meat products, it is very important to strengthen its own competitive positions. This can only be achieved by carefully studying the tastes and preferences of the buyer, which will allow the manufacturer to approach the creation of the "ideal" in the eyes of the consumer of the product offer and take the necessary marketing decisions, which, due to a more loyal customer relationship with the product, will increase the degree of presence of the manufacturer in the market. The market for demand and sales of deli meats products is subject to significant fluctuations, due to certain trade, economic and social factors, therefore the analysis of this market is a topical issue.

Materials and methods. For carrying out a full inspection and determination of the peculiarities of the meat delicatessen market, information from research articles and journals in a special direction was used. The analysis of annual data on the production of deli meats and consumer purchasing power has been carried out. The dependence of the volume of production and sales of these products on a number of factors and the consequences that led first to the deficit, and further to the expansion of the range, were analyzed.

Results. Both boiled-smoked and smoked-baked, and smoked and dried meat deli meats are in great demand. According to market operators, on average, the Delicacy Group takes from 7 to 10% of the total assortment. Sometimes the fate of the delicacy group reaches 20%. From 2010-2014 there was a certain shortage in the market. This was due to the long-term introduction of large areas and energy-intensive equipment. Over the past few years (including 2018 data), there has been a noticeable increase in sales from 8 to 12.5%. This allowed increasing the yield of the finished product, while reducing the cost. The demand for delicacies in major cities has stabilized. Due to the shortage of beef and a large supply of poultry meat, a significant increase in the production of raw smoked and dried jerked pork and poultry delicacies (chicken, turkey) is predicted. Due to the high cost of deli meats, a substantial expansion of the product line of this group of products is predicted for serving cuts (in small portions) using modern packaging solutions.

Conclusion. Thus, carrying out a full-scale general analysis of the market for a delicacy group of meat products made it possible to observe a certain positive trend in recent years and to predict possible trade, economic and social changes.

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39. Estimation of the technological efficiency of the food fibers using

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Introduction. The food fibers are the necessary elements of the food, its physiological need is 20 g per day. The monitoring of the food structure of the Ukrainians proves that nowadays the level of these nutrients using is 30-40% of the day quota [1].

The materials & the methods. The food fibers are the complex of the compounds which form the cell walls of the plants & consist of the cellulose, hemicellulose, lignin & also pectin agents and some other water-soluble polysaccharides.

The results. To estimate the technological efficiency of the cellulose tissue it is necessary to estimate the role of these agents in the recipes of definite products groups & to compare with the producers' recommendations. In the emulsified sausage products (cooked sausage, sausages & thick sausages) it is recommended to use the cellulose tissue of all kinds up to 2% from the mince mass. The level of hydration is from 1: 3 to 1: 8. The producers promise to increase the mass efficiency, to reduce the loss during the high-temperature processing, to improve the structure, wet & fat bundling[2].

The recommendations are almost the same in the semi-smoked & cooked smoked sausages but it is recommended to reduce the level of hydration by 1:2-6. The using of wheat cellulose tissues here is more reasonable in comparison with the cooking methods of cooked sausages. It is very reasonable to add the cellulose tissue to the products which, according to the recipes, suppose to have the high content of fat materials. In the recipes with coarse grinding materials the using of food fibers, which create additional matrix in the product, makes it possible to keep moisture & fat really more effective.

The food fibers can't be used as effective materials to bundle the fat but they can make the emulgators work easier. It's better not to use them in the cooked smoked sausages, which can be dried, because during this process the time of the dense consistency reachment increases, but the speed-up of the drying with the capillary transferal from the product centre to the surface doesn't work. It happens because the hydrated cellulose tissue dewater very badly in the process of drying & the dense consistency reachment takes more time. It is recommended to use the cellulose tissue with the fibers length of 200 mcm in the raw smoked sausages, it allows to restrict the water activity at the first stage of the maturation, to stabilize & to make the structure denser, to reduce the risk of the cores in sausage, to cut the mass loss down & to increase the product mass efficiency. It is possible that the water activity restriction, the risk of the cores in sausage decrease & the mass loss reduction during the production of the raw smoked sausages really happen, but the process of drying even under the minimal hydration of 1:2 prolongs rather much what is not economically reasonable for this kind of products.

Conclusion. The using of food fibers in the recipes of meat products as functional elements depends on the length of the fibres, hydration, the level of meat grinding & the kind of high-temperature processing.

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40. Analysis of the market for delicatessen meat products

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Results. Both boiled-smoked and smoked-baked, and smoked and dried meat deli meats are in great demand. According to market operators, on average, the Delicacy Group takes from 7 to 10% of the total assortment. Sometimes the fate of the delicacy group reaches 20%. From 2010-2014 there was a certain shortage in the market. This was due to the long-term introduction of large areas and energy-intensive equipment. Over the past few years (including 2018 data), there has been a noticeable increase in sales from 8 to 12.5%. This allowed increasing the yield of the finished product, while reducing the cost. The demand for delicacies in major cities has stabilized. Due to the shortage of beef and a large supply of poultry meat, a significant increase in the production of raw smoked and dried jerked pork and poultry delicacies (chicken, turkey) is predicted. Due to the high cost of deli meats, a substantial expansion of the product line of this group of products is predicted for serving cuts (in small portions) using modern packaging solutions.

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41. Microbiological stability of semi-products from meat with vegetable components

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Introduction. The application of quality control on a regular basis is regarded as necessary for all types of meat. The quality of semi-products from meat can be assessed by determining the quality indices: organoleptic, physico-chemical and microbiological. The purpose of this paper was the study of the possibility of obtaining semi-products from mutton and poultry meat with the addition of oilseeds groats of walnuts, pumpkin, sesame and wheat fiber, preserved by cold, appreciation of changes microbiological characteristics and determining of the keeping period.

Materials and methods. For the purpose of the work were prepared the semi-products from mutton and poultry meat (70:30) with 7% oilseeds groats of walnuts, oilseeds groats of pumpkin, oilseeds groats of sesame and 2% wheat fiber, technological production stream approved under the conditions of mini-enterprises. The samples were manufactured in the Food Biotechnology Laboratory of PSIHFT and Technology Laboratory from meat and meat products of the Department Food Products Technology, Faculty Food Technology, TUM and stored in refrigerated condition at $t = 0 \dots +4^{\circ}\text{C}$, $W = 75-78\%$, $t = 96$ hours. Microbiological indices have been determined in the Biotechnology Laboratory's premises fed up and equipped to perform microbiological investigations according to standardized methods. Microbiological indices have been identified - MAFAM (number of mesophilic aerobic and facultative anaerobic microorganisms); coliform bacteria; pathogenic microorganisms, including Salmonella; yeast; molds, according to standardized methods.

Results and discussion. Based on elaborated recipes, four variants of samples of semi-products from sheep and poultry meat were prepared. During storage in the refrigerated state, the microbiological indices presented in Table 1 were studied.

Table 1

Modification of microbiological indices in experimental samples with 7% oilseeds groats and 2% wheat fiber

№	Samples	MAFAM, CUF/1g				Molds, CUF/1g			
		0	24	48	72	0	24	48	72
		hours				ore			
1	"Mici" from mutton and poultry meat (70:30) – control sample	$1 \cdot 10^4$	$15 \cdot 10^4$	$8 \cdot 10^5$	$5 \cdot 10^6$	has not been detected	has not been detected	$4 \cdot 10^1$	$3 \cdot 10^2$
2	"Mici" from mutton and poultry meat (70:30) with 7% oilseeds groats from walnuts and 2% wheat fibers	$9,6 \cdot 10^4$	$5,2 \cdot 10^5$	$9,3 \cdot 10^5$	$4,7 \cdot 10^6$	has not been detected	has not been detected	$4 \cdot 10^1$	$8 \cdot 10^2$
3	"Mici" from mutton and poultry meat (70:30) with 7% oilseeds groats from pumpkin and 2% wheat fibers	$2,7 \cdot 10^4$	$5,2 \cdot 10^4$	$25,5 \cdot 10^5$	$3,0 \cdot 10^6$	has not been detected	has not been detected	$6 \cdot 10^1$	$10 \cdot 10^2$
4	"Mici" from mutton and poultry meat (70:30) with 7% oilseeds groats from sesame and 2% wheat fibers	$1,9 \cdot 10^4$	$3,2 \cdot 10^4$	$2,8 \cdot 10^5$	$3,0 \cdot 10^5$	has not been detected	has not been detected	has not been detected	$1 \cdot 10^1$

Microbiological analyzes of "mici" from sheep and poultry meat experimental samples with added walnuts, pumpkin seeds, sesame seeds and wheat fiber showed lack of coliform bacteria, pathogenic bacteria, including Salmonella, and sulphite reductase colistrites.

It was found that MAFAM in all samples with the addition of oilseeds groats and wheat fiber after storage for only 72 hours falls within the admissible limits which are 5×10^6 , provided by legislation.

In the initial samples no yeasts and molds were found, but keeping in the refrigerated state at $0 \dots +4^\circ\text{C}$ is characterized by an insignificant increase of mycelial cells in the limit of 10^1 - 10^2 CUF/1 g.

Conclusions. Experimental samples with 7% oilseeds groats from walnuts, oilseeds groats from pumpkin, oilseeds groats from sesame and 2% wheat fibers have microbiological stability during storage for 72 hours in the refrigerated state at $t = 0 \dots +4^\circ\text{C}$, $W = 75 \dots 78\%$. The keeping period in refrigeration state at $0 \dots +4^\circ\text{C}$ of semi-products of type "mici" from mutton and poultry meat with the addition of oilseeds groats from nuts, oilseeds groats from pumpkin, oilseeds groats from sesame and wheat fiber packed in casseroles polystyrene and sealed with stretch foil was found to be 72 hours.

42. Influence of some local vegetable addition on physicochemical, rheological and sensory properties of yogurt

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Introduction. In recent years, there has been observed an increase in the consumption of fermented dairy products, due to their nutritional value and for their therapeutic benefits. The aim of the proposed study is to generate original results on the achievement of a novel yogurt by harnessing some local vegetable raw materials with beneficial effects on consumer health and antioxidant activity, with a role in the stability of yogurt and thus in increasing their shelf-life.

Materials and methods. For this purpose the local vegetable raw materials (buckwheat flour, acorn flour, Jerusalem artichoke, beetroot powder and rosehip powder) in different percentages were added to yogurt. Yogurt enriched with different vegetable powder improves the rheological, physicochemical and sensory properties of natural yogurt. Rheological characteristics were performed using the Modular Advanced Rheometer System Haake Mars, determining: viscoelastic properties, thixotropy and flow and viscosity curves.

Results. The results of the study lead to the determination of the optimum formulation of a novel yogurt, with best sensory acceptance, rheological, textural and physicochemical properties. Because of its universal popularity, there is a high economic importance in diversifying yogurt products. The results of this study showed that it is possible to produce a yogurt with the addition of plants flour or plants powders. The addition of buckwheat flour, acorn flour and beetroot powder, three raw materials that have not been investigated in the production of yogurt have led to consumer acceptance of finished products, and good results of rheological physicochemical and sensorial evaluation.

Conclusions. Generally the addition of plants in various ways (flour, powders, extracts) in the production of yogurt can improve its nutritional value, respectively the physicochemical and sensory properties of the finished product. In conclusion the indigenous plants are certainly potential raw materials that can provide to be useful in new product development.

Acknowledgments

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43. Herbs extracts supplementation effect on the quality characteristics of yogurt

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Introduction. Yogurt is a very important product in human diet, being one of the widely produced and consumed dairy products all around the world. Currently, the process of yogurts fortification with natural antioxidants is increasingly popular, thereby perpetuating the concept of a healthy nutrition. The assortment of dairy products has expanded with the help of herb extracts addition, fibres extracted from fruit processing industry offal and, moreover, fresh spices. The purpose of this study was testing the improvements different herb extracts addition has done to the yogurt shelf life.

Materials and methods. It was tested the effect of aqueous herbs extracts in different concentrations (0.25 ÷ 1%) (w/v) on the yogurt samples qualitative characteristics and shelf life (pH, syneresis, rheology, and sensory and antioxidant activity). The analyses were conducted immediately after preparation and over a 28 days storage period at 4± 0.5 °C.

Results and discussion. The four plants studied were: thistle, hawthorn, sage, and marjoram. They have not been used to manufacture yogurt until now. After 28 days of storage, the physicochemical and rheological properties improved from the control sample. The best results for a syneresis properties improvement and WHC was the usage of thistle extract; for antioxidant activity, the best choice was the marjoram extract and, finally, for best rheological properties – the sage extract.

Conclusions. The results of this study confirmed the positive effect the addition of herbs extracts on yogurt preservation time. Furthermore, the natural ingredients insertion during the yogurt production enhanced its nutritional value, respectively, its rheological and sensorial characteristics. The antioxidant activity was maintained during storage and even boosted in some samples. It can be noted that lactic acids and vegetable extracts influence the stability of the product over time. This study accentuates the fact that yogurts improved with natural extracts may perform as functional food products, with remarkable health benefits. More than this, the herb extracts addition showed no inhibitory effects on the starter culture.

Acknowledgement

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44. Effect of different starter cultures on the quality characteristics of yogurt

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Introduction. Fermented dairy products are very popular in Romania and around the world due to their pleasant sensory properties and their potential for maintaining and improving consumer health. Starter cultures used for the production of yogurts have a primary role in defining its qualitative and nutritional characteristics, determining the type of fermentation and its final products. *Streptococcus thermophilus* and *Lactobacillus bulgaricus* are homofermentative lactic acid bacteria used as traditional yogurt starter cultures. The role of these two starter bacteria can be summarized in the acidification of milk and the formation of flavor compounds. There is an interaction in yogurt between the two species of bacteria, called proto cooperation and a combined metabolism with positive effects on the fermented product. In this symbiotic relationship, each bacteria produces beneficial substances for the other. The ratio between *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus* in starter culture of yogurt influences the sensorial properties of the fermented product, and in most of cases it is 1:1.

Materials and methods. The purpose of this paper was to study the quality characteristics of yogurts obtained by fermentation with different starter cultures of lactic acid bacteria, starting from the same raw material under the same conditions of temperature and environment. In this case, three samples of yogurt were obtained and were studied for their texture, rheological, physicochemical and sensory properties.

Results and discussion. Yogurt samples were analysed after 24 hours of storage under refrigeration conditions. It was determined the influence of different starter culture on physicochemical, sensorial and rheological properties of yogurt. In the process of obtaining yogurt it is very important to monitor the evolution of each species of lactic bacteria from the starter culture. Lactic bacteria from commercial starter cultures are performant strains, characterized morphologically and physiologically and selected according to specific criteria.

Conclusions. From the three studied bacteria starter cultures, the best results for the milk as raw material and the adopted technology were obtained by using the starter culture from manufacturer B followed by the one from manufacturer A. The paper highlighted the role of the quality of starter cultures of specific lactic bacteria on the quality of yogurt - finished product.

Acknowledgments

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45. Research quality indicators of protein-berry concentrates

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Introduction. At the production stage of milk protein products, continuous quality control of raw materials and semi-finished products is important, which can be achieved by applying instrumental methods. These include rheological and physico-chemical indicators, which depend on changes in the chemical composition of the product, modes and methods of its production. The study of these characteristics and patterns of their change is important in the development of new types of milk protein products. This will allow not only to manage technological processes, but also the quality of finished products.

Materials and methods. The subject of research was chosen protein-berry concentrates, which were obtained by thermo-acid coagulation of milk proteins at a temperature of $(75 \pm 2)^\circ\text{C}$ with duration of (2 ± 1) min, adding berry coagulant ($\text{pH } 2,6 \pm 0,2$) in amount of from 3 % to 11 % (weight fraction of organic acids from 0,09 % to 0,33 %). Rheological characteristics of protein-berry concentrates were determined on a rotational viscometer «Reotest 2». In addition, the main quality indicators – organoleptic and physico-chemical (active acidity, moisture mass fraction, water-retaining capacity), which have an influence on the structural-mechanical properties of PBC, were investigated.

Results. The studied protein-berry concentrates are pseudoplastic in structure and in the whole range of sliding velocity from $0,55 \text{ s}^{-1}$ to 15 s^{-1} flow like quasi-viscous liquid. The effective viscosity of protein-berry concentrates under the same conditions increases from 1,24 to 3,7 $\text{MPa} \cdot \text{s}$ with an increase in the amount of berry coagulant addition from 3 % to 11 % and a parallel increase in its active acidity from 2,8 to 2,4. This is probably due to a decrease in the moisture mass fraction in the protein-berry concentrates from 77,6 % to 67,96 %, and also a change in their spatial structure of the formed phase – the casein calcium-phosphate complex (CCPC) and the carbohydrate components of the berry coagulant. Model samples had a homogenous, delicate and smearing consistency, which is characteristic for milk-protein concentrates that are made in a separate way using a separator to separate the clot.

A tendency has established that with an increase in the amount of berry coagulant to 11 % and a decrease in the pH level to 2,4, the obtained clot was characterized by a low active acidity index – 4,4, in contrast to the sample with the addition of 3 % berry coagulant with a pH of 2,8, which had a higher the value of active acidity at 6,02. The least value of water-retaining capacity at the level of 23,51...37,13 % has noted in protein-berry concentrates, obtained under the following conditions thermo-acid coagulation – 3 % berry coagulant ($\text{pH } 2,8$ and $2,4$) with a weight fraction of organic acids 0,09 %. These results are explained by hydrophilic characteristics of berry coagulant, and also the ionic adsorption of proteins. In the isoelectric point, when the dissociation degree of protein molecules is minimal and the charge of the protein molecule is close to zero, the ability of the protein to bind water is the lowest.

Conclusion. The obtained values of quality indicators allow to reasonably carry out mechanical processing of protein-berry concentrates and confirm the possibility of using them as a basis for the production of cheese products on the existing equipment of dairy plants.

46. Deficiency of proteins and ways its solution

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Introduction. Consumption of the required amount of protein is a fundamental factor in human health. The protein needs can be met by the complex consumption of animal and plant foods [1]. Proteins of plant and animal origin contain essential amino acids in different amounts and ratios. For example, animal protein from blood plasma is valuable because it contains all the essential amino acids. Collagen proteins are inferior. Soy - balanced in terms of the amino acid composition of the reference protein, but have insufficient amounts of sulfur-containing amino acids [2].

Materials and methods. To improve the technology of cooked sausage products was used the developed and investigated functional composition containing protein (FCP) with a balanced amino acid composition in amount of 30% with red chicken meat in exchange of hydrated soy protein and emulsion on the basis of pig skins and part of fatty raw materials. The influence of FCP on the proteins amino acid composition of the manufactured product samples and its biological efficiency, which was determined by biological value (BV), comparative redundancy and coefficients of differentiation of the amino acid composition (CDAAC) and utility, was investigated.

Results. Comparing the obtained results on the study amino acid composition of the experimental cooked sausages samples with using the FCP and the control sample, it is possible to note increase the number of essential amino acids to the established level in accordance with needs of person and the balance of their amount, as evidenced by the indicator of CDAAC, which for the experimental sample is at 11,95% and decreases by 4.6% compared with the control. For this sample, in comparison with the control, the number of all essential amino acids is increased by an average of 67.2%. The increase in the amount of meat raw material due to introduction of red poultry meat and the use of developed FCP with a balanced amino acid composition greatly influenced on the results. In the experimental sample there was a significant increase in the amount of lysine in comparison with the control sample. It is due to the use of poultry meat, which is characterized by high content of this amino acid and FCP, which includes soy proteins. The analysis of calculated data on determination of utility and comparative redundancy the amino acid composition of product shows that the use of FCP in the amount of 30% in combination with red chicken meat increases the utilitarian utilization rate by 7.2% compared to the control sample and is 0.89 and reduces the redundancy by 42.8% to the level of 0.04.

Conclusions. Using developed FCP in recipes of cooked sausages increases and balances the amino acid composition of experimental samples (there is an increase in the content of all essential amino acids). The obtained results indicate that protein preparations should be used in the form of binary and multicomponent mixtures in certain ratios of components that provide enrichment with the amino acid composition and modification of functional and technological properties.

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47. Analysis of the market for delicatessen meat products

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Introduction. The issues of the establishment and development of the meat products market in Ukraine today have become especially urgent. In particular, it is vividly manifested in the market of sausage products and meat delicacies, which is very dynamic, as it plays a major role in the nutrition of the population, and their production is the most common method of processing meat and other products of slaughter of animals in the meat industry. At the same time, in conditions of increasing competition in the context of the globalization processes taking place in the economy, for any commodity producer, including in the area of production of meat products, it is very important to strengthen its own competitive positions. This can only be achieved by carefully studying the tastes and preferences of the buyer, which will allow the manufacturer to approach the creation of the "ideal" in the eyes of the consumer of the product offer and take the necessary marketing decisions, which, due to a more loyal customer relationship with the product, will increase the degree of presence of the manufacturer in the market. The market for demand and sales of deli meats products is subject to significant fluctuations, due to certain trade, economic and social factors, therefore the analysis of this market is a topical issue.

Materials and methods. For carrying out a full inspection and determination of the peculiarities of the meat delicatessen market, information from research articles and journals in a special direction was used. The analysis of annual data on the production of deli meats and consumer purchasing power has been carried out. The dependence of the volume of production and sales of these products on a number of factors and the consequences that led first to the deficit, and further to the expansion of the range, were analyzed.

Results. Both boiled-smoked and smoked-baked, and smoked and dried meat deli meats are in great demand. According to market operators, on average, the Delicacy Group takes from 7 to 10% of the total assortment. Sometimes the fate of the delicacy group reaches 20%. From 2010-2014 there was a certain shortage in the market. This was due to the long-term introduction of large areas and energy-intensive equipment. Over the past few years (including 2018 data), there has been a noticeable increase in sales from 8 to 12.5%. This allowed increasing the yield of the finished product, while reducing the cost. The demand for delicacies in major cities has stabilized. Due to the shortage of beef and a large supply of poultry meat, a significant increase in the production of raw smoked and dried jerked pork and poultry delicacies (chicken, turkey) is predicted. Due to the high cost of deli meats, a substantial expansion of the product line of this group of products is predicted for serving cuts (in small portions) using modern packaging solutions.

Conclusion. Thus, carrying out a full-scale general analysis of the market for a delicacy group of meat products made it possible to observe a certain positive trend in recent years and to predict possible trade, economic and social changes.

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48. Estimation of the technological efficiency of the food fibers using

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Introduction. The food fibers are the necessary elements of the food, its physiological need is 20 g per day. The monitoring of the food structure of the Ukrainians proves that nowadays the level of these nutrients using is 30-40% of the day quota [1].

Materials & the methods. The food fibers are the complex of the compoundings which form the cell walls of the plants & consist of the cellulose, hemicellulose, lignin & also pectin agents and some other water-soluble polysaccharides.

Results. To estimate the technological efficiency of the cellulose tissue it is necessary to estimate the role of these agents in the recipes of definite products groups & to compare with the producers' recommendations. In the emulsified sausage products (cooked sausage, sausages & thick sausages) it is recommended to use the cellulose tissue of all kinds up to 2% from the mince mass. The level of hydration is from 1: 3 to 1: 8. The producers promise to increase the mass efficiency, to reduce the loss during the high-temperature processing, to improve the structure, wet & fat bundling[2].

The recommendations are almost the same in the semi-smoked & cooked smoked sausages but it is recommended to reduce the level of hydration by 1:2-6. The using of wheat cellulose tissues here is more reasonable in comparison with the cooking methods of cooked sausages. It is very reasonable to add the cellulose tissue to the products which, according to the recipes, suppose to have the high content of fat materials. In the recipes with coarse grinding materials the using of food fibers, which create additional matrix in the product, makes it possible to keep moisture & fat really more effective.

The food fibers can't be used as effective materials to bundle the fat but they can make the emulgators work easier. It's better not to use them in the cooked smoked sausages, which can be dried, because during this process the time of the dense consistency reachment increases, but the speed-up of the drying with the capillary transferal from the product centre to the surface doesn't work. It happens because the hydrated cellulose tissue dewater very badly in the process of drying & the dense consistency reachment takes more time. It is recommended to use the cellulose tissue with the fibers length of 200 mcm in the raw smoked sausages, it allows to restrict the water activity at the first stage of the maturation, to stabilize & to make the structure denser, to reduce the risk of the cores in sausage, to cut the mass loss down & to increase the product mass efficiency. It is possible that the water activity restriction, the risk of the cores in sausage decrease & the mass loss reduction during the production of the raw smoked sausages really happen, but the process of drying even under the minimal hydration of 1:2 prolongs rather much what is not economically reasonable for this kind of products.

Conclusion. The using of food fibers in the recipes of meat products as functional elements depends on the length of the fibres, hydration, the level of meat grinding & the kind of high-temperature processing.

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49. Antimicrobial activity of preservatives in gel against *Escherichia coli*

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Introduction The natural gel base containing polysaccharides and water is a breeding ground for the growth of bacteria and fungi. Bacteria of the *Escherichia* genus are often plated from tainted gel. These bacteria do not only pollute cosmetic or therapeutic products, but can cause a disease.

Material and methods *E. coli* strain was used at 1.5×10^8 CFU concentration as a test culture. Antimicrobial activity of preservatives was investigated by diffusion in agar. The effectiveness of the action was evaluated by the zone of delayed growth of test culture in agar. The following preservatives were investigated in working concentrations: Cosgard (0,6%), Verstatil TBG (2%), Dermosoft 700B (1%), Leucidal (3%), drug Enoxil (0,02%). 1% xanthan gum, which is natural polysaccharide, was used as gel formulation. Gel without preservatives was used as a reference gel basis.

Results and discussion Studies have shown that synthetical preservative Cosgard (a mixture of benzyl alcohol and dehydroacetic acid, with the Ecosert certificate) has shown higher antibacterial activity than the investigated alternative preservatives. The growth retardation zone of *E. coli* in agar was 24 mm when using Cosgard.

Table. Antimicrobial activity of preservatives against *Escherichia coli*

Samples	Growth retardation zone, mm	The presence of <i>E. coli</i> in gel
Control	-	+
Cosgard (0,6%)	24	-
Verstatil TBG (2%)	20	-
Dermosoft 700B (1%).	-	-
Leucidal (3%)	25	-
Enoxil (0,02%)	-	-

The preservative Verstatil TBG (contains triethyl citrate; glyceryl caprylate; benzoic acid) used for certified natural cosmetics provided 20mm growth retardation of test cultures in agar. Dermosoft 700B, a plant preservative, which includes levulinic acid, sodium levulinate and glycerin, inhibits the germination of the test microorganisms, but no delay of *E. coli* growth in agar was observed. Among natural preservatives, the highest antimicrobial activity was shown by Leucidal, obtained by fermentation of radish with the bacteria *Leuconostoc Kimchi*. The *E. coli* growth retardation zone in agar when applied to the preserved gel was 25 mm. The drug Enoxil (a complex of biologically active substances from grape seed) inhibited the germination of the test microorganisms into the cosmetic gel, but no delay in the growth of *E. coli* in the agar. In this case, we observed turbidity of the control gel at the 24th hour of the experiment as a result of contamination by microorganisms.

It should be noted that the active ingredients contained in the preservatives may have different permeability to the agar, which may also affect the results of the experiment.

Conclusion Thus, studies have shown that Cosgard synthetical preservative and natural Leucidal exhibit high antimicrobial activity in gel against *E. coli* and the possibility of using alternative preservatives for gel storage.

50. Influence of technological factors on the properties of oil-fat composition (OFC KTIOL)

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Introduction. Wool grease is a natural lipid that softens the skin and sheep's wool fibers, as well as protects them from adverse weather conditions. The most widely used products are refined wool oil and its modifications, which are called lanolin. Lanolin and its derivatives have a wide range of applications.

Materials and methods. Research materials are anhydrous lanolin and oleinic sunflower oil. Research methods are standard methods for determining the physico-chemical parameters, in particular peroxide value (PV) and refractive index (n_D), and the method of thermooxidation of lipids.

Results. In its composition, lanolin is similar to the intercellular lipids of the stratum corneum, so lanolin plays an important role in regulating the moisture content of the human skin. In addition, it has emulsifying properties, anhydrous lanolin can absorb up to 200% of water to its mass, and is able to redistribute absorbed moisture to environments with a relatively low moisture content [1].

The mechanism of reaction and the factors affecting oxidation for emulsified lipids are significantly different from pure lipids [2]. The ability of lipids to oxidation is the main reason for the deterioration of the quality of many natural food, cosmetic and special products and preparations [3,4]. The research focuses on detecting the antioxidant properties of OFC KTIOL. The results are shown in Fig.

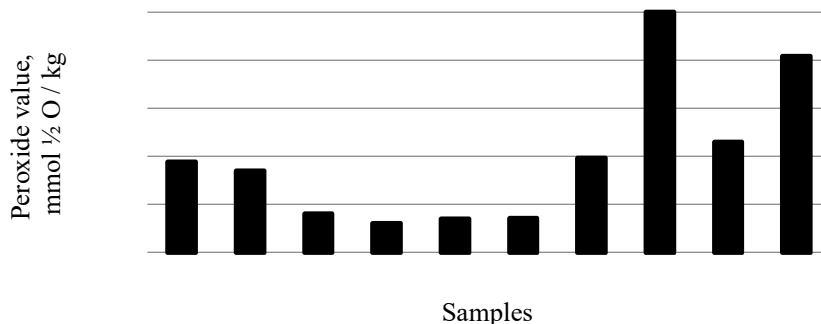


Fig. Dependence of the PV OFC KITOL on the conditions of thermooxidation

1 - LD 120-0-4,5; 2 - LD 120-3-4,5; 3 - LD 80-1-3; 4 - LD 80-1-6; 5 - LD 80-5-3;
 6- LD 80-5-6; 7- LD 160-1-3; 8- LD 160-1-6; 9- LD 160-5-3; 10- LD 160-5-6.

In addition, a study of the change in optical density due to thermal oxidation has been carried out. It was found out that the investigated factors on the reduction of influence on thermooxidation are ranked (taking into account the received model): 1 - the temperature regime of the process; 2 - duration of the oxidation process; 3 - concentration of lanolin. Among the combined factors is the combined effect of temperature and duration of heat treatment.

An increase in the temperature of the heat treatment rises the optical density of the OFC KTIOL (maximum at $\lambda = 340$ nm). With an increase in the concentration of additive, the dependence is maintained.

Conclusions. It was found that the process of thermal oxidation is not standard, which confirms the results obtained earlier. On the basis of research data, the possibility of improving and reducing the techno-chemical control for OZHK KTIOL was discovered.

51. Development of hairbalmformula with keratin

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Introduction. Hair fibers are primarily composed of various types of keratins (proteins). Thekeratin fibers consist of long molecular chains intertwined and firmly attachedthrough various bonds. Due to the excessive influence of heat (drying, straightening) and chemical processes (hair dyeing, permanent waving), the hair loses its elasticity and needs to be restored. The only way to restore damaged hair and disturbed protein and water balance is to fill the lack of keratin [1].

Hair balm is a cosmetic product with antistatic and regenerating effect for hair treatment after washing. Balm acts directly on the hair follicle, stimulates hair growth and regulates sebaceous glands. Therefore, the formulation of the hair balm with keratin is relevant [2].

The purpose of the work was to develop keratin hair balm formula and to evaluate its compliance with normative standards.

Матеріалита методи. The physicochemical and sensory characteristics of the keratin hair balm were analyzed with DSTU 4763: 2007 "Cosmetic balms. General specifications". The rheological properties of the hair balm were determined by using a viscosimeter "Reotest-2".

Results and discussion.The ingredients of keratin hair balm by our formulation according to the INCI nomenclature were: Aqua, Emulsifying wax, Simmondsia chinensis (jojoba) seed oil, Cetearyl alcohol, Hydrolyzed keratin, Pantothenic acid, Cocamidopropyl betaine, Isopropyl palmitate, Phenyl trimethicone, Cananga odorata essential oil, Rosewood oil, Sodium benzoate, Cyamopsis tetragonoloba (guar) gum.

According to the formulation we have prepared five samples of hair balm with different contents of keratin, the concentration of which varied in the range from 2 to 10%. Control samples of hair balm were prepared without adding keratin.

The determination of physicochemical and organoleptic properties were carried out and it was found that all samples are conform to normative standards and safe for use [3].

The rheological properties of the obtained keratin hair balms were determined and it was found that all samples are solid-like structured systems.

Conclusions. The hair balm was developed and the optimum keratin content was established. The keratin hair balm obtained by our formulation complies with the requirements of DSTU 4763: 2007 "Cosmetic balms. General specifications".

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52. Development of a vegetable oils blend for use in shampoos

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Introduction. Natural cosmetic oils without synthetic preservatives, dyes and petrochemicals are becoming increasingly popular. The most important characteristic of vegetable oils, which determines their properties as a cosmetic ingredient, is their fatty acid composition [1]. To balance the fatty acid composition commonly used the method of blending - the mixing of various vegetable oils in certain proportions [2].

To ensure the needs of the hair core in fatty acids, it is necessary not only to ensure their supply, but also to balance them in the correct ratio. Especially important for a cosmetic product are essential fatty acids that are not synthesized in the body and should come from the outside: it is linoleic (ω -6), α -linolenic (ω -3) and γ -linolenic (ω -6) acids [2]. Due to the oil blending it is possible to achieve the required ratio of PUFA.

Materials and methods. To calculate the ratio of oils, a calculator has been developed in software package Excel. To determine the quality of the vegetable oil blend were carried out standard methods: the estimation of iodine value (DSTU ISO 3961:2004), an acid value (DSTU ISO 660:2009) and estimation of saponification value (DSTU ISO 3657: 2004).

Results and discussion. During the research, we studied the composition and properties of twenty vegetable oils: apricot kernels, amaranth, peanut, baobab, grape seed, walnut, jojoba, wheat germ, hemp, sesame, flax, macadamia, almonds, safflower, cotton, as well as sea buckthorn, olive, castor, coconut, sunflower seeds. Selected 4 oils for combining: olive, linseed, sea buckthorn and coconut. They are the most balanced in composition and belong to different groups of oils: B2, B1, A1 and T2 respectively [2].

Using the developed methodology in the Excel program, the optimum composition of the oil bath is determined, which corresponds to the requirements of the balance of the fatty acid composition. For hair, the optimum ratio ω -3: ω -6: ω -9 fatty acids should be 4: 2.5: 1.5, respectively [1]. According to the calculations carried out in Excel, the PUFA ratio in the developed blend is 3.9: 2.2: 1.4, which is close to the balanced PUFA value. The content of oil (in%) in the blend is given in Table 1.

Table 1

The composition of the blend of vegetable oils (ω -3: ω -6: ω -9 = 3.9:2.2:1.4)

Name of the oil	Content %
Buckthorn Oil	9
Fruit oil	63
Coconut oil	10
Olive oil	18

To determine the qualitative parameters of the developed product, iodine value of the blend was determined - 207.1; acid value - 2,3; saponification value is 192.3.

A high iodine value indicates the freshness of the oil, and also that the blend will not form a film, which is an important condition for an ingredient of shampoo. A low acid value indicates the freshness of the oil.

Conclusions. A blend of vegetable oil with a balanced fatty acid composition has been developed. Qualitative parameters of the vegetable oil blend are checked, it is found that they correspond to normative values.

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53. Determination of optimal molar ratio of acetate and sunflower oil for cultivation of *Acinetobacter* sp. IMV B-7005 on their mixture

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Introduction. The main effectiveness criterion of mixed substrates using is ensuring the maximum full carbon conversion of both monosubstrates into exopolysaccharides (EPS), that achieved at optimal molar ratio of their concentrations in the mixture.

Materials and methods. *Acinetobacter* sp. IMV B-7005 was grown in such liquid mineral medium (g/l): 6.8 KH_2PO_4 , 0.9 KOH, 0.4 $\text{MgSO}_4 \cdot 7 \text{H}_2\text{O}$, 0.1 $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, 0.8 NH_4Cl , 0.001 $\text{FeSO}_4 \cdot 7 \text{H}_2\text{O}$. As a source of carbon and energy, the mixture of sodium acetate (0.5 %, w/w) and refined sunflower oil (0.15–0.55 %, v/v) was used. Inoculum was grown on refined oil (0.5 %, v/v). Expenditures and generation of ATP during ethapolan and biomass synthesis on acetate and sunflower oil were determined as described previously [1, 2].

Results and discussion. Finding the optimal substrate ratio requires: 1) calculating the energy of the biomass and EPS synthesis on energy-deficient substrate; 2) determining the concentration of energy-excessive substrate, which adds to refill the carbon loss of energy-deficient substrate under its oxidation to CO_2 to obtain the energy necessary for constructive metabolism [1, 2]. Then optimal molar ratio of monosubstrates is confirmed by experimental researches.

According to Babel's energy classification [2], acetate is energy-deficient substrate, and sunflower oil which contains higher fatty acids (mainly linoleic and oleic fatty acids) is an energy-excessive substrate.

On the basis of theoretical calculations of energy consumption for the synthesis of ethapolan and biomass, it has been determined that the optimal molar ratio of the concentrations of acetate and energy-excessive sunflower oil substrates in mixture was 1.0:0.13.

At the next stage, ethapolan synthesis was investigated at different molar ratios of sodium acetate and refined sunflower oil in the medium mixture.

Experiments have shown that the highest values of ethapolan synthesis (3.43 g/l synthesized EPS, EPS-synthesizing ability of 2.69 g EPS/g biomass) were observed at the molar ratio of monosubstrates in mixture 1.0:0.18, which is as close as possible to the theoretically calculated one (1.0:0.13).

Conclusions. Thus, it has been determined that optimal molar ratio of energy-deficient (acetate) and energy-excessive (sunflower oil) substrates for cultivation of *Acinetobacter* sp. IMV B-7005 on their mixture was 1.0:0.18.

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Special thanks to *Okopna Y.V.* for helping with translation

54.Improvement of biotechnology for the production of recombinant interleukin – 7

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Introduction. Presence of foreign DNA in recombinant microbial strains increases their sensitivity to culturing conditions. One of the limiting factors when they submerged culturing for assurance of maximum end product yield.

Materials and methods. Need appears in comparative analysis of the effects of various stirring regimens and establishment of the optimal rate values to be used in industrial and laboratory conditions during the process of submerged culturing of recombinant bacteria. The regularities between culturing regimens have to be identified, and peculiarities of the mechanisms of stirring effects in submerged culturing conditions on morphological structure of recombinant bacteria cells, their viability and productivity have to be determined.

Results. Having analyzed results, we have arrived to the conclusion that more sparing process regimens need to be applied for recombinant microorganisms versus the ordinary strains. Let's take a closer look at culturing conditions and experiments conducted by scientists in different recombinant bacteria species, and compare the effect of stirring regimens o biomass increment, proteins accumulation and external structure of microbial cells, and try to establish the causes of such effect.

During investigation of stirring and aeration effects on synthesis by recombinant strain *Escherichia coli* SGK25/pIF TREN, the experiments were carried out for three cases: in variable aeration intensity and stirring duration, in variable aeration and constant stirring rate, in constant aeration and variable stirring rate. During the experiment, the stirring rate was varied within the range of 50 rpm to 400 rpm. The highest biomass quantity was accumulated with constant aeration and stirring intensity 200 rpm, and the maximum metabolite yield was seen at constant aeration intensity and stirring rate 400 rpm.

In studies of the effect of stirring and aeration on growth kinetics of bacteria *Thermusthermo philus* HB 27, it was established that the culture growth rate increases with increase of stirring and aeration intensity. Nevertheless, the increase of stirring rate has more weighty contribution than the increase of aeration intensity. Increase of stirring device rotation rate from 200 to 300 rpm resulted in increase of bacterial growth rate by a factor of 2, and the highest biosynthesis productivity (biomass accumulation and product yield) were seen at 500 rpm.

Conclusions. That stirring rate exerts essential influence in submerged culturing of recombinant bacteria and represents one of the limiting factors of this process. Besides, the ratio between stirring duration, aeration intensity, and nutrient medium composition is of great importance.

55. Substantiation of the choice of a modifying agent for the production of acid dextrin

Viktoriia Myrhorodska, Tetiana Avdienko, Mykola Nikolenko

Ukrainian State University of Chemical Technology, Dnipro, Ukraine

Introduction. In the modern food industry, various nutritional supplements are used: preservatives, dyes, flavors and others. Widely used nutritional supplements that regulate the consistency of food systems. In particular, it is a group of gel-forming agents, stabilizers and thickeners, which include degradation products and various modifications of native starches. One of the representatives is dextrin (E-1400) [1].

Materials and methods. The material for the exploration is corn starch. As a modifying reagent, inorganic acids with different concentrations were used: phosphoric acid and hydrochloric acid. The basis of this exploration is the method of acid production of dextrin and determination of solubility. The method of infrared spectroscopy was used to identify the dextrin samples.

Results. For the choice of a modifying agent in the production of acid dextrin, the time of soaking of corn starch and the concentration of acids was changed.

As a result of the exploration samples of acid dextrin of yellowish-white color were obtained. The performed microscopic studies of these samples showed that the starch granule remained unaltered after the modification.

It is established that in the IR spectra of both native corn starch and modified samples there are bands differing in intensity and frequency of oscillations of certain molecular bonds, there are distinctive features of peaks at intensity and width of absorption bands.

An important characteristic feature of starches is their solubility in cold water. Therefore, having determined the solubility of the obtained samples of dextrin, it was found that the best solubility is the acid dextrin obtained using phosphoric acid for modification. In addition, the time is soaking the starch in acid. To determine the effect of this factor on the properties of the samples, they were kept in acids for 6 hours and 10 hours. As the experiment showed, with increasing time of soaking, the solubility of dextrin is better.

Varieties of dextrin are determined not only by the color after drying, but also by coloration as a result of interaction with iodine. Namely, during the hydrolysis of starch in acid, amylopectin is initially formed, then erythropectin, ahropectin and the last stage is maltodextrin. Amylopectin dissolves in hot water and gives a blue coloration with iodine, and erythropectin has the ability to dissolve in cold water and when interacting with iodine gives a red color. Acropectins and maltodextrins have the ability to dissolve under any conditions and do not give coloration with iodine. That is, as dextrin forms, their solubility in cold water rises, and the iodine reaction is lost. Obtaining samples in reaction with iodine gives a blue color corresponding to amylopectin.

Conclusions. The use of acidic modification of native corn starch phosphoric acid is substantiated. Its optimum concentration and soaking time are determined. It is established that the best solubility in cold water is given by dextrin with a longer shelf life in acid. According to the results of the study amylopectin was obtained.

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56. Development of a vegetable oils blend for use in shampoos

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Introduction. Natural cosmetic oils without synthetic preservatives, dyes and petrochemicals are becoming increasingly popular. The most important characteristic of vegetable oils, which determines their properties as a cosmetic ingredient, is their fatty acid composition [1]. To balance the fatty acid composition commonly used the method of blending - the mixing of various vegetable oils in certain proportions [2].

To ensure the needs of the hair core in fatty acids, it is necessary not only to ensure their supply, but also to balance them in the correct ratio. Especially important for a cosmetic product are essential fatty acids that are not synthesized in the body and should come from the outside: it is linoleic (ω -6), α -linolenic (ω -3) and γ -linolenic (ω -6) acids [2]. Due to the oil blending it is possible to achieve the required ratio of PUFA.

Materials and methods. To calculate the ratio of oils, a calculator has been developed in software package Excel. To determine the quality of the vegetable oil blend were carried out standard methods: the estimation of iodine value (DSTU ISO 3961:2004), an acid value (DSTU ISO 660:2009) and estimation of saponification value (DSTU ISO 3657: 2004).

Results. During the research, we studied the composition and properties of twenty vegetable oils: apricot kernels, amaranth, peanut, baobab, grape seed, walnut, jojoba, wheat germ, hemp, sesame, flax, macadamia, almonds, safflower, cotton, as well as sea buckthorn, olive, castor, coconut, sunflower seeds. Selected 4 oils for combining: olive, linseed, sea buckthorn and coconut. They are the most balanced in composition and belong to different groups of oils: B2, B1, A1 and T2 respectively [2].

Using the developed methodology in the Excel program, the optimum composition of the oil bath is determined, which corresponds to the requirements of the balance of the fatty acid composition. For hair, the optimum ratio ω -3: ω -6: ω -9 fatty acids should be 4: 2.5: 1.5, respectively [1]. According to the calculations carried out in Excel, the PUFA ratio in the developed blend is 3.9: 2.2: 1.4, which is close to the balanced PUFA value. The content of oil (in%) in the blend is given in Table 1.

Table 1

The composition of the blend of vegetable oils (ω -3: ω -6: ω -9 = 3.9:2.2:1.4)

Name of the oil	Content %
Buckthorn Oil	9
Fruit oil	63
Coconut oil	10
Olive oil	18

To determine the qualitative parameters of the developed product, iodine value of the blend was determined - 207.1; acid value - 2,3; saponification value is 192.3.

A high iodine value indicates the freshness of the oil, and also that the blend will not form a film, which is an important condition for an ingredient of shampoo. A low acid value indicates the freshness of the oil.

Conclusions. A blend of vegetable oil with a balanced fatty acid composition has been developed. Qualitative parameters of the vegetable oil blend are checked, it is found that they correspond to normative values.

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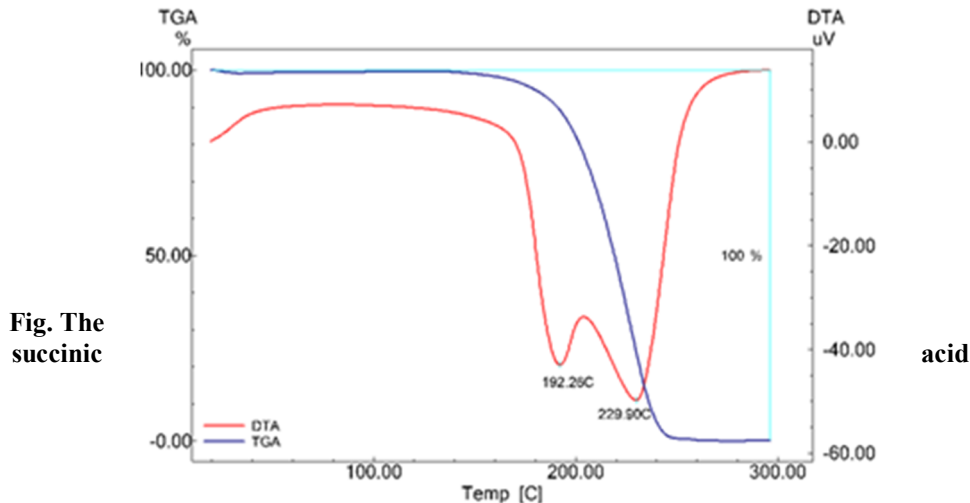
57. Determination of the thermal stability of succinic acid on air

Oleksandr Popov, Anastasiia Serhiienko, Igor Fesych, Nataliya Sabadash
National University of Food Technologies, Kyiv, Ukraine

Introduction. Succinic acid is a food additive E363 and belongs to the class of antioxidants. It is contained in cheese, rye bread, some fruits and berries. Since succinic acid is used in various technological processes associated with different thermal processing of raw materials, in particular in the manufacture of bakery and confectionery products, it is important to study the thermal behavior of the investigated food additive and determine the temperature of its decomposition.

Materials and methods. The object of the study was crystalline succinic acid. The thermogravimetric analysis was carried out on a derivatograph DTG 60H of the Japanese company Shimadzu. The experiment was carried out in aluminum crucibles on air (21% O₂, 78% N₂ by volume) in the temperature range 20 ... 300 °C at a heating rate of 20 °C·min⁻¹. The weight of the succinic acid was ~ 5 mg. The thermograms recorded the temperature changes (T), mass (TGA) and the differential temperature variation curve of the sample (DTA).

Results. In fig. the thermogram of succinic acid is given at a heating rate of 20°Cmin⁻¹. On the DTA curve it is possible to fix two endo-effects. The first effect observed at a temperature of 192 °C and not related with the loss of sample mass corresponds to the acid melting process. The second endo-effect at 230 °C is associated with mass loss and corresponds to the process of decomposition or destruction of succinic acid. First there is a process of dehydration with the formation of anhydride, which is further transformed into ethylene, CO and CO₂.



thermogram at a heating rate of 20 °C · min⁻¹.

Conclusions. According to the results of our research, it was found that acid does not change until reaching 200 °C (there is no chemical transformation); after this temperature there is a decomposition, so it is technologically expedient to use the food additive E363 in the temperature range from room temperature to 200 °C.

58. Synthesis and characterization of aliphatic sulfonyl amides

Ivan Markushyn, Olena Podobiy

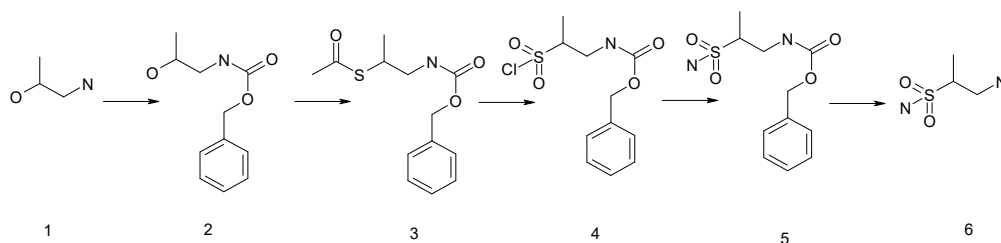
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Introduction. That include sulfonamide $-\text{SO}_2\text{NH}-$ group occurs in numerous biologically active compounds, which include antimicrobial drugs, saluretics, carbonic anhydrase inhibitors, insulin-releasing sulfonamides, antithyroid agents, antitumour drugs and number of other biological activities [1-3].

Sulfonamides are among the most widely used antibacterial agents in the world, chiefly because of their low cost, low toxicity and excellent activity against common bacterial diseases. The synergetic action of sulfonamides with trimethoprim has brought about enormous resurgence of sulfonamide usage everywhere over the last decade.

Materials and methods. This prompted us to synthesize a series of novel symmetric aliphatic sulfonamides.

Results. We start our synthesis from aminoalcohol **1**, which was protected by benzyl carbamates group on the first stage to form **2**. Next stage was classical Mitsunobu reaction with substrate **1** and thioacetic acid which gives the S-acyl derivative **3**. Then after a few attempts, we find that chlorination by chlorine in acetic acid/water is the best method to get the sulfochloride **4**. Transitional phase of synthesis sulfonamide **5** was carried out as follows: to ammonia solution in THF was added by slowly dropwise THF solution of sulfochloride **4**, maintaining the temperature between 5 and 10°C. Then, the reaction mixture was stirred for 24 h at room temperature (completion of the reaction was monitored by TLC). After the completion of the reaction, solvent was evaporated in vacuum. The solid residue was purified by column chromatography.



Conclusions. The last stage of synthesis is the removal of aminoprotection group in concentrated HCl, keeping the temperature in the limit of 60 °C.

Finally, we identified the optimal version of the synthesis and developed a method for derivatives of aliphatic sulfamides.

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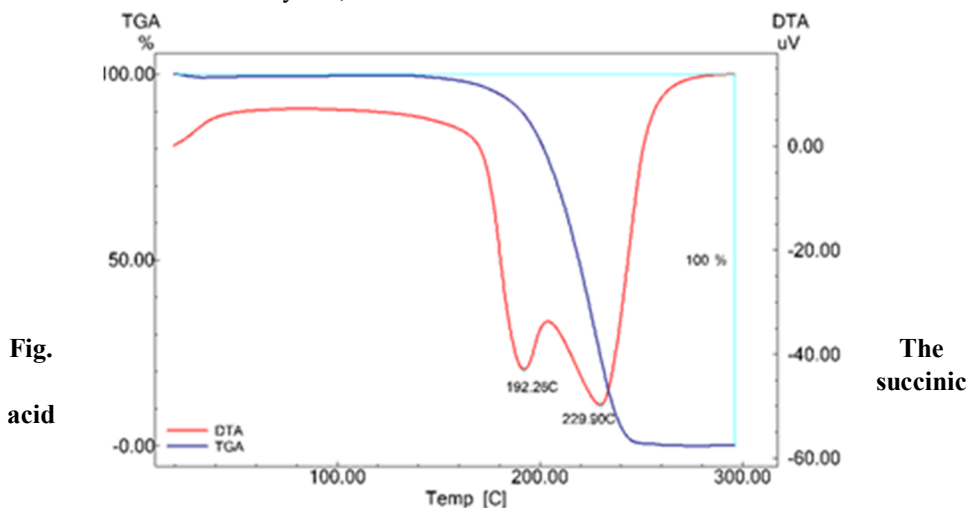
59. Determination of the thermal stability of succinic acid on air

Oleksandr Popov, Anastasiia Serhiienko, Igor Fesych, Nataliya Sabadash
National University of Food Technologies, Kyiv, Ukraine

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Materials and methods. The object of the study was crystalline succinic acid. The thermogravimetric analysis was carried out on a derivatograph DTG 60H of the Japanese company Shimadzu. The experiment was carried out in aluminum crucibles on air (21% O₂, 78% N₂ by volume) in the temperature range 20 ... 300 °C at a heating rate of 20 °C·min⁻¹. The weight of the succinic acid was ~ 5 mg. The thermograms recorded the temperature changes (T), mass (TGA) and the differential temperature variation curve of the sample (DTA).

Results and discussion. In fig. the thermogram of succinic acid is given at a heating rate of 20 °C·min⁻¹. On the DTA curve it is possible to fix two endo-effects. The first effect observed at a temperature of 192 °C and not related with the loss of sample mass corresponds to the acid melting process. The second endo-effect at 230 °C is associated with mass loss and corresponds to the process of decomposition or destruction of succinic acid. First there is a process of dehydration with the formation of anhydride, which is further transformed into ethylene, CO and CO₂.



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Conclusions. According to the results of our research, it was found that acid does not change until reaching 200 °C (there is no chemical transformation); after this temperature there is a decomposition, so it is technologically expedient to use the food additive E363 in the temperature range from room temperature to 200 °C.

60. Perspective of using carotenoids extract against oxidation process in cosmetic products

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Introduction. The synthetic antioxidants use is decreasing due to their ability to accumulate in a human body and potential carcinogenic effects. Natural antioxidants are widespread in plant materials because they protect them from oxidative stress. They can be extracted as pure compounds and their mixture from raw plant materials and used as preservatives for cosmetic or food products to prevent oxidative process.

Materials and methods. The method of liquid extraction was used to extract active compounds from marigold flowers. There was used a range of organic solvents during the process to increase the proportion of carotenoids in the extract and reduce the number of other compounds: hexane, ethyl acetate, isopropyl alcohol, chloroform.

Results and discussion. Target substances were mixture of carotenoids from natural source. It was found that carotenoids are able to quench singlet oxygen and interact with free radicals. The natural source of carotenoids was chosen the flowers of marigolds (*Tagetes Erecta*). These plant have a high amount carotenoid, especially a lot of lutein in them (Figure 1).

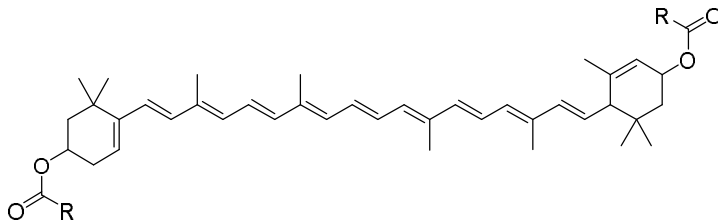


Figure 1 – Structure molecule of lutein

Lutein in plants are esterified mainly with lauric, myristic, palmitic and stearic acids in different proportions. Since in natural raw material lutein is in the form of an ester, the selection of the methodology process of the extraction was carried out taking into account the features of this compound. The optimal mode of extraction process taking into account the features of the extracted substance has been selected. Gravimetric analysis and evaluation of the obtained dry residues have been carried out. The obtained extracts have shown antioxidant activity in preliminary studies. This gives us the opportunity to consider both promising them as natural compounds for cosmetic products.

Conclusions. Now studies are being conducted to determine the exact antioxidant capacity of the obtained extracts. Identification of the chemical composition and number of individual compounds in the extracts is carried out.

61. Production technology of sugar glycerides (food additive E474)

Yulia Korobka, Olga Haletiy, Svitlana Kovaleva

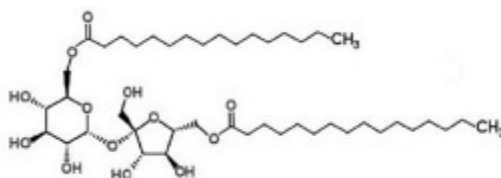
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Introduction. Sugar glycerides are products of re-esterification reaction between fats and carbohydrates. They are able to stabilize and emulsify food products, keep their viscosity and improve their consistency. Sugar glycerides are used in the production of food coatings.

Materials and methods. Sugar, palm fat, dimethylformamide, potassium carbonate, ethanol, methods of organic synthesis, literature. An analytical review of the literature was conducted, experience was learned with the technology of obtaining of sugar glycerides - food additive E474 and its properties.

Results. Sugar glycerides are complex mixtures of reaction products between fats and sucrose. The chemical composition and the consistency of the additive E474 depends on the selected starting compounds, their ratios, and the conditions of the reaction. If saturated fat is used, the resulting sugar glycerides are of semi-solid consistency, that is convenient to transport and dose of the additive obtained. Sugar glycerides, obtained by the esterification of sugars with different types of edible fats or oils, consist of mono- and di-esters of sucrose and edible fatty acids with mono-, di- and triglycerides. Sugar glyceride stability to high temperatures depends on the sugar content in this additive.

Sugar glycerides can be obtained in laboratory by esterification reaction between sucrose and edible fats or oils, for instance palm oil, in any polar organic solvent or without the use of solvent. Besides the target sugar glyceride, some by-product are also identified. They are different products of sugar decomposition, potassium salts of fatty acids, contaminations of solvent. Sugar glyceride, to be permitted for use in food industry, must be carefully purified of contaminations. One of the industrial methods to obtain sugar glycerides is reaction between sucrose and solid fats under heating in dimethylformamide solution in presence of potassium carbonate.



Sucrose dipalmitate

The final product is isolated by evaporation of the solvent and subsequent twice extraction of the reaction mixture with hot ethanol. The sugar glycerides crystallize when the alcohol extract is cooled. Although sugar glycerides are considered as one of the most available food additives, there is no any final conclusion concerning to safety of its use. Effect of the additive E474 on the human body has not been studied finally yet, so sugar glycerides are temporarily excluded from permitted additives list in many countries.

Conclusion. Sugar glycerides are perspective emulsifying additive for use in various food production. However, their production requires careful selection of starting reagents, solvents, catalysts and process parameters, since all these factors affect chemical composition of product, that in turn influence their emulsifying properties and human health safety.

62. Study of chemical transformations in sunflower oil during heat treatment by NMR ^1H spectroscopy

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National University of Food Technologies, Kyiv, Ukraine

Introduction. Sunflower oil consists of glycerol esters and oleic and linoleic acids almost 90%. The last one is a predominance component. The purpose of the work is to study chemical transformations taking place in refined sunflower oil during long heating oil by NMR ^1H spectroscopy.

Materials and methods. Refined sunflower oil of the brand "Chumak", heat treatment of an oil sample at 230 – 240 °C. Monitoring of chemical transformations results in oil is carried out in 30, 60, 90, 120 minutes from the beginning of the experiment by NMR ^1H spectroscopy with the equipment "Varian VXR-300", as internal standard, TMS is used, a solvent CDCl_3 .

Results. The ^1H NMR spectrum of an oil sample prior to the start of the experiment shows peaks characteristic of the protons of the glycerol part. Picks of oleic and linoleic acids skeletons protons are also observed. These results are consistent with literature data regarding the fatty-acid composition of sunflower oil. The monitoring of the chemical composition of the oil sample and the comparative analysis of the integral intensities of hydrogen atoms picks in the spectra obtained show that linoleic acid moieties tend to undergo the most significant changes under heat treatment process. It is evidenced by the decrease in the area of the CH_2 signals of the bis-allylic fragment of the carbon skeleton from the beginning of the experiment to 120 minutes of heating (Table 1). The spectra show the gradual decreasing of hydrogen atoms picks that are characteristic of linoleic acid.

Table 1. Changes in the intensity of proton signals in ^1H NMR spectra from the initial value, %

The duration of the experiment	Intensities of protons signals as a percentage of the initial value,%		
	Bis-allylic- CH_2 -groups of linoleic acid at 2.77 ppm	Vinylic $-\text{CH}=\text{CH}-$ at 5.33 ppm	Allylic CH_2 groups of bond $-\text{CH}_2-\text{CH}=\text{CH}-\text{CH}_2-$ at 2.31 ppm
0 min.	100	100	100
30 min.	92	92	95
60 min.	70	80	90
90 min.	45	52	77
120 min.	36	42	76

The integral intensities of the signals of the vinylic and allylic hydrogen atoms change less as compared to bis-allylic ones.

Conclusions. During the heat treatment of sunflower oil, triglyceride molecules undergo irreversible transformations. The most sensitive fragments of triglycerides are bis-allylic groups $-\text{CH}_2-$ of linoleic acid moieties that undergo the most major transformations. The degree of irreversible transformations in oil is in direct proportion to time of heat treatment.

63. Determination of fatty-acid composition of fat in confectionery product «Kyiv cake»

Neliubina Alexandra, Kryshtof Valentyna

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Introduction. On the label of the product «Kyiv cake» there is no detailed list of used fats available in its composition, therefore, it is advisable to study the fatty acid composition of the product.

Materials and methods. A sample of the «Kyiv cake» confectionery product, solvent for extraction of hexane, research methods – liquid chromatography.

Results. According to the data of liquid chromatography, the mass fraction of fatty acids in the fat of the confectionery «Kyiv cake» is 92%, among them, saturated and unsaturated acids make up 43,6% and 48,5% respectively. The dominant components of saturated acids are palmitic, myristic, lauric acids. Oleic and linoleic acids are predominate among unsaturated acids. Other acids are minor components. The average molecular weight of fat is 512.

Based on the data on the average fatty acid composition of milk fat, in which the mass fraction of myristic, palmitic and oleic acids is 14,5%, 32-36% and 15-26% respectively, it appears that the fatty basis of the confectionery product "Kyiv Cake" contains about 60% of butter, indicated on the label as "Extra". The content of oleic acid in the fat of the confectionery product exceeds twice its content in milk fat. It means, some vegetable fats with the predominant content of this acid were added to the confectionery product.

Table 1. Content of some fatty acids in the fat of the confectionery product "Kiev cake" and in the fat of milk.

Fatty acids	Mass fraction of fatty acids, %	
	<i>Milk fat</i>	<i>«Kyiv cake»</i>
Saturated acids	68	43,6
Palmitic	34,6	23,8
Myristic	14,5	8,7
Lauric	4,8	3,1
Unsaturated acids	26	48,5
Oleic	21	40,2
Linoleic	0,9	5,7

Conclusions. As a result of this work, the fat content in the confectionery product "Kyiv Cake" was determined. The defined fatty acid composition does not contradict the information indicated on the label.

64. Snail slime as an alternative to cosmetic products with mucin

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Introduction. One of the biggest problems today is the development of dermatitis – diseases of the human skin, the occurrence of which is associated with both the constant impact of environmental factors (microorganisms, animals-parasites, viruses, air temperature, harmful radiation), and changes in the human body (diseases of internal organs, disorders of the nervous system, endocrine disorders). Skin diseases entail a number of consequences, including the formation of scars, blood infection, cancer, etc. A large number of tools and procedures for the treatment of skin diseases are used, but almost all of them are expensive and not always effective. However, in recent years, cosmetics which include mucin (mucus) of snails in the treatment of dermatitis has acquired great popularity.

Materials and methods. The snails *Achatina fulica* and their slime were the material for research. The scientific research method was the main method used.

Results. The use of snails for medical purposes has been known since ancient times. Hippocrates used a mixture of crushed snails and sour milk to treat skin diseases and blood flow; snail mucus was used to treat whooping cough, wound healing, prevent aging [1; 2].

The mucus of giant *Achatina (Achatina fulica)* is used much more often for producing cosmetics based on snail mucin. The quality of snail slime depends on the environmental conditions, as well as on what the snails eat. But the most important factor affecting the quality of mucin is the method of collecting, because the most qualitative slime of the snail is secreted in the calm state, in the familiar environment. The greater the stress snails get, the less the quality of their slime is.

Snail slime consists of 90% of water, and the remaining 10% include enzymes, antimicrobial peptides, glycolic and hyaluronic acid, collagen, elastin and vitamins A, E, and C. Thanks to this qualitative composition, snail mucus has such properties, as wound healing, prevention of scarring, anti-aging effect, antimicrobial, moisturizing and protective properties. Since snail mucin has a wide range of properties, it is actively used as a basis for creams (Snail Repair Perfect Cream), serums (Snail Repair Intensive Ampoule), emulsions (Gold 24K Snail Essential Emulsion), gels (Snail Soothing Gel) and masks (Pureness 100 Snail Mask Sheet).

Conclusions. The use of cosmetic products based on snail mucin is quite effective methods of treatment for skin diseases. In addition, due to the wide range of properties and relatively inexpensive cost, the use of these cosmetics can significantly reduce the cost of treatment and prevention of dermatitis.

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65. Ecological problems in production of ethanol from starch-based raw materials

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Introduction. The instability of the market situation leads to the need to find ways to increase the efficiency of productions or solve problems.

Materials and methods. One of the most important problems is the issue of integrated use of material resources by improving technological processes, introducing non-waste technologies, expanding recycling of secondary resources and utilizing waste products. The maximum use of waste allows you to save valuable raw materials, it is better to organize the protection of the environment from pollution. The main wastes are: bard, carbon dioxide, yeast-saccharomycetes, sewage.

Results and discussion. The bard is formed during the distillation of the mature bug. The content of dry matter depends on the raw material that is processed, and is 8-10%. The composition also includes nitrogenous substances (proteins, amino acids, etc.), nitrogenous substances -hydrocarbons, and also a small amount of fats and minerals. Barda is considered a valuable fodder product due to the high content of B group vitamins. In most alcoholic plants of Ukraine, this production waste is dumped into the fields of filtration, along with sewage, quickly decay, produce unpleasant odors, and also cause insect reproduction. Abroad use alcoholic bard for the production of dry protein feed. The processing of bards in a dry granulated feed product includes four main stages: the separation of bards on the liquid and dispersed phases; evaporation of filtrate bards to dry matter content 40%; drying of products of first and second stages; granulation of dry bards.

The second direction of utilization of post-alcohol bardes is the production of biogas. Biogas is a fermentation product (methane fermentation) of organic waste of any origin. At the same time, it should be noted that in the distilleries the most favorable conditions for organizing the production of biogas are: available raw materials (waste) with a temperature of 40-50° C, as well as secondary heat sources (condensates, luriert water, etc.). Depending on the content of methane, the energy content of biogas is 23-25 MJ / m³, which is 70% of the energy intensity of natural gas. Biological treatment of after-alcoholic bardes allows additionally to get from 1800 to 3000 m³ of biogas per 1000 decalitres of alcohol, which is equivalent to 40% of the demand for natural gas of alcohol the factory. At the same time, 70-90% can reduce pollution of sewage, obtain high-quality organic fertilizers and create autonomous production of bioethanol with a closed cycle of energy and water consumption. At the distilleries processing the starch-based raw materials, household and industrial waste water is a waste of production. At many plants, such waste water is not cleaned and sent to bardo-settlers. Production of 1,000 decalitres of ethyl alcohol is accompanied by the amount of sewage in the volume of 80-95 m³. The contamination of such wastewaters according to the CSC is 900-1300 mg / dm³.

Conclusion. Therefore, with such contamination anaerobic purification with subsequent aerobic purification in aerotanks is used with the help of microorganisms immobilized on a stationary fibrous carrier. This way reduces the specific air flow, accelerates the output to the regulated cleaning regime and improves its efficiency.

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66. Search for alternative filtering materials in production of beverages

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Introduction. Today's situation in food industry, including the production of beverages, requires economic and expedient use of resources. Therefore, the search for alternative filtering materials in water conditioning technology for the production of beverages is one of the key tasks.

Materials and methods. Investigated natural materials (PM) - natural opal and rauchotopas, quartz sand (control sample). Applying methods of modeling, capillary-photometric and photometric analysis, theoretical generalization and comparison, system approach. To determine the optimal parameters of filtration and organoleptic and physico-chemical parameters of water prepared for the production of beverages, an experimental plant operating in a dynamic mode was used.

Results and discussion. Water was filtered through a layer of appropriate PM and control sample (quartz sand). The process of conditioning the water was cyclic and consisted of the following consecutive operations:

- preparation of the corresponding PM;
- Filtration of water through the layer of the corresponding PM to reach the maximum permissible values of the parameters according to the JIS 15.9-37-237 [1].

On the basis of the conducted researches it was established that at the rate of water filtration 8-15 m / h in case of application of natural opal and rauchotopase, the organoleptic and physico-chemical parameters of the water prepared are optimal. Compared to quartz sand, the samples tested have higher mechanical strength: rauchotopas 4%, natural opal 2%, and ash less than 2 times. The application of the studied materials allows to increase the filtration cycle by 20-35% and reduce the flow of water for washing by 35-40%, increase the capacity of mechanical impurities by 20-25% compared with the control sample of quartz sand

According to the results of research, it was found that in the case of water filtration through natural opal and rauchotopase in comparison with quartz sand (control sample):

- water conditioning is provided on the basis of organoleptic characteristics, with the color and turbidity reduced by 100%;
- does not increase the content of silicates, calcium and magnesium in the filtrate;
- the content of iron and manganese is reduced to 1.5 times;
- permanganate oxidation decreases by 25%.

The difference between the optical water density before and after the treatment characterizes the filtering ability of the materials, which is expressed as the purification effect as a percentage of the original optical density value. It is determined that the effect of purifying the initial water by the investigated materials by 20 - 25% is higher than in quartz sand.

Conclusion. The results of the study indicate that natural minerals natural opal and rauchotopes are promising for use in mechanical filtration systems for water conditioning for the production of beverages in comparison with quartz sand.

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67. Development of sauces for long-term storage sauces

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Introduction. One of the most important socioeconomic tasks facing our society today is meeting the needs of the population in high-quality food products in accordance with scientifically justified consumption standards.

Results and discussion. Previously, food industry faced with the challenge of expanding the range and improving the quality of products. This applied in full to the production of meat products, including cooked sausage products, which account for a significant share in the total volume of meat products. We have developed recipes of cooked sausage products of extended shelf life, for the improvement of taste and biological properties of which the development of various types of sauces has been proposed.

The purpose of the work was to develop various types of sauces for long-term sausage products.

Sauces for filling cooked sausage products can be classified into the following groups:

1. Salt solution of different concentrations.
2. Acidified solution without salt.
3. Fat-based sauce (emulsified on vegetable oils or animal fats)
4. Classical sauces: sour-sweet sauce, based on vegetables and fruits; tomato - vegetable and fruit base, white sauce - animal and milk basis; Cream - on animal bouillon; Behamel is based on flour, cream and animal fats.
5. Cheese Sauce

At the first stage of the study, the recipes of the sauces are presented in Table 1.

Table 1.–Model recipes of sauces for filling canned sausages.

Ingredients of recipes	Content in the formulation, %				
	1	2	3	4	5
Plum duct	30	30	-	-	30
Sugar	8,0	8,0	-	-	-
Fatty base (vegetable oil)	40	50	60	70	60
Salt	2,0	2,0	-	-	-
Tomato paste			30	30	
Water	20	10	10	-	10

In future, the rheological characteristics of sauces, physical and chemical parameters before and after heat treatment will be investigated. An optimum option for filling the long-term storage of sausages will be determined.

Conclusion. There are many ways to improve boiled sausages, extended shelf life. Sauces help get the finished product with high flavor properties and a pleasant appearance. They affect not only organoleptic parameters, but also the physical, chemical and technological properties of the finished product.

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68. "Green Practices" in the restaurant industry

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Introduction. Healthy eating becomes more popular in the modern world. Research of professional journals has shown that this trend influences the restaurant sphere all over the world.

Materials and research. Following the trend of sustainability, many organizations in the restaurant industry have considered this movement as an opportunity and have started to "go green." Roberta Atzori, Valeriya Shapoval and Kevin S. Murphy analyzed Starbucks, the American global coffeehouse chain. Through an importance-performance analysis, they investigated the gap between the importance assigned by customers to a set of green practices that can be implemented by restaurants and their perception of Starbucks' performance. The results suggest that, by making some green practices visible to their customers, Starbucks is creating the perception that the company is performing well in several other "green" areas.

"Green Practices" (GP) have become a major concern in the restaurant industry as a means of increasing social benefits and for sustaining business in the long run. Applying Stakeholder Theory to managers' GP orientations, the study of Gunae Choi MS and H. G. Parsa examined managers' attitudes, preferences, and involvement with regard to GP and assessed the relationship between the psychological factors and managers' willingness to charge a premium to support such practices. The results of the study suggested that willingness to charge higher prices for socially responsible practices was significantly influenced by managers' preferences for and involvement in such practices. Importantly, it was illustrated that managers' preferences for such practices affect their decision to increase prices by more than 6%. On the other hand, it was also indicated that their attitude about GP measured by health concerns, environmental responsibility, charity, and consumer communication had little or no effect on managers' willingness to increase prices for socially responsible practices

Given the healthy eating trends and the growing popularity of Asian cuisines in the USA, the research of Jung Kuk Jang and Anna S. Mattila investigates the interaction effect of gender and two types of health cues, namely core menu attribute (perceived healthiness-chicken vs. beef) and menu background colour (green vs. white) on consumer attitudes toward Korean dishes. The findings indicate that pairing a chicken dish with a green menu background leads to highly favorable attitudes among women. Men, on the other hand, exhibit similar attitudes toward chicken and beef dishes with a green background. Such gender differences are attenuated with a white (neutral) menu background.

Conclusion. The GRA rates existing restaurants and food-service operations with points in seven environmental categories. These categories are water efficiency, waste reduction and recycling, sustainable furnishings and building materials, sustainable food, energy, disposables, chemical and pollution reduction.

Certified Green Restaurants need to accumulate points to be certified, have a full-scale recycling program, be free of Polystyrene Foam, and fulfill yearly education requirements.

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69. Value of protein for athletes and ordinary people

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Introduction. In the modern world, the issue of nutrition has become more urgent as speed of our lives and amount of work require food to be more balanced and healthy. Therefore, people explore components and energy value of food. I want to pay more attention to protein for athletes and ordinary people.

Materials and methods. Proteins are large compounds of smaller amino acid structures. They are macronutrients and give the body energy in the form of calories. 1 gram of protein contains 4 calories. Nowadays we begin to think more about a healthy lifestyle, going to the gym and exercise in general. They are becoming more popular and special attention has to be paid to nutrition and amount of protein.

Results and discussion. Scientists say that people should eat proteins every day, but their amount depends on men's health, level of activity and age. The Dietary Guidelines recommends that approximately 10-35% of total calories accounted for protein [1]. When a person begins to exercise more, his body needs more calories. According to the results of research, the best addition to the usual food is pure protein. Protein powders can come from plant or animal sources. The most common of them are whey, soy and casein protein. Peter Horvath, Assistant Professor in the Department of Exercise and Nutrition Sciences at the University of New York at Buffalo says: "Whey powder is used most often because it is a water-soluble protein. It is also valuable because of its properties." [2].

The most important thing for athletes is to restore power without replenishment of calories burned during exercise. Protein restores the structure of the muscles and promotes their growth, enriches the body with amino acids, and provides energy for further activity and normal life.

Pure protein is a great bonus for a supplement, but it is worth treating it with caution. We do not actually know what a powder contains besides protein. Professor Wayne Campbell's program at Purdue University researched how nutrition and exercise affect on the metabolism and health of people through the life course. In an interview with WebMD (an American corporation - an online publisher of information on human health and well-being), he said: "Some powders may contain unexplored ingredients. And the problem here is not that they are dangerous in themselves, but that we simply do not know what effect they will have on the body in the future" [3].

Conclusion. For a person with standard life parameters it is easy and affordable to replenish protein reserves from common foods. These foods include meat, fish, milk, grains, and the richest protein beans.

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70. Profession "Food Technology and Engineering" in the World

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Introduction. Food science & technology is the branch of applied sciences that combines the fundamentals of biochemistry, physical sciences and chemical engineering to study the physical, chemical and biological nature of food items. In simple words, food science deals with the manufacturing, processing, treatment, preservation, and distribution of food.

Materials and Methods. We as undergraduates need expect to take an assortment of rigorous courses covering chemistry, biology, calculus, statistics, nutrition and health. We are also frequently required to take classes on writing and oral expression, since food scientists often perform advisory functions for the government or food processing companies.

Ideally you need to have Physics, Chemistry, and Biology (PCB) combination in your 10+2, and may be Mathematics as well. At Bachelors level, ideal courses are 3-year or 4-year degree courses in Food Science, Food Technology, Food Science and Technology, or Food Science and Agriculture. Now demand is growing on such profession as Food Science & Technology Professional. Food Science is still a very new discipline, and it is growing due to rapid urbanization and lifestyle changes worldwide. Being a branch of applied sciences, Food Science is very multi-disciplinary in nature, just like Biomedical Science, Pharmacy or Translational Science.

Results. So Food Scientists are the innovators of all things edible, from creating new products and flavour combinations to learning how to process foods to reduce food and energy waste.

Food technologists may specialise in fields such as meat, dairy, seafood, cereal products, confectionery, snack foods, beverages and minimally processed fresh produce. On a day to day basis, however, food scientists could be called on to do the following things:

- Maintain safe and hygienic conditions during processing, storage, packaging of food.
- Check raw ingredients and processed food for nutritional value, safety and quality.
- Research aspects of food processing, food preservation, food quality, food deterioration, packaging, storage and delivery in order to improve them.
- Check food consistency for colour, texture and taste.
- Develop and look after food standards.
- Design new food products and the techniques needed to make them.
- Supervise cleaning and maintenance of food processing machinery.
- Do comparisons with products from other brands and write reports for management about new products and market trends.
- Supervise the effective transportation of foodstuffs such as fruit, vegetables and milk – making sure that the product quality is unaffected.
- Be the quality control king in a food manufacturing factory.

Conclusions. A food scientist could work in any number of roles including, food technologist, new product developer, food testing, laboratory scientist, food microbiologist, quality manager, or even a nutritionist. Food scientists work in any industry which is related to food – from major food and beverage brands to research organisations, to flavour producers and regulatory authorities.

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71. Nanotechnology in food preservation

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Introduction. Nanoscience emerges from the understanding of physical and chemical processes at the molecular or atomic level. The NANOFOODS initiative focused on translating such knowledge into food preservation.

Material and methods. Being able to exploit the health potential of many bioactive components in food requires specialised product processing and storage. Using appropriate polysaccharides it is possible to protect the bioactive compounds during processing and storage, and release them only in the lower intestinal tract. The use of nanocapsules is believed to overcome stability problems. Based on this the EU-funded 'Development of foods containing nanoencapsulated ingredient' (NANOFOODS) project proposed to adopt tailored nanocapsule technology to preserve food bioactive compounds during processing and storage. As seen on the project website partners were particularly interested in the bioactive compounds with potential anti-inflammatory activity such as omega-3 fatty acids butyrate and silymarin complex.

Results and discussion A series of prototypes of micro-encapsulated compounds were developed using different combinations of core and capsule materials. Omega-3, encapsulated in starch complexes and integrated in a food product, should survive storage until the time of consumption. To translate the pilot-scale technology to industrial production, partners explored methods of nanocapsule freeze-drying and spray-drying. Different starch–omega-3 complexes were physically characterised with regard to thermal and oxidative stability. Their functionality in simulated gastrointestinal tract conditions was also evaluated by exposing complexes to extreme pH conditions and enzymatic digestion. The next step was to incorporate these bioactive nano-encapsulated omega-3 fatty acids and silymarins to generate novel foods such as pasta or dough for bread. Testing of these food products on patients with inflammatory bowel disease (IBD) or ulcerative colitis revealed an amelioration of the inflammatory status, indicating a beneficial effect.

Conclusion. Overall, the NANOFOODS project successfully exemplified the improvement in the processing stability of bioactive ingredients including silymarins and polyunsaturated fatty acids (PUFAs) through nano-encapsulation. The NANOFOODS approach could satisfy the requirements for food products with enhanced nutritional value, quality and safety.

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72. Manufacture of dry fillers on the basis of ginger

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Introduction. Recently, there is a steady upward trend the population's demand for food products and beverages with medicinal additives from plant raw materials. This allows both expanding the range of products and enriching it biologically active substances.

Materials and methods. The main raw material to process was ginger. Methods of research are standard. The roots of cleaned ginger were cut into rings 2-3 mm thick. The prepared ginger was blanched for 5...20 minutes in water, at solution of citric acid at a concentration of 1...5%, in sugar syrup at a concentration of 10...50%, changing the temperature from 50 to 900C.

Results. Particular attention should be paid to spicy aromatic plants that contain unique antioxidants, essential oils, vitamins, phytosterols and many other nutrients that help the body fight with microbes, toxins, and also increase immunity [1, 2]. Ginger (*Zingiber officinale*) is such a plant. The root of ginger contains the efficient amount of vitamins of group B (B6, B9, B5, B2), as well as vitamin A and C. In addition, it is rich in salts of calcium, magnesium, phosphorus, contains silicon, chromium, choline, zinc, manganese; essential amino acids (lysine, phenylalanine, threonine, methionine, etc.) which are synthesized by the body in very small quantities and should come with food; olein, capillary, caffeine, nicotine and linoleum acids, P-carotene, capsaicin and curcumin. The acrid taste is due to the presence of gingerol, a phenol-like substance [See 3].

We conducted a research on obtaining a dry filler of high quality ginger. The peculiarity of ginger processing is the need for preliminary heat treatment, which helps accelerate the drying process, preservation of color, taste, smell, vitamin activity, as well as the destruction of oxidative enzymes. The obtained samples were compared according to organoleptic, physical and chemical indices. So, samples, blanched in 4% citric acid solution, had the most attractive appearance, and vitamin C losses were only 5%.

Properly prepared samples were sent for further drying, which was carried out by convection method, in the field of microwave and their combination. A series of studies have shown that in order to obtain a pleasant light colored ginger filler and maximally preserve biologically active substances, namely vitamin C to 80%, it is advisable to use drying in the field of microwave. The use of ginger filler in the confectionery and canning industry was explored. Products with its use favorably differed from analogues.

Conclusions. We established that ginger root is a valuable natural source of vitamins, minerals and essential oils. Ginger powder, obtained by drying in the microwave field, has got high organoleptic and physical-chemical parameters, which gives the possibility to use it in production of food and beverages for well-being.

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73. Production of cheese desserts as an available direction for the creation of health improving products

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Introduction. Nutrition is the main controlled factor that provides normal growth and development of children, health and quality the life of a person, working capacity, active longevity, the creative potential of the nation.

Materials and methods. The scientific fundamentals for the effective use of nutrition factor in preserving human health and preventing diseases are theoretical justification the relationship of nutrition and vital activity of the organism. One of the most important problems of the food industry is the expansion of the spectrum health food products through enriching them with increased content of biologically active substances. Therefore, products of cottage cheese became basic for this research, due to high demand on them.

Results. As it is well-known, properly organized nutrition plays an important role in reducing the risk of developing chronic non-communicable diseases, especially so-called age-related diseases: cancer, diabetes, obesity, osteoporosis, tooth decay, etc. The enriched products would occupy an important place thanks to vitamins, trace elements, food fibers etc., or the products that had been removed from certain compounds (ballast substances). The basic principle of creating functional food products can be considered to enhance human health by influencing the relevant physiological body reaction.

In today's conditions, market competitiveness is increasingly popular acquire dairy products for dessert purposes. In the major assortment cheesecake desserts are dairy products made on the basis of cottage cheese with addition of sugar or other sweeteners, dietary supplements, stabilizers, fillers and the like. They are characterized by good consumer properties, have a dense consistency, high nutritional and biological value. Dietary properties cheesecake desserts are that they improve the metabolism, stimulate the secretion of gastric juice and increase appetite.

An urgent problem in the dairy industry is the expansion of the range production of cheese desserts. One of the most important directions in increasing the nutritional value has become creation of products of complex raw materials. The most suitable foundation is dairy products and, especially, sour milk products are recognized for the creation of such products cheese desserts. Creating a cheese dessert for health purposes, based on sour milk cheese enriched with a complex of biologically active substances is the promising direction in food technologies. Products based on dairy cheese are very popular due to high nutritional and biological value, due to high content milk protein, mineral compounds, especially calcium, vitamins and the like.

Conclusions. The department of Technology Healthy Products at the National University of Food Technology has developed a recipe for cheese dessert, enriched with syrup elderberry black, in order to provide cheese sour-milk functional properties. This product is availably balanced by the protein and fatty acid composition, and also has a powerful antioxidant effect.

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74. Investigation of physical and chemical laws in electrochemical treatment of water on diaphragm electrolyzer «Emerald»

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Introduction. Water is very sensitive regarding external physical influence. It is able to capture this effect, store energy and information factors of influence and transmit energy and information acquired factors are those systems designed by nature for their perception.

Materials and methods. Tap water from Shevchenko district of Kyiv was treated in diaphragm electrolyzer «Emerald (KFTO)» with the selective membrane in the contact chamber. A favorable factor for this is the presence in the troubled established research laboratory NUFT modular water treatment laboratory, which incorporates electrochemical diaphragm electrolyzer module «Emerald VFKT». For fixation of parameters we used the following devices: ORP meter 'Ezodo PCT-407', pH Meter 'I-160M' and TDS-meter 'AD8000 ADWA'. Research conducted at $t = 19 \pm 1^\circ\text{C}$.

Results and discussion. Many examples of nonchemical modified (activated) water to improve food technologies, mainly chemical and microbiological. Most processed and scientifically grounded is a method of water treatment in the two-chamber electrochemical membrane electrolyzer. The resulting products are anolyte and catholyte have a unique set of properties with a broad prospect of application. Study parameters treated water ORP conducted water sampling (after 3 minutes of electrolytic) at these speeds water flow (mg/min: 200, 300, 350, 480, 550, 600, 700, 750, 800), presented in Figure 1.

Ultimate relaxation of water held since opening in a container cork cylinder, which was closed for 8 days after making catholyte. To install «Emerald» received a prototype electron donor 20 liters of water ORP = -180 mV and pH = 9,3. Pour in a bottle and crown cork closed. Research of water relaxation of the opening shown in Figure 2.

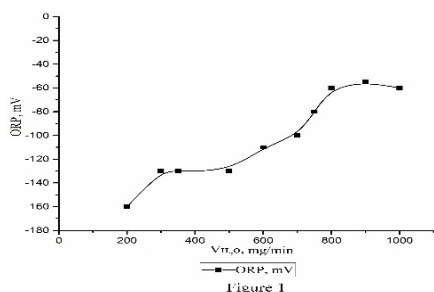


Figure 1. Dependence treated water ORP speed of water flow in the electrolyzer

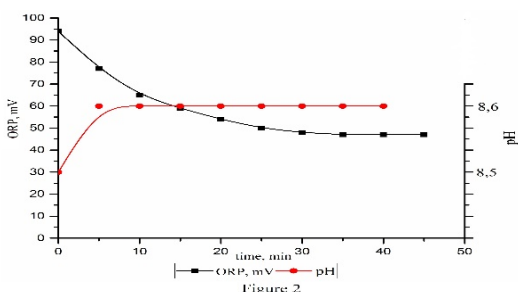


Figure 2. ORP and pH dependence of the relaxation time of water

The study relaxation of open water in bottles for 1 hour showed that after 8 days after opening the bottle ORP relaxed to +47 mV, pH 8.6, and ppm = 224. Thus, the supply of oxygen and carbon dioxide and acidified water displaces its ORP in the negative direction.

Conclusions. Decrease speed of water in the electrolytic reaction space, increases the number of products of electrochemical reactions at the cathode and anode, which allows obtaining activated solutions with predetermined redox state.

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75. Use of liposomes in cancer therapy

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Introduction. Nanoscale systems of delivery of cytotoxic agents to tumor tissue using liposomes offers improved pharmacokinetics properties, controlled and sustained release of drugs and, more importantly, lower systemic toxicity.

Materials and methods. The objects of study were liposome-based chemotherapeutics used in the treatment of cancer. The liposomes are prepared by the method of thin lipid film hydration, or removal of the solvent. After completion of hydration, the liposomes of multilamellar vesicles (MLV) in the size range of 200-1000 nm are produced. These MLVs are broken down into smaller liposomes by sonication, or extrusion. The methods of drug encapsulation in to the liposomes are carried out by passive loading in which drug encapsulation occur during the vesicle formation process or by active loading in which drug is wrapped after the formation of vesicles.

Results. In cancer therapy, liposomes have been demonstrated to be particularly useful. A number of different liposomal formulations of anticancer agents have been shown to deliver the drug at the site of solid tumors with minimum toxicity as compared to free drug. Furthermore, because many chemotherapeutics require a certain concentration to be efficacious, the clearance of these molecules by the immune system and by bodily excretion can limit their bioavailability and activity. Liposomal encapsulation can help reduce drug clearance by the immune and renal systems, and thus, extend the circulation time of anticancer drugs and increase their availability to the tumor. Additionally, due to the amphiphilic properties of phospholipids, liposomes are considered to be a versatile drug carrier that can encapsulate both hydrophobic and hydrophilic drugs, improving their solubility and stability.

Randomized controlled trials have evaluated the efficacy and safety profile of liposomal formulations with conventional anthracyclines. The primary outcome was the adverse effects including congestive heart failure (CHF), hematological toxicity, palmar-plantar erythrodysthesias (PPE), alopecia, nausea and vomiting. The odds ratios of the adverse effects were calculated separately and the overall odds ratio of the pooled data was calculated. The study included 2220 patients, of which 1112 patients were treated with liposomal formulations and 1108 were treated with conventional anthracyclines. The study found that the liposomal formulations have low incidence of CHF (OR 0.34, 95% CI, 0.24–0.47), alopecia (OR 0.025, 95% CI, 0.010-0.62), neutropenia (OR 0.62, 95% CI, 0.45–0.85), febrile neutropenia (OR 0.89, 95% CI, 0.71-1.125), and thrombocytopenia (OR 0.87, 95% CI, 0.61-1.25). The incidence of PPE was similar in both arms (OR 1.08, 95% CI, 0.11- 10.30). CI: Confidence interval; OR: Odd ratio.

Liposomal formulations of anticancer drugs have already approved for human use. These liposomal formulations include Doxil, Myocet, DaunoXome, Marqibo and DepoCyt.

Conclusions. Liposomes offer numerous advantages over conventional chemotherapy using free drug treatment. Liposomes help to improve the efficacy and safety profile of anticancer agents and, more importantly, the fate of cancer patients.

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76. Determination of optimal molar ratio of acetate and sunflower oil for cultivation of *Acinetobacter* sp. IMV B-7005 on their mixture

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Introduction. The main effectiveness criterion of mixed substrates using is ensuring the maximum full carbon conversion of both monosubstrates into exopolysaccharides (EPS), that achieved at optimal molar ratio of their concentrations in the mixture.

Materials and methods. *Acinetobacter* sp. IMV B-7005 was grown in such liquid mineral medium (g/l): 6.8 KH_2PO_4 , 0.9 KOH, 0.4 $\text{MgSO}_4 \cdot 7 \text{H}_2\text{O}$, 0.1 $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, 0.8 NH_4Cl , 0.001 $\text{FeSO}_4 \cdot 7 \text{H}_2\text{O}$. As a source of carbon and energy, the mixture of sodium acetate (0.5 %, w/w) and refined sunflower oil (0.15-0.55 %, v/v) was used. Inoculum was grown on refined oil (0.5 %, v/v). Expenditures and generation of ATP during ethapolan and biomass synthesis on acetate and sunflower oil were determined as described previously [1, 2].

Results and discussion. Finding the optimal substrate ratio requires: 1) calculating the energy of the biomass and EPS synthesis on energy-deficient substrate; 2) determining the concentration of energy-excessive substrate, which adds to refill the carbon loss of energy-deficient substrate under its oxidation to CO_2 to obtain the energy necessary for constructive metabolism [1, 2]. Then optimal molar ratio of monosubstrates is confirmed by experimental researches.

According to Babel's energy classification [2], acetate is energy-deficient substrate, and sunflower oil which contains higher fatty acids (mainly linoleic and oleic fatty acids) is an energy-excessive substrate.

On the basis of theoretical calculations of energy consumption for the synthesis of ethapolan and biomass, it has been determined that the optimal molar ratio of the concentrations of acetate and energy-excessive sunflower oil substrates in mixture was 1.0:0.13.

At the next stage, ethapolan synthesis was investigated at different molar ratios of sodium acetate and refined sunflower oil in the medium mixture.

Experiments have shown that the highest values of ethapolan synthesis (3.43 g/l synthesized EPS, EPS-synthesizing ability of 2.69 g EPS/g biomass) were observed at the molar ratio of monosubstrates in mixture 1.0:0.18, which is as close as possible to the theoretically calculated one (1.0:0.13).

Conclusions. Thus, it has been determined that optimal molar ratio of energy-deficient (acetate) and energy-excessive (sunflower oil) substrates for cultivation of *Acinetobacter* sp. IMV B-7005 on their mixture was 1.0:0.18.

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77. Prospects for the use of various sugars to produce fondant with reduced glycemicity

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Introduction. The traditional sugar used in the manufacture of fondant is sucrose disaccharide. But today, one of the priority areas identified by the World Organization of the World Food Organization (WHO) is the reduction in the share of sugar in products, reducing the caloric content and glycemicity of products.

Sugar tagatose has a unique combination of important technological characteristics and properties to improve human health, making it one of the most promising substitutes for traditional sugar. Thus, tagatose during its use does not cause caries, has a prebiotic effect, causes a very low glycemic response, has a reduced caloric content compared to other mono- and disaccharides (1.5 kcal / g). Its long-lasting intake improves blood glucose and cholesterol levels, reducing the risk of developing obesity and type 2 diabetes. In addition, it is considered potentially useful in the treatment of anaemia and haemophilia, infertility, has cryoprotective and antioxidant properties [1]. Therefore, we are offering the development of candy technology for crystalline structure based on this sugar.

Materials and methods. The manufacture of a new kind of sweets was carried out by replacing traditional raw materials - white crystalline sugar with new generation sugars - tagatose. For the study of the quality of semi-finished products and finished products, conventional organoleptic and physico-chemical methods were used. Glycemicity of finished products was determined by their glycemic index.

Results. During the development of a new recipe for sweets, tagatose was used in the complete replacement of white crystalline sugar. Studies have shown that solid crude crystalline structure of candies, with tangible crystals of solid phase, is formed. Further research was aimed at investigating the effect of treacle on the process of fondant formation on the basis of tagatose. The expediency of the use of starch treacle in the amount of 10-15% to the formulation of fondant is established. But during storage, candies made on the very tagatose quickly acquired a solid consistency, which greatly worsened their quality. In the course of further research, it was suggested to use a mixture of tagatose and hygroscopic fructose. It was established a rational ratio of these sugars, which allows to obtain the fine crystalline structure of fondant mass and provide longer storage of manufactured candies without degradation of their quality. The introduction of fructose allowed to reduce the dosage of treacle in the formulation of sweets, which positively influenced the decrease in the glycemic index of the developed products.

Conclusion. A recipe of fondant candy based on tagatose in combination with fructose monosaccharide has been developed, which is 5 times less glycemic in comparison with sucrose-based sugar control. The offered candies will expand the assortment of low-calorie confectionery products and can be recommended for patients with diabetes mellitus.

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Section 2

Processes, equipment and control systems of food production

Chairpersons:

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1. Application of the hydrodynamic treatment of hydroponic solutions

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Introduction. Today the farming and food industry are measured as one of the largest segments worldwide with important involvement to the financial expansion. The modern technologies and equipment gives the potential to decrease the energy and recourses consumption of foodstuff production. The aim of this research work was to investigate the power of hydrodynamic effects during the water treatment for hydroponic system.

Materials and methods. Wide-ranging complex scientific methods, special methods, volume parametric imitation and visualization modelling methods, math modelling methods, optical microscopy, and ionometry were used for the researches. Prepared examples of water and water solutions were used as the model mediums in hydroponic system for experiments.

Results and discussion. One of the ways to produce low cost food products is application of a system where plants are grown in growth medium other than natural soil. Using such systems gives of bigger productivity and quality than the growing through at open sky, due to the fact, that it permits a better control in the illnesses derived from the environmental conditions, decreases the harvest-production period.

A hydroponics production of herbs, fruits, vegetables and other agricultural vegetation are becoming more widespread. The main aspects of hydroponics growing are: the plant, growth medium or without it and water solution (water, nutrients, and fertilizers). The control of potential of hydrogen is extremely important, not only in hydroponics but in soil as well. Plants lose the ability to absorb different nutrients and fertilizers when the potential of hydrogen varies. In hydroponic method, potential of hydrogen is constantly changing during the plant grows. For that reason pH control is a requirement in hydroponic solutions, because the plant growth depends on this. The pH range from 5,0 to 7,5 is most favorable for the availability of nutrients from most water nutrient solutions. There are many methods of water treatment to receive water with required physical and chemical parameters and properties. They are including: the electromagnetic pulse effect of the low-frequency field; acoustic treatment; emitting treatment: ultraviolet, ionizing, infrared; cavitation processing; hydrodynamic treatment. One of the modern methods in the technology of the water processing in the hydroponic systems is a method of the hydrodynamic treatment.

This study was carried out at the pilot unit designed and created at the IET HASU, the main part of the unit is a rotary pulsed apparatus in which realized hydrodynamic treatment. Through researches increases pH of the pure water on 15% have been established, thus the hydrogen potential of the water prepared on technology for hydroponic system has raised on 16-17,5%. The period of treatment varied from 30s to 300s. Throughout treatment of hydroponic water solutions in uninterrupted mode a value of pH decreased from 8,85 to 6,68 that averages 24,5%. This research helped to identify the most efficient combination of hydrodynamic effects and duration of water treatment for best cultivation process in greenhouse.

Conclusions. Investigational studies have shown that the appliance of the hydrodynamic treatment of water solutions may possibly for technology of water treatment in hydroponic system. As a result of research, it was found that this modern technology of water treatment can significantly decrease energy, power and resource consumption and increase efficiency of the growing crops.

2. 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. However, the incorporation of substances that can bring nutritional and sensory benefits leads to the development of a material with superior qualities, as was the case with the present study: an edible material entirely made from biopolymers and enriched by the addition of *Stevia Rebaudiana*.

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).

Results and discussion. 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 ($21 \pm 2^\circ\text{C}$). 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.

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3. Extraction methods of polyphenols from forestry waste

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Introduction. Annually, millions of tones of forestry waste are incinerated, land filled or used to produce thermal energy without being capitalized. Forestry waste has a high content of organic extractable substances such as polyphenols, which can be extracted with organic solvents or water, as well as significant amounts of minerals.

Materials and methods. In this study, the used samples of sawdust, bark and spruce branches were milled and various granulosesities were obtained. Polyphenols from forestry waste were extracted using water and organic solvents (at different concentration of ethanol and methanol).

Results and discussion. By the Folin-Ciocalteu analysis method, the total polyphenols content was determined using an Ocean Optic spectrophotometer (QE65000). The identification and quantification of individual polyphenols was carried out using a high performance liquid chromatograph with a Diode Array detector (HPLC-DAD) with 12 analytic standards (Sigma Aldrich) as reference. Polyphenols from forestry waste were studied in different conditions of extraction time, temperature and S/L ratio, using water, ethanol and methanol as solvents. The 1:15 S/L ratio was considered convenient for the extraction of polyphenols. A lower S/L ratio resulted in low yields because the solvent was insufficient to adequately hydrate the entire plant material.

Conclusion. The highest yield of polyphenols from forestry waste was obtained from bark, using methanolic solvent. For a S/L ratio greater than 1:15, a higher yield was obtained, however, a greater amount of solvent is not particularly advantageous when it is desired to reduce the extraction costs. To obtain better results ultrasounds can be used to increase the extraction yield of polyphenols.

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4. Influence of anisotropy on the measurement of food texture properties

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Introduction. Texture is an important parameter in evaluating the quality of food products and represents all the mechanical, geometrical and surface properties of a food product perceptible by touch or mechanical receptors and, where appropriate, visual and auditory receptors too.

Materials and methods. The samples analyzed in this study were carrots (*Daucus carota*) with a diameter of 35 ± 2 mm, from which cubic samples with sides of 20 mm were cut. The prepared samples were subjected to heat treatment in the oven for: 30, 40, 50 and 60 minutes and after they have cooled the textural determinations were performed.

The texture measurements were carried out with a Mark 10 texturometer, (Mark 10 Corporation, USA) with a loading speed of 10 mm/min, fitted with 500 N load cell, using compression discs with 50 mm diameter. In order to determine the texture parameters of carrots samples a TPA (Texture Profile Analysis) test was performed, the sample being compressed to 50% of its original size.

Results and discussion. In this work the TPA test was performed in force – displacement coordinates and the primary (hardness (H), viscosity (V), adhesion (A), cohesiveness (Co), elasticity (E)) and secondary (fracturability (F), gumminess (G) and chewiness (Ch)) texture parameters were calculated. The anisotropic character of carrot samples was highlighted by changing the test direction of the sample (parallel and perpendicular to the growth direction).

According to obtained data it can be observed that some texture parameters (hardness, gumminess and chewiness) of carrot samples decreases with increasing of heat treatment time. The hardness of analyzed samples decreased from 87.7 N to 28.4 N in the case of perpendicular direction and from 98 N to 36.6 N for parallel testing, the testing direction being very important in evaluating the texture properties. The elasticity measured in the parallel direction presents higher values than those measured in perpendicular one while the viscosity is higher in the case of perpendicular testing compared to parallel testing.

The variance analysis shows that there are significant differences between the texture parameters measured in perpendicular direction and the texture parameters measured in parallel direction of carrot samples.

Conclusions. Based on this study we can conclude that food anisotropy has a strong influence on the texture properties measured by TPA test.

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5. Dependence of vegetable structural-mechanical properties on speed factor

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Purpose. The purpose of the article is to select cutting speed used in modern vegetable equipment of food industry enterprises, determine the influence of the speed factor on structural and mechanical properties of vegetables during deformation and chopping and to get the calculated values of the firmness modulus and friction coefficients for some vegetables.

Methods. The author has carried out the research of vegetables' rheological characteristics according to the standard method by compressing the raw material between two planar-parallel plates. The study of friction coefficients was carried out on an experimental disk-type facility, which allows replicating fully the actual process of raw material friction against the surface of the rotating knife. The author has carried out the elaboration of the results of experimental studies with the help of mathematical statistics methods. Determination of efforts is executed with tensometers.

Results. The article analyzes the technical and operational characteristics of modern vegetable cutting equipment of a disk type. Cutting speed range used in the food industry is defined to be from 225 to 475 min⁻¹. The influence research of the speed factor on the structural and mechanical properties of vegetables has been conducted in a definite interval.

Analytically, the author has proved that the increase in the speed factor causes the decrease of the viscosity of vegetables and reduces the display of the elastic properties of vegetables. The results of analytical studies have been confirmed experimentally. The author has found that an increase in the rate of deformation of a raw material sample in a given interval leads to a 1.2 time decrease in the turgidity modulus; moreover, with increasing speed, the coefficient of vegetable friction against a steel surface of a knife in the specified interval decreases in 1.2-1.5 times.

The author has experimentally obtained the calculated values of friction coefficients and firmness modulus for some vegetables that can be used in calculations of vegetable equipment.

Cutting speed also affects the specific cutting force of vegetable raw material, but this factor depends on the velocity range under study. At cutting speeds from 5×10^{-3} m/s to 1.25 m/s, this dependence is described by the power function. There is a decrease of specific cutting force with the speed increase. The paper has determined the vegetables cutting force at cutting speeds of 250, 400, 600 min⁻¹ and 1200, which correspond to the knives rotation modes in modern vegetable cutting equipment.

Conclusions. Cutting is one of the most commonly used food processing methods in the food industry. It depends on a large number of factors, in particular the structure of the product, its properties, the cutting mode, and so on. Considering these factors and their quantitative assessment are important for the development of cutting equipment. According to the results, it is recommended to use higher cutting speeds to reduce the energy component of the process, since the known dependence of the power, spent on the cutting of raw materials, upon its structural and mechanical characteristics.

6. Investigation the energy consumption of the process kneading of wheat dough

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Introduction. A quantitative assessment of the quality of the process of kneading the dough in dough machines, of both periodic and continuous, is the total and specific energy consumption. Specific energy consumption is calculated for mixing of 1 gram of dough. Determination of energy consumption is necessary for the calculation of the dough machine as well as the energy analysis of specific stages of the process.

Materials and methods. Studies were conducted on a laboratory kneading machine of periodic action. The dough was kneaded according to the recipe for 20 minutes. The speed of rotation of the working body of the kneading machine is considered as controlled parameters. To measure the energy consumption used wattmeter Lemanso LM669.

Results. The amount of energy consumed for mixing can be determined experimentally and calculated according to the proposed method of Prof. O.T.Lisovenko. The energy balance for a dough machine with a rotary movement of a kneading blade is determined by one cycle of the kneading blade.

An analysis of the experimental data showed how energy consumption varies throughout the time of the experiment and confirmed three stages of the process of kneading wheat dough. Comparing the calculated theoretical values with the obtained experimental values, it is clear that they are different. In the first and second stages, the difference is insignificant. The greatest deviations are observed in the consumption of specific work on the plasticization stage.

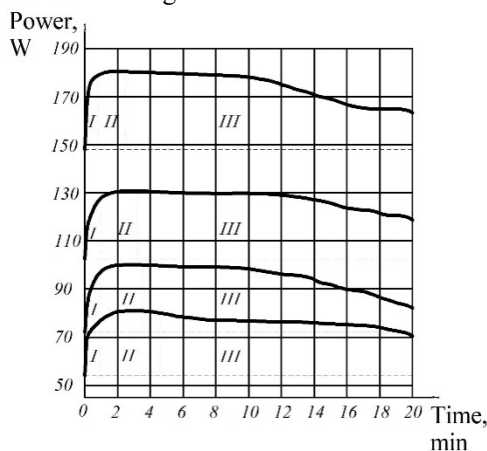


Fig. 1. The dependence of energy consumption in time

The calculation does not fully take into account the energy expenditure on the viscous friction of the mass of the dough during mixing and the change in the structural and mechanical properties of the dough mass, the transition during mixing from the individual powder and liquid masses to the complex structure, which is characterized by non-Newtonian properties.

Conclusion. Studies of the process kneading of wheat dough prove the need for changes in the method of calculating energy consumption for the kneading, eliminating the formal approach to this process and taking into account the energy consumption of structural transformations.

7. Design and creation of equipment for grinding of plant products

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Introduction. For grinding of brittle and viscoplastic materials many types of crushers of various sizes are created, however, the search for more advanced machine designs continues for reasons: the bulkiness of existing crushers and their low efficiency; complexity of the design and ensure ease of installation, safe operation, maintenance and repair; compliance with sanitary and hygienic requirements for the process of grinding food materials; increasing the requirements for the purity of the grinding products; the desire to reduce energy and metal consumption per unit of crushed material.

Results and discussion. Due to the fact that the crushed material has different characteristics, and also taking into account the different technological requirements for the finished product, crushing plants of a certain design are used. In this case, the selection of a particular equipment is one of the important stages and it is a kind of compromise between the crushing efficiency and operational quality of the machine. Today, a sufficient number of developed and continue to develop a completely new design of grinders with a vertical shaft the scope of which is quite wide, as evidenced by numerous inventions and patents. Variety of technological problems solved with the help of hammer crushers, gave rise to various constructive solutions, associated, for example, with the design and mounting features of the rotor, drive, shock and rebound elements, loading and unloading devices, etc. Despite all the differences, the principle and mechanism of these grinders is similar.

As experience shows, one of the most advanced methods of impact crushing is the use of crushers with multi-link impact elements. This is due to the fact that in case of accidental contact with the crusher body foreign objects (unbreakable or hard to break) hinged suspension of shock elements avoids jamming of the rotor as well as large deformations, which in turn increases the reliability.

Despite the structural simplicity in the chamber of the impact crusher are quite complex processes. Is carried out simultaneously with the crushing of the material and its movement down to the place of unloading the speed and direction of motion of the material particles in which depend on many factors: particle shape and size; physical and mechanical properties of the material; the position of the particle relative to the impactor at the time of impact, etc. Also, the results of crushing are influenced by humidity, conditions of supply of the source material and his size. In addition, the nature of the movement of material particles in the crusher chamber has a significant impact on the wear of the working shock elements.

Conclusion. The analysis of the equipment shows that one of the simplest and most successful designs of multi-link crushers of impact action with a vertical rotor arrangement for today is a two-support single-drive hammer crusher.

8. Research of vacuum cooling of bread

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Introduction. Cooling of hot bread after baking before cutting and packaging is relevant for the baking industry. The traditional way of cooling and storing bread on trolleys (containers) involves the use of manual labor. Equipment which is used in bakeries to cool bread is massive, and the process is long.

Materials and methods. The application of the vacuum bread cooling method is expanding, and this method makes it possible to reduce the cooling time, reduce the cost of equipment and production space. To study the processes of cooling the bread under vacuum, we have created an experimental installation (fig.1), which includes: 1 oven, 2 dough workpiece, 3 strain gauge scales, 4 dewar dish with thermocouples, 5 computer, 6 analog module, 7 data conversion module, 8 vacuum evaporative cooler, 9 vacuum pump, 10 receiver, 11 capacitor, 12 manometer.

Results. The obtained temperature curves of bread-dough and its following cooling in vacuum and storage conditions indicate a significant reduction in the cooling process of bread in vacuum conditions compared with traditional ones. It was found, that from 98 ° C to 30 ° C 6-5,5% of moisture evaporates from the weight of the billet during vacuum cooling, while cooling in a storage facility, the amount of evaporated moisture is 2.5 - 5%.

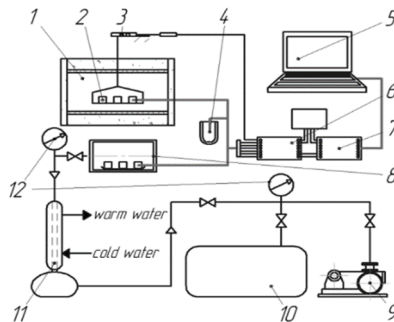


Fig. 1. Experimental vacuum evaporator installation

Conclusions. Slight moisture losses in vacuum cooled billets can be compensate with shorting of baking time, and such benefits as reducing the process length, reducing energy consumption costs for cooling products, and improving their qualitative indicators, which testifies about prospects of vacuum cooled bread.

9. Choice of approach to multiphase flow modeling in pipelines

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Introduction. Multiphase flows are widespread in the energy, processing, and food industries, and differ in much more complex physics than single-phase ones. Even for such a simple flow, as the current in a round tube, there may be substantially different flow regimes.

Materials and methods. One universal model that allows you to model all possible modes does not exist. To simulate different modes, sometimes quite different approaches are used. Examples of multiphase flows are flows with a free surface of "liquid-gas", a flow with suspension of solid particles in gas or liquid, a flow with liquid droplets in gas and flows with gas bubbles in a liquid. In practice, there are more complex cases, for example, with the free surface of the "liquid-gas" and solid particles that move in the gas, deposited on the free surface and drown in the liquid.

Results. Depending on the approach to modeling, the model of multiphase flows is divided into two main classes: the Lagrangian and Euler models. The Lagrangian approach is based on the consideration of the motion of individual particles (or groups of particles) of the secondary disperse phase. The Euler approach is based on the consideration of changes in flow parameters (velocities, pressures, temperatures) at the points of space. In the case of multiphase flows, the concept of volume fraction of phase, another additional parameter of the current, is introduced. As part of the Euler approach, all phases are considered as solid, regardless of their real morphology. There are also hybrid models, in which alternatives to Lagrange and Euler (averaging over space and the transition from the real particle distribution to volume fraction) steps. For example, in the products of the ANSYS CFD, there are models of both classes. ANSYS Fluent The Lagrangian approach is represented by the DPM (Discrete Phase Model) and DEM (Discrete Element Method) methods. The latter is used as a submodel within DPM. The Euler approach is represented by VOF models (Volume of Fluid), Mixture (multiphase mix model), and Eulerian (full Euler model, the so-called model of interpenetrating media). There is also a special Euler model for describing the flow of thin films of fluid on the wall - the model EWF (Eulerian Wall Film - Euler's film model on the wall). The hybrid approach is represented by the DDPM model (Dense Discrete Phase Model), built as a combination of Eulerian and DPM models. The ANSYS CFX Lagrange approach is represented by the Particle Transport Model, a model similar to the DPM model in ANSYS Fluent. Euler approach is formally represented by one model, but the choice of different submodels and options within it actually allows you to get practically the same set of models as in ANSYS Fluent. Note that the ANSYS CFX does not have hybrid models, a direct analogue of Euler's model of liquid film on the wall and the DEM model.

Conclusions. So, for the correct choice of model you need to know at least the flow class: stratified or dispersed. In the case of disperse mode, it is also necessary to know: the density of the dispersed phase (ie, the expected local values of the volume fraction) and the characteristic size of its element (drops, bubbles, or grains). Simulation of mixed modes and transition from one mode to another is possible if both modes are supported by the selected model.

10. Analysis of the basic mathematical models of simulation of multiphase flow regimes

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Introduction. The possibilities of the Eulerian and Lagrangian models for the simulation of some current regimes are questionable, therefore, the question arises of their comparative advantages and disadvantages.

Materials and methods. The possibilities of modeling multiphase flows are constantly expanding. This extension goes in two main directions. The first is related to the introduction of new correlations for various interphase interactions. For example, some specific correlations for heat exchange between a continuous medium and drops, and continuous media and solids, instead of one universal correlation. The second direction is related to the possibility of sharing different models and submodels, for example, the ability to record boiling in models of equilibrium distribution of bubble sizes.

Results. The advantage of the Lagrangian model of DPM lies in the fact that it allows precisely to take into account the nature of the interaction of particles with the wall. Within the framework of the model of interaction with the wall is an additional model of wall erosion. In addition, within the framework of the DPM model, it is much easier to take into account the multidispersity of the secondary phase and the secondary decomposition of its particles (if it is droplets or bubbles). As part of the Euler model, multidispersity and particle decay / merging can also be considered, but this requires the addition of additional models of Equilibrium Size Distribution (Population Balance Model, PBM) that is computable from a computational point of view. The disadvantage of the DPM model is the limitation to the local volumetric particle concentration (less than 10%).

All models, and Lagrange and Euler, include a large number of submodels for describing interphase interactions: models of power interaction, models of heat exchange, models of mass transfer. The sets of these submodels for the Lagrangian and Euler models are different. For example, in the framework of the DPM model, one can not take into account the component of the lateral force, which depends on the distance from the wall (i.e., "Wall raining force", wall lubrication force). At the same time, in the framework of the Euler model, one can not take into account, for example, the force acting on small particles in the presence of a large temperature gradient in the carrier phase.

For Euler models Mixture and Eulerian there are more sub-models of phase-to-mass transfer (phase transitions). Sub-models of boiling, condensation and evaporation, as well as interphase chemical reactions, including combustion, are available for both Eulerian and Lagrangian models, but they are formulated differently and are intended to describe various physical phenomena.

Conclusions. Hence, for Euler models, the key factor in boiling and evaporation / condensation is the temperature difference (secondary phase and critical temperature), while for Lagrangian the pressure difference (the partial pressure of boiling or evaporation of the component in the surface of the particle of the secondary phase and the critical pressure). Therefore, when simulating multiphase flows it is necessary to pay attention to the key factors of each model, to know their difference and to apply the necessary.

11. Analysis of expediency of using turbulence models in calculations of non-stationary flows

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Introduction. Turbulent flows in industry are encountered more often and, at the same time, have the most complex form of motion of liquids and gases. Turbulence is a rather complicated subject for research.

Materials and methods. ANSYS Fluent and ANSYS CFX contain a wide range of various turbulence models - these are time-tested RANS models (averaged over Reynolds), and modern methods of large and disconnected vortices LES and DES, respectively, as well as hybrid models that combine advantages RANS and LES simulation.

Results. The most popular one-parameter model of turbulence, which is widely used in problems of external hydrodynamics when calculating irrigated currents, is the model of the Spatar-Almaras. In this model, vortex viscosity is determined from one differential equation for the transport of turbulent kinetic energy. With the introduction of corrections for curvature, rotation and roughness, the scope of this model has significantly expanded. However, two-parameter models such as $k-\epsilon$ and $k-\omega$ can also be used to calculate non-detachable currents or currents with restricted separation zones. For a thin boundary layer, the model $k-\omega$ more precisely predicts the position of the cutoff point than the model $k-\epsilon$. However, when calculating internal flows, the $k-\omega$ model tends to be worse than $k-\epsilon$. In the case when it is necessary to calculate anisotropic turbulence or to investigate nonequilibrium effects, the Reynolds-Stress Model model is used. This model gives the most accurate results for complex currents with secondary streams. However, calculations are also performed on the basis of LES (high vortex method) and DES (method of separated vortices) methods. The basic idea of the LES method is to localized averaged characteristics of the turbulent flow by regions with filter order sizes. The method of disconnected vortexes DES can be conventionally called the hybrid LES / RANS method. When using it in the boundary layer, the non-stationary Reynolds equations are used, while the LES method is used in the separation zones. LES zones are usually located in the turbulent currents dominated by large-scale turbulent structures. In the mare area, the appropriate RANS models are used. DES method is mainly used for simulation of high relay flows; in the modeling of internal currents the accuracy of this method is significantly reduced. Computing costs using the DES method are lower than when using LES, but larger than using the RANS method.

Conclusions. Therefore, when simulating a pronounced nonstationary current, it is advisable to use the SAS (Scale-Adaptive Simulation) model, which is an advanced version of the non-stationary RANS method (URANS) and allows for reliable results for the pulsation component of the flow. The SAS model is dynamically adapted to the URANS-scaled-up method and allows tracking the development of turbulent structures in certain areas of the current. Thus, in non-stationary flow areas, the SAS model works like the LES method, and in stationary areas, it is analogous to the RANS method.

12. Investigation the process of superfine grinding on the bead mill the suspension of titanium dioxide and quinacridone red

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Introduction. Analytical and experimental research was conducted to improve the process and equipment for the superfine grinding of medicinal and cosmetic preparations.

Materials and methods. Based on modern scientific literature and own experience given a comparative analysis of modern equipment for ultra-fine grinding. In the investigation are used suspensions of titanium dioxide and quinacridone red 122 with the Vaseline oil.

Results. Among the recommended installations, the most versatile, productive, compact, energy saving, with high degree for grinding (up to 1 microns), effective in the process of dispersion and homogenization, have a simple constructive solution are bead mills.

When grinding titanium dioxide over a period of 0 to 30 minutes, the power increases from 205 to 209 W. The temperature of the suspension is from 21.9 to 23.4 °C, the density increases from 889 to 1176 kg/m³, and the particle size decreases from more than 100 µm to 10 µm. The most intensive grinding in the first 5 minutes of the process. This can be explained by the fact that the suspension has the highest density after grinding - 1176 kg/m³, as well as the largest size of agglomerates at the beginning of the experiment (more than 100 µm).

When the quinacridone red 122 is grinded, the power is increased from 205 to 210 W. The temperature of the suspension is from 22.4 to 24.3 °C, the density increases from 870 to 952 kg/m³, and the particle size decreases from more than 60 µm to 2 µm, while the most intensive grinding occurs in the first 5 minutes of the process. This can be explained by the fact that Red 122 has a greater bulk density (540 kg/m³) than titanium dioxide (82 kg/m³) and crystal lattice strength due to a different chemical formula, which may also be due to the density of the suspension.

Consequently, with increasing time of grinding, both suspensions increase power, temperature, and density and decrease the size of particles. The most intense changes occur during the first 15-20 minutes of the experiment, where there is an intense reduction of particles of solid material.

In results, the smaller the particle size and the higher density of the suspension that needs to be ground, the more energy is needed to conduct the process and the more heat will be released.

Conclusions. Among the recommended installations, the most optimal and productive are bead mills. It is recommended carrying out the grinding process on the bead mills periodically with the circulation of the suspension with the obligatory cooling.

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13. Method of deep processing of nanofiltration permeate of milk whey

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Introduction. In the milk industry there remains the problem of processing nanofiltration permeate of whey. This is due to the presence of organic impurities in it, which makes it impossible to use it further. The application of the ozonation process and further sorption purification may allow the removal of almost all organic matter, which will further intensify the membrane processing, which will allow for the deep processing of permeate.

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 vacuum pump for pumping the gas phase. For research, a solution of nanofiltration permeate of milk whey (400 ml) was used. The time of one experiment was 10 minutes. The cost of the ozone-gas mixture was 3 l/min. Ozone content in the gas mixture was about 4...6 %. The chemical oxygen demand (CHC) was determined by the Kube method. The amount of ozone was determined by the iodometric method. Its essence is captured in determining the amount of iodine, which in the equivalent amount ($I:O_3 = 1:1$) is formed when the ozone-gas mixture passes through the KI solution.

Results and discussion. The principle of the proposed scheme is as follows. After the baths, the milk serum is sent to the NF station, where it is divided into NF permeate and concentrate. The latter, with a content of dry matter of 20 ± 3 %, is sent to the final condensation in vacuum evaporators and dried to further obtain valuable components from it. The resulting NF permeate is fed to an ozonation station, where it is treated with ozone in the contact capacity. It contributes to the oxidation of organic compounds and the disinfection of the solution. It was found that the combination of ozonation and subsequent sorption purification reduces the COD in NF permeate by 96 %. The treated solution after the ozonation and filtration station through the layer of activated carbon is concentrated to the reverse osmosis station. Due to the preliminary removal of organic components, the performance of reverse osmosis membranes rises by 25...30 %, in comparison with the processing method without the ozonation station. This increases the amount of purified water obtained, and the amount of concentrate is reduced by 2 times. The resulting concentrate goes to the electrodialysis station (ED), where the concentration of salts occurs, which can then be used for the pre-mineralization and re-mineralization of potable water. The use of ED is due to the lack of phase transition of treated substances and direct action on mineral salts during the process of their concentration. The filtrate after reverse osmosis and after ED diluent mixes with residual ozone, which can reach 40...70 % of the initial values at the ozonation station, and is used for washing the equipment.

Conclusions. According to the results of the work, rational parameters were determined during the processing of NF of milk whey in the ozonation station and the hardware and process scheme of NF permeate treatment was proposed. The ozonation station allows removal of up to 96 % of organic compounds of NF permeate, $TOD = 20...28 \text{ mg/dm}^3$. It was established that the ozone utilization factor, in the case of ozonation of NF reagents, is within 40...60 %. The TOD should be $2,5 \text{ mg/dm}^3$ for a minimum required ozone dose of $0,1 \text{ mg/dm}^3$. The significant benefit of the proposed scheme is the deep processing of NF permeate in breast milk.

14. Mathematical modeling of mass transfer and hydrodynamics for baromembrane processes

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Introduction. The problem of the use of membrane technology lies in the increased level of membrane contamination due to the use of wrong operating modes. As a result, the concentration of dissolved substances near the surface of the membrane increases significantly (the phenomenon of concentration polarization). At high concentrations, some of the components may form insoluble compounds, a gel precipitate, and the like[1-3].

The purpose of the work was to determine the rational parameters of the operating mode of microfiltration ceramic membranes and to study the dynamics of the phenomenon of concentration polarization.

Materials and methods. Applying the corresponding boundary conditions characterizing the physical essence of the baromembrane processes, as well as numerical methods for solving differential equations, we obtain a system of algebraic kinetic equations that allow us to determine the distribution of the concentration of the dissolved substance by the height of the pressure channels, which is practically impossible to do experimentally.

Results and discussions. Experimental and theoretical studies of the productivity of microfiltration ceramic membranes of cylindrical form at different pressures and at different temperatures were conducted.

The distributions of the concentration of the dissolved substance in the solvent medium on the height of the pressure channel of the baromembrane apparatus by the method of mathematical modeling (the method of finite differences)[3] were obtained. Pressure channels were presented in the form of a rectangular grid with a predetermined step. The stability condition of the solutions was verified using the Courant criterion [4,5]. On the received distributions, using the model "Concentration polarization" the membrane performance is determined.

Applying the corresponding boundary conditions characterizing the physical essence of the baromembrane processes, as well as numerical methods for solving differential equations, we obtain a system of algebraic kinetic equations that allow us to determine the distribution of the concentration of the dissolved substance by the height of the pressure channels, which is practically impossible to do experimentally.

Substituting geometrical, physical and mass-exchange characteristics of real membrane systems in them, they managed to simulate the real processes of separation. It is established that due to the semipermeable properties of membranes, the amount of the dissolved substance at its surface increases with time, that is, the phenomenon of concentration polarization appears. Depending on the pressure, membrane characteristics and flow turbulence, the concentration of polarization may vary, which needs to be taken into account for the effective use of barometric processes.

Conclusion. The character of the obtained dependences is in good agreement with the theoretical foundations of the membrane processes and allows us to apply the proposed algorithm for the preliminary analysis of the phenomena occurring in the pressure channels in the division of complex multicomponent liquid systems.

The rational pressure range for the microfiltration process on cylindrical ceramic membranes (0.2-0.4 MPa) is established. The temperature influence and the dynamics of the phenomenon of concentration polarization under different pressures were studied.

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15. Modeling of pneumonozzle system work

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Introduction. The purpose of the study is to develop a formalized approach to the simulation of kinematic and dynamic analysis of a pneumatic blower unit of the ejection type in the environment of PP FluidSim with CFD modeling.

Materials and methods of research. Outgoing long-time simulations are selected: conical pneumatic hook with different sections of the confuser; restriction of the input pressure in the range from 3 to 6 bars; conditions for the arrangement of the nozzle - a variable angle of the confuser in the range from 30 to 60 degrees, the length of the nozzle from 5 to 25 mm. The mathematical model is constructed taking into account the laws of ultraviolet body transference, the motion of Newtonian fluid and gas through a nozzle; the law of continuity of the work flow. Adiabatic leakage velocity was determined as:

$$C_{ad} = \sqrt{\frac{2k}{k-1} RT_0 \left[1 - \left(\frac{P_c}{P_0} \right)^{\frac{k}{k-1}} \right]},$$

where T_0 – absolute temperature in the nozzle, K; P_c/P_0 – relation of pressure at the entrance and at the experimental section of the nozzle, Pa; k – coefficient of adiabatic, R – gas constant.

Result and discussion. Changing the velocity flux across the pneumatic nozzle, assuming assumptions about the working environment, is depicted in Fig. 1.

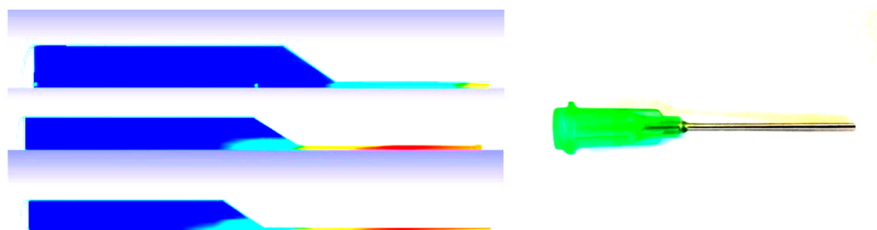


Fig.1. a – Distribution of the flow rate of the stream in the flow of the experimental working environment at an angle of confusion 60°; b – real nozzle.

Conclusions. The research was carried out to determine the sufficient number of nodes of the design grid of the experimental pneumatic tube. The value of maximum and minimum possible pressure change inside the confuser section when using different working media is obtained. During the irregularization of the data of the physical and simulation experiment, the error of the pressure change at the outlet of the nozzle was within 1.5%. The obtained results allowed to choose the design of a pneumatic molding with minimum destructive properties under pressure at the exit for a length of 15 mm.

16. Successful use of modern nanotechnologies in physiological optics

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Introduction. The visible light that can be perceived by human's natural vision occupies just a very small fraction of the electromagnetic spectrum. Electromagnetic waves longer or shorter than visible light carry lots of information.

Materials and methods. Mice with vision enhanced by nanotechnology were able to see infrared light as well as visible light. A single injection of nanoparticles in the mice's eyes gives infrared vision for up to 10 weeks with minimal side effects, allowing them to see infrared light even during the day and with enough specificity to distinguish between different shapes. These findings could lead to advances in human infrared vision technologies, including potential applications in civilian encryption, security, and military operations.

Results. When light enters the eye and hits the retina, the rods and cones-or photoreceptor cells-absorb the photons with visible light wavelengths and send corresponding electric signals to the brain "Say Han. "Because infrared wavelengths are too long to be absorbed by photoreceptors, we are not able to perceive them."

In this study, the scientists made nanoparticles that can anchor tightly to photoreceptor cells and act as tiny infrared light transducers. When infrared light hits the retina, the nanoparticles capture the longer infrared wavelengths and emit shorter wavelengths within the visible light range. The nearby rod or cone then absorbs the shorter wavelength and sends a normal signal to the brain, as if visible light had hit the retina.

Nanoparticles absorbed infrared light around 980 nm in wavelength and converted it into light peaked at 535 nm, which made the infrared light appear as the color green.

The researchers tested the nanoparticles in mice, which, like humans, cannot see infrared naturally. Mice that received the injections showed unconscious physical signs that they were detecting infrared light, such as their pupils constricting, while mice injected with only the buffer solution didn't respond to infrared light.

To test whether the mice could make sense of the infrared light, the researchers set up a series of maze tasks to show the mice could see infrared in daylight conditions simultaneously with visible light.

In rare cases, side effects from the injections such as cloudy corneas occurred but disappeared within less than a week. This may have been caused by the injection process alone because mice that only received injections of the buffer solution had a similar rate of these side effects. Other tests found no damage to the retina's structure following the sub-retinal injections.

Conclusion. In our study, we have shown that both rods and cones bind these nanoparticles and were activated by the near infrared light. So we believe this technology will.

Literature

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17. Emissions of Greenhouse Gases at the Ukrainian Thermal Power Plants

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Introduction. One of trends of the development of world power engineering lies in the prevention of change in climate and decrease in the man-made emission of greenhouse gases. One of the greatest sources of emission of greenhouse gases in Ukraine are thermal power plants (TPP).

Materials and methods. At the Ukrainian TPPs, about 20 % of the total volume of man-made emissions of greenhouse gases is ejected during the last years. Just CO₂ is the main GG that is formed at the burning of organic fuel. The main factors determining huge volumes of CO₂ emission at the Ukrainian TPPs are the volumes of coal consumption and high specific expenditure of fuel [1]. Using the procedure described in [2], we estimated CO₂ emission caused by coal burning at the Ukrainian TPPs in 2017. For these calculations, we used information from the official accounts of TPPs.

Results and discussion. In table 1, we present the generalized results of these calculations. Total emissions formed during the burning of coal at the Ukrainian TPPs in 2017 constituted 44.4 mln t. For comparison, we also give the values of CO₂ emissions at the Ukrainian TPPs in 2014–2016. The gradual decrease in CO₂ emissions at TPPs is connected with the decrease in energy generation during the last 3 years. As is seen in Table 1, the specific CO₂ emission at TPPs is about 1100 g CO₂ per kW-h of supplied electric energy. This correlates with the high values of specific expenditure of fuel per 1 kW-h of generated electric energy, which is observed at the Ukrainian TPPs (see Table 1). Note for comparison that at coal-fired TPPs of Japan, Europe, and America working with supercritical steam parameters (its pressure is 240–260 bar), with established equipment for sulfur and nitrogen purification, this parameter is 860–940 g CO₂/kW-h, whereas for TPPs on ultracritical steam parameters (more than 280 bar), it is 760–840 g CO₂/kW-h [3].

Table 1 – Total CO₂ emissions at Ukrainian TPPs in 2014–2017

Year	Supplied electric energy, kW-h	Total CO ₂ emission, kt	Specific CO ₂ emission, g CO ₂ /kW-h	Specific expenditure of fuel, g e. f./kW-h
2014	62032.7	68114.1	1098.0	397.7
2015	49397.8	54592.9	1105.2	400.8
2016	52726.3	60636.2	1150.0	403.7
2017	40526.1	44896.5	1107.8	402.6

Conclusion. During the last year, high specific emissions of CO₂ are observed at Ukrainian TPPs. Ukrainian power engineers should solve the problem of passage to the trajectory of low-carbon development according to the European environmental legislation and national interests. The strategy of measures for decrease in CO₂ emissions in power generation should lie in the wide introduction of ecologically pure power efficient low-carbon technologies.

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18. Kinetic Study of Dehydration Stage of Biomass, Coal and Their Mixtures Thermal Degradation

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Introduction. Since the modern technologies of clean coal utilization suggest the co-firing of coal with solid biomass, therefore, the determination of kinetic constants of biomass (or coal-biomass mixtures) demoisturization (as a separate stage of biomass combustion) becomes an important problem. In the present work a new method of approximation has been developed.

Methods and Instrumentation. The experimental data processed as stated above are presented in Fig.1

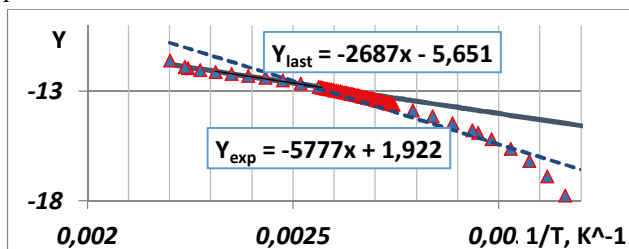


Fig.1. Correlation of experimental data

Results and Discussion. It can be easily seen that when approximated by a single straight line ($Y_{exp} = -5777x + 1,922$) the data more or less align along the line in a central part of a plot, whereas at the low and high temperature regions they tend to deviate, which eventually determines a significant deviation of calculated current values of a sample mass from the experimental ones. The line $Y_{last} = -2687x - 5,651$ approximates the points close to the process ending approximately within the reverse temperatures of $0,0024 \dots 0,0022 \text{ K}^{-1}$. If now imagine a series of tangential lines to the experimental curve, then it becomes clear that the slope of these lines will gradually decrease with the increase of temperature, until reaches the last line $-Y_{last}$. Having differentiated, one obtains an equation for the determination of the slope of the tangent to every point of the Y_{exp} curve, presented in the form. It is easily differentiable, and gives an equation of the MathCad form. The slope of every such derivative will determine the current value of activation energy as a function of temperature. The value of the frequency factor could be derived from the value of the free member of a straight line passing through every point on the curve $Y_{exp} (1/T)$ and having a slope determined by the same equation. Comparison of resultant calculations are given in Fig.2 a and b.

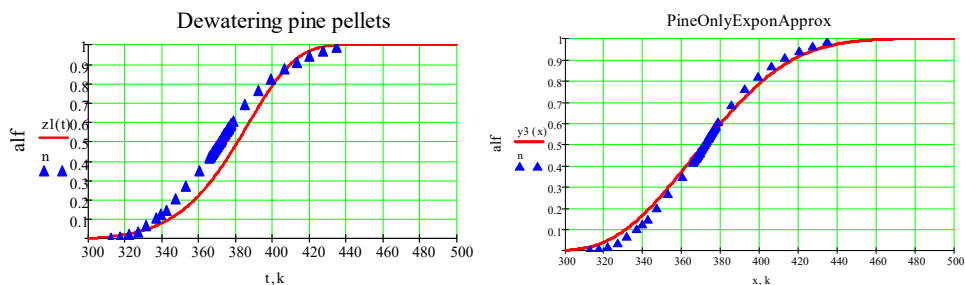


Fig. 2. Degree of conversion change with the temperature growth at constant rate heating, pine pellets

Conclusion: The developed method of the variable kinetic coefficients determination allows for the calculation of the dehydration stage of the thermal degradation process with high accuracy and may be recommended for use in the engineering calculations.

19. Thermal compensation of wire sag for power lines up to 110 kV.

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Introduction. Compensation of wire sag on overhead power line wires allows to optimize construction of power lines.

Materials and methods. Graph theory, principles of theory of automatic regulation, physical and mathematical process modeling.

Results of discussion. Increasing the length of the power lines or reducing the height of the towers while maintaining the existing estimated spans can significantly reduce the cost of building materials, linear fittings, isolation during the construction of power lines. Such devices by the authors were called thermal compensators of power line arcs of sagging. The active thermal compensation of the sag can be achieved with the help of force elements, which are fastened to the wire and act on it. Making devices with negative temperature extensions for a certain temperature range became possible after the discovery of the unique property of some alloys "to memorize the shape". Most vividly this property is manifested in the alloy of nickel with titanium - nitinol. The alloy is heated to change its structure to a high-temperature modification and in this state it is given a certain shape. Then the alloy smoothed out below the critical temperature and passed to another, low temperature phase. This process resembles thermoelastic transformation.

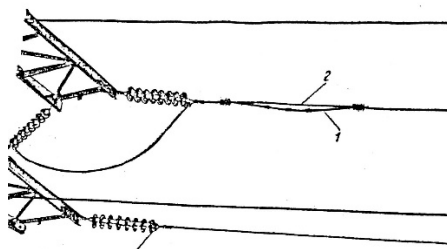


Fig.1. Thermal compensator installed on power line with voltage class 110 kV.
Here 1 – thermal compensator, 2 – power line wire.

With increase of air temperature, the length of a wire increases. When the ambient temperature reaches the temperature of the start of the reverse martensitic transformation of the thermal compensator, it begins to change its length and pull the wire. Lowering the temperature to the point of direct martensitic transformation causes deformation of the thermal compensator. The tension along the wire in the temperature range from the beginning of the direct martensitic transformation to its end is changing. With a further decrease in temperature, the thermal compensator does not participate in the work of the wire, and the tension varies according to the natural characteristic. The main requirement for the work of the thermal compensator with the shape memory effect (SME): the length of the section of the wire, parallel to which the thermal compensator attaches, shall be equal to the length of the thermal compensator in the unloaded state, increased by the magnitude of the maximum permissible deformation of the compensator in the plane parallel to the wire, and the magnitude of the maximum possible deformation of the thermal compensator must be equal to the absolute elongation of the wire in the given temperature range.

Conclusion. The results of these studies can be applied for power lines up to 110 kV. It can be implemented on power lines with any type of towers.

20. Thermal compensation of wire sag on power lines up to 750 kV

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Introduction. Compensation of overhead power line wires sag with voltages up to 750 kV allows to reduce negative influence of electromagnetic field of power line on living organisms in the environment.

Materials and methods. Physical and mathematical modeling were used.

Results of discussion. The value of the temperature extension of the wires Δl , which needs to be compensated is always known. Therefore working stroke of thermal compensator is also known and it also equals Δl . Since the maximum allowable elongation of the material with shape memory effect (SME) - ε , then the length of the thermal compensator:

$$l_k = \frac{100 \cdot \Delta l}{\varepsilon}.$$

Second main requirement of the work of the thermal compensator is the identity of the force generated by the thermal compensator P_k , and the tension T_{np} along the power line wire, $P_k = F_k \sigma_k$, where F_k - cross-sectional area of the thermal compensator;

σ_k - the maximum force generated by the thermal compensator per unit area of the cross section.

After calculating the area of the cross-section of the thermal compensator F_k , it is possible to determine the mass of the thermal compensator. In case if $P_k < T_{np}$, the thermal compensator will not be able to provide compensation for the extension of the wire, the working stroke of the thermal compensator will be less than Δl .

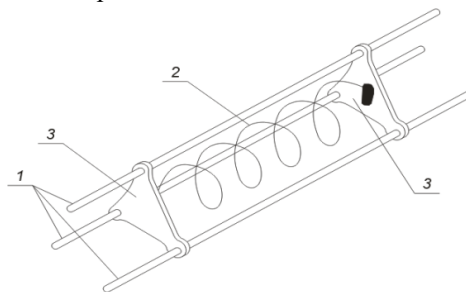


Fig.1. Installing the thermal compensator on power line up to 750 kV:

1 - three wires of one phase. The force element in form of a spring 2 made of the material with SME is attached to two plates 3.

When the thermal compensator is triggered, the spring 1 is compressing and at the same time pulling the wires and compensating the wires sag. With the coaxial placement of wires 3 and thermal compensator 2, the force element of the material with SME can be used both for stretching (compressing) and for twisting the wire in the span. Simultaneous action of twisting and stretching wires creates optimal conditions for removing ice deposits from the wires.

Conclusion. The results should be used in electric networks of all consumers.

21. Basic principles of attachment an active thermal compensation device to working power line

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Introduction. Method and device for attachment a thermal compensating device made from shape memory alloy (SMA) to working power line were reviewed.

Materials and methods. Graph theory and principles of theory of automatic regulation.

Results of discussion. Taking into account that there is a reverse dependence between temperature extension of power line wires and tension in the wires, the compensation of wire sag can be accomplished by increasing the tension in the wires at maximum temperature. Thermal compensation of wire sag is performed with the help of force elements, which are fastened to the wire and act on it. Using the unique properties of material with shape memory effect (SME), it is possible to have a zero or negative temperature extension of power line wire with an increase in temperature. Due to the fact that the material with SME - nitinol has a significant impact strength, a high endurance limit, is easy to bend, dampens vibration, does not corrode even in seawater, does not oxidize when heated to a temperature of 880 °K, is not cracking under stress and is non-magnetic, it is possible to manufacture from this material a power element in the form of a thread of length 1-8 m and to attach it parallel to the segment of the wire in each span.

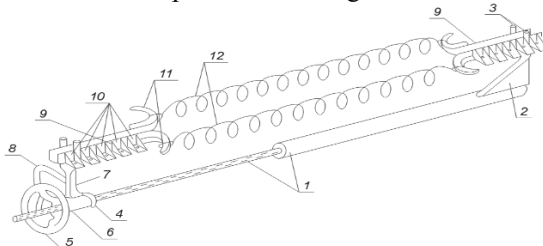


Fig.1. Mounting device with thermal compensator installed.

The device consists of a rod 1, on one side it has a thread, on the other - a mounted bracket 2 with a fork 3. On the threaded side there is a bushing 4 with an internal thread and a flywheel 5. On the bushing there is a joint 6 with a bracket 7 and a fork. From the side of coupling 6 and bracket 7 handle 8 is placed. Forks planes are perpendicular to the rod 1. Forks have semi-circular enclosures 9 (for spring nodes fastening). To the lateral walls of the enclosures brackets 10 with holes, located symmetrically to the axis of the enclosure are attached. The enclosure, from the one side, has brackets 11, to which the power elements of the thermal compensator 12 are attached. The distance between the teeth of the forks is equal to the width of the housing 9, and the thickness of the teeth of the forks is equal to the distance between the side brackets 10. The simplification of the installation of thermal compensators on the wires of power lines is achieved by the fact that the thermal compensating device is preheated to the end temperature of the reverse martensitic transformation, the wire is pulled up by the value of its absolute temperature extension in the given temperature range independently of the environment temperature, and the thermal compensator is fastened to the wire loop, which emerged in the process of installation.

Conclusion. The results should be used in electric networks of all consumers of electric energy.

22. Cavitation wear in gofmodified ceramics

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Introduction. Technological equipment in various industries implements the processing of products mainly in a liquid-phase state. At the same time, special conditions of flow appear in the equipment units. These conditions include cavitation. Thus, a rational choice of appropriate materials is relevant. One of these materials is ceramics.

Materials and methods. There are present research of the cavitation resistance of specimens of modified ceramics based on the matrix Al_2O_3 with the addition of ZrO_2 up to 2% by mass. The resistance of the specimens was determined by the action of ultrasonic cavitation, which was generated by oscillations of a magnetostrictive vibrator with a frequency 22 and 44 kHz. The indicator of the wearing resistance of the specimens was the loss of their mass. It was determined by the gravimetric method at fixed time intervals.

Results. The wear resistance of the specimens with different oscillation frequencies is determined by the intensity of the mechanical impact on them. This is confirmed by the graph of the rate of mass losses of the specimens (Fig. 1, 2). The cyclical pattern of wearing is most pronounced at the frequency 44 kHz. Mechanical impact on the surface of the specimens causes an intensive formation of microcracks. They are formed at the boundaries of internal defects or large grains of Al_2O_3 . The additives of SiO_2 form the glassy phase between grains of Al_2O_3 . It weakens the structure of the specimens and also is a source of cracking. The cavitation resistance of the specimen №2 is explained by the hanging content of Al_2O_3 and by the introduction of fine-grained ZrO_2 into the composition of the specimen.

This allows to increase the viscosity of ceramics. The shock waves after the collapse of cavitation bubbles are absorbed by the structure of the material.

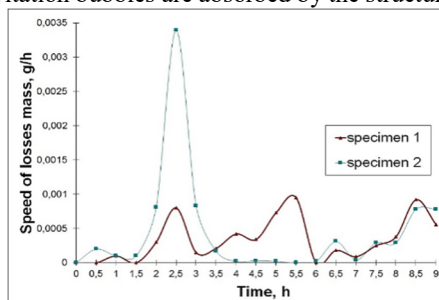


Fig. 1. The rate of mass losses of the specimens by the time at an oscillation frequency of 22 kHz.

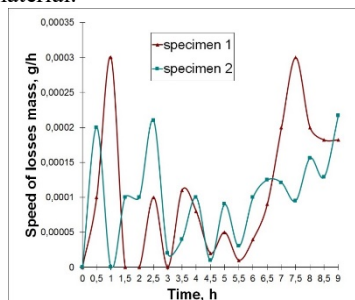


Fig. 2. The rate of mass losses of the specimens by the time at an oscillation frequency of 44 kHz.

Ceramics haven't plastic deformation. The brittle fracture nature of its destruction is the most typical. Hooke's law is valid for most types of ceramics. Their characteristics are evaluated by the values of flexural strength, Young's modulus and other indicators. Therefore, traditional approaches can be used for research of ceramics. That is why the cyclical nature of the destruction of ceramics can be compared with hydro-abrasive wear of metals.

Conclusions. The introduction of the modifier of ZrO_2 into the Al_2O_3 ceramic matrix allows the significant increasing of its wear resistance. Wear of materials is determined by the intensity of the cavitation effect and the phase ratio of components. To assess the wear of ceramics it is possible to use the approach similar to that one used for the assessment of wear of metals.

23. Analysis of modern equipment for superfine grinding by dry method

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Introduction. Analysed the most efficient and productive installations, such as separation mill, jet steam mill, SpheRho® dry grinding bead mill from Netzsch to justify the choice of a rational method of grinding.

Materials and methods. Analytical researches were carried out on the basis of analysis of modern literary sources.

Results. Separation mill. It is a rotor impact-reflective mill into which the dynamic air classifier is integrated.

Advantages: easy cleaning and maintenance; uniform load on the classifier, the gaps of the classifier rotor are inflated with air, ensuring the elimination of large particles into the product.

Disadvantages: uneconomical due to the obligatory presence of powerful compressors for air injection; effective only for materials of relatively high cost.

The product is ground to 10 microns (on limestone).

Use: for receiving pigments, toners, silicone sealants, sugar, cocoa powder, batteries (cathode and anode materials), processing of ore, minerals and some metals.

Steam jet mill. Uses for grinding superheated high-pressure steam.

Advantages: allows you to simultaneously grind and dry wet products without pre-drying at the entrance; productivity twice is more than at traditional jet mills; ability to grind adhesive products.

Disadvantages: uneconomical due to the mandatory presence of powerful compressors and heaters for steam injection; effective for materials of relatively high cost.

The product is ground to less than 0.2 microns (limestone).

Use: for photocatalysts, liquid crystal displays, multilayer ceramic capacitors, polishing, ferrite, glass, ceramics, batteries (cathode and anode materials), conductive additives and liquid solutions, digital ink.

SpheRho® dry grinding bead mill from Netzsch. The mill has a simple and strong design, providing quick replacement of grinding media and agitator elements, facilitating maintenance. It works with very small beads (2 mm) and the so-called "dry" agitator.

Advantage: high throughput with low specific energy consumption. It is possible to grind even a relatively coarse starting material with low energy consumption.

The product is ground in less than 2 microns.

Use: for grinding ores, minerals and metals, for the production of ceramic pigments and digital ink.

Conclusion. Steam jet mill is recommended for superfine grinding of wet components; separation mill - for grinding non-solid components; SpheRho® dry grinding bead mill is recommended for grinding relatively coarse starting material.

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24. Energy efficiency in the food industry is illustrated with the example of the feed production plant

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Introduction. It is often said that a decreased demand for electric energy in the production plant by only a few percent may result in considerable savings which in turn assure increased production profitability. If we reduce the energy consumption, it will translate into reduced pollution generated and emitted to the environment [1].

Materials and methods. First of all, it is worth considering the plants producing animal feed which belong to the group of agricultural and food processing plants form a manufacturing-technical-organizational structure. The structure of these production plants is dependent upon materials being processed and products these materials form.

When it comes to the issue of optimizing the energy consumption in these production plants has been popular for many years and implemented in certain production facilities [2]. The main reason for optimizing these plants is the need to lower costs of particular energy carriers, which may directly cause the profits of the plant to rise.

In addition, if we decrease the energy consumption, has led to support the local eco-climate by reducing the emission of atmosphere pollutants, reducing the noise and producing green energy, which may well be resold to local residents [4].

Results. Consequently, Energy optimization process in feed production plants may be a multiple-step process and should engage the entire plant, starting from production halls, through technical rooms or storage rooms, ending up with offices [5].

Conclusion. To sum up, you can say that to have an insight into energy consumption in animal feed production plants, it is necessary to choose relevant testing methods and specify which of them are the most effective, and provide credible and reliable results. In my opinion, if we test the energy consumption and attempt to reduce it, the feed production plant and its surrounding will benefit from it. We should remember however that it is of paramount importance to get familiar with the entire manufacturing process and the plant structure, as well as estimate potential improvement costs and forecasted profits in order to make sure the improvement pays off [9]. Thanks to such balance, we will learn if the modernization is profitable or not.

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25. Investigation of the drying agent flow, trajectory, product span distance in the drying chamber of the A1-ARCH complex, as well as drying time.

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Introduction. The milk serum contains up to 50% of dry milk substances, which is 36% of its energy value, therefore the issue of its use in food for non-waste milk processing became especially relevant. One of the most effective ways to reduce serum losses and maximize the use of all its components is to organize its processing into long-stored concentrates - dry and condensed.

Materials and methods. The most widespread occurrence of dehydration of liquid products has been the way of their drying in a sprayed state, which is characterized by high intensity.

The lack of information on the aerodynamic interaction of streams in centrifugal spray drying chambers has determined the need to find out, first of all, the physical picture of their movement. The disadvantage of existing techniques is that it is impossible to determine the amount of air recirculation in the volume of the drying chamber, which exceeds the value of the primary streams several times and has a decisive influence on the movement of the drying agent and the disperse phase.

Results A simulation and a series of investigations of changes in velocity, temperature and direction of flow of heat transfer fluid inside the drying chamber have been carried out. It has been shown in experiments that under conditions of compression and asymmetry of the volumes of "above" and "under" the root of the spark spark, there always exists a gradient of static pressure directed towards a smaller volume, which causes the deviation of the spray torch from the horizontal position.

With the help of the Ansys software system, the gidrodynamic flows near the spray device, the time of drying of the particle size from 5 to 150 microns and the spray path of the spray product in the drying chamber were investigated.

Conclusions At the present stage, the largest distribution in the dairy industry has been the drying of dairy products by spraying method. The application of this method allows to increase the contact surface of the interacting phases and thereby significantly intensify the drying process.

The existing methods of research on the general aerodynamics of drying chambers with the top feed of the coolant and centrifugal spraying of the product have been studied and the most optimal method for the given conditions is chosen.

The Autodesk Inventor and ANSYS CFX software packages simulate and investigate hydrodynamic flows and determine the influence of constructive factors on the parameters of the drying equipment.

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26. Advantages of operation of liquid-gas ejector with non-stationary liquid jet

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Introduction. Development of perfect jet apparatus with high efficiency and their implementation solves many problems of intensification of metabolic processes in food and other industries.

Materials and methods. To establish the laws of hydrodynamics of two-phase flow in the mixing chamber ejector was made hydraulic stand. As a working nozzle, the developed and patented by us adjustable (pulsed) nozzle, which worked in impulse mode, was used. The experimental data were processed in Microsoft Excel.

Results. One of the promising and innovative types of jet apparatus are ejectors with non-stationary (pulse) dispersed jet of liquid. The use of such ejectors can significantly reduce energy costs for technological processes, with the same longitudinal and transverse dimensions as in stationary devices. The use of active non-stationary flow contribute to more efficient energy exchange between active and passive medium.

From the physical point of view, the effectiveness of the impact on the passive environment can be explained as follows: the ability to transmit a pulse of energy using pressure waves; the ability to create a workflow not only sequential but also parallel connection of additional masses; increasing the intensity of mixing flows.

For the operation of the jet aparat, the choice of a liquid sprayer is important, which will form a pulsed supply of the active flow to the mixing chamber. He needs to provide a dispersed the liquid jet of fluid (a significant surface of contact of phases) and be reliable (not to create when working hydraulic shocks).

Such conditions of operation of the ejector were created using our patented pulsating nozzle (Fig.1). The inner cup of the nozzle rotated from the drive with a variable speed. Due to the periodic overlapping of the input channels, a pulsating effect of the working flow into the mixing chamber was created of ejector.

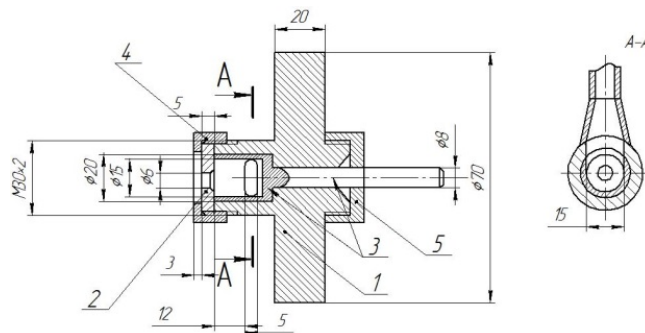


Figure 1. Experimental pulse nozzle:

1-body; 2-nozzle; 3-stem with movable cup; 4, 5-clamping nuts

Conclusions. On the basis of the studies of the ejector with a non-stationary liquid jet, the dependence of the ejection coefficient on the frequency of the jet pulsations was established. Is established the optimal value of the ripple frequency in the range $18 \dots 22 \text{ s}^{-1}$, at which the maximum K_{ej} is reached, which exceeds almost five times the numerical value of other ejectors with a similar geometric characteristic.

Section 3

Economics and management

Chairpersons:

Dr. Mychailo Arych

Dr. Yurii Kulynych

1. Index of Economic Freedom

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Introduction. The Index of Economic Freedom is an annual indicator and rating created in 1995 by the newspaper The Wall Street Journal and the American research center The Heritage Foundation to measure the level of economic freedom in the world's nations.

Materials and methods. Methods of comparison, analysis, generalization, synthesis are used in the research. Information base of the research is represented by materials taken from Internet sources.

Results and discussion. The index of economic freedom is calculated by the arithmetic average of 10 control indicators: labor freedom, business freedom, trade freedom, property rights, investment freedom, government spending, freedom from corruption, fiscal health, financial freedom, monetary freedom.

Based on the rating, all countries participating in the research are divided into 5 groups: with a free economy (index from 80 to 100 points), with a mostly free economy (70-80 points), with a moderately free economy (60-70 points), with a mostly unfree economy (50-60 points) and with an unfree economy (index less than 50 points).

According to the research for the year 2018, the average global index was 61.1 points, and became the highest in the history of the Rating. Among the 180 participating countries, results improved in 102 countries, declined in 75 countries and remained unchanged in 3 countries.

The group of countries with a free economy included Hong Kong (90.2 points), Singapore (88.8 points), New Zealand (84.2 points), Switzerland (81.7 points), Australia (80.9 points) and Ireland (80.4 points).

Belarus remained in the group of countries with a mostly unfree economy and took 104th place with 57.9 points. As for the neighboring countries, Lithuania ranked 21st (74.2 points), Latvia - 35th (70.4 points), Poland - 46th (67.8 points), Russia - 98th (58.9 points) and Ukraine - 147th (52.3 points).

The top-10 countries with the most unfree economies included: Algeria (46.2 points), East Timor (44.2 points), Bolivia (42.3 points), Equatorial Guinea (41.0 points), Zimbabwe (40.4 points), Republic of Congo (39.7 points), Eritrea (38.9 points), Cuba (27.8 points), Venezuela (25.9 points), North Korea (5.9 points).

Conclusion. To increase the Index, governments should focus on raising the standard of living of the population, stimulate business activities, fight corruption more effectively, reduce export and import duties, simplify restrictions for foreign investors on land purchase.

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2. Problem of unemployment in Ukraine

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Introduction. Studies have been conducted to explore the reasons of unemployment and ways to overcome unemployment in Ukraine.

Methodology of research. While work has general scientific methods and techniques: formal logic, statistical analysis – to study the state of unemployment in Ukraine; abstract logical – for formulating conclusions.

Results. Unemployment is an economic and social phenomenon, when on the labour is bigger than the demand for it. So there are more applicants for a job than vacancies. Growth of unemployment creates a whole range of problems: reduced purchasing power of the population, the budget loses taxpayers, the company loses staff. The problem of unemployment directly affects every working citizen who pays a certain amount of money from their salary to the compulsory state social insurance against unemployment. In Ukraine, in 2018, the unemployment rate was 9.0%. The unemployed population was 1548.5, but the registered unemployed was 287.1. The analysis of various literary sources makes it possible to distinguish the following main causes of unemployment in Ukraine:

- instability in the country is caused by military actions in the Donbas
- the searching of new jobs with higher salaries
- decrease in demand for a number of professions
- imbalance of labor supply and demand
- underdeveloped private sector and the presence of a shadow economy
- low wages and the weakness of trade unions that can not achieve a general increase in wages

After analyzing the reasons that affect the unemployment rate in Ukraine, we can propose the following ways of reducing it:

- stabilizing the economy
- stimulating the development of small and big business
- professional development of personnel
- reduction of taxes for enterprises
- the holding of special labor fairs for educational institution, with the aim of employment of graduates

Conclusion. These measures can improve economic and social situation in the country.

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3. Plagiarism as a problem of Ukrainian education and methods to prevent it

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Introduction. Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's language, thoughts, ideas, or expressions and the representation of them as one's own original work. Plagiarism is not in itself a crime, but can constitute copyright infringement [1].

Materials and research. The plagiarism problem was studied in this research, having based on the literary searches from scientific works. Nowadays the following cases are considered as plagiarism: copying words or ideas from someone else work without giving information about source, failing to put a quotation in quotation marks, giving incorrect information about the source of used information, changing words but copying the sentence structure of a source without writing the source in work, copying a lot of words or ideas from a source without writing own information and ideas.

Results. Today, the issue of plagiarism is a problem in the world, and especially in Ukraine and the CIS countries. Plagiarism penetrates into all spheres of our lives, and begins from educational level.

The problem of plagiarism every year is becoming more and more important. There are services which specialized in writing works, but to be honest it is a plagiarist. As a consequence, the students are not specialists after finishing the university. But plagiarism is used not only by students but also by scholars. The problem of academic plagiarism is already forming at the school level, and therefore this problem requires urgent decisions [2].

The following methods must be used to prevent plagiarism in Ukraine:

- creation and certification of a special computer program that would be effective and valid to the tasks of identifying academic plagiarism in Ukraine and could be used by both academics and the public as well as specialized court experts (primary, pre-expert processing of the expert's research that significantly reduces the cost of service);
- improvement of existing and development of new expert methods for the detection of academic plagiarism, borrowing the experience of the EU countries, the USA, Switzerland, etc.;
- improvement of the current legislation about copyright and related rights, scientific activity, judicial expertise by ensuring implementation acts of EU legislation in the field of protecting consumer's rights in the field of intellectual property;
- intensification of the educational activities of civil society institutions and relevant international programs and organizations to strengthen academic integrity in Ukraine.

Conclusion. Problems of plagiarism are relevant not only in Ukraine. Throughout the world, methods are being developed and used to prevent plagiarism. In order to overcome the crisis of academic integrity in Ukraine, it is necessary to establish special laws and regulations in case of education and research institutions and procedures to identify these violations.

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4. Organizational and economic new products' development management model

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Introduction. There is a need to disclose issues of interaction between state bodies, scientific and with the mean of a new product's development despite the significant scientific background formed in innovative economy.

Materials and methods. Official statistics in a field of science and innovation as well as industrial organizations' innovation development results were analyzed. During research process such general scientific methods as system approach, induction, deduction, analysis, synthesis, comparison, generalization, observation, description were used as well as specifically scientific methods — testing, simulation.

Results and discussion. Clarification of theoretical and methodological approaches to the industrial organizations' innovative development was made as the result of this research. It is based on the concept of triple helix model [1]. The main idea is in interaction between state bodies, industrial and scientific organization. The analysis [2] revealed the potential of direct interaction between scientific and, as well as the following trends of industrial organizations' innovative development: a) planning the industrial organizations' innovative development is carried out by state bodies; b) low-tech industries show higher intensity of costs for technological innovation compared to high-tech industries; c) decisions on financing are made by state bodies, the private sector is almost not involved in financing. It is established that the main source of financing the expenses for technological innovations are industrial organizations' own means and internal expenses for research and development are generally financed by the budget. Consequently, the direct interaction between scientific and industrial organizations will: a) reduce the financial burden on both the national and local budgets; b) commercialize existing R&D; c) compensate the insufficient level of industrial organizations' research component. It is offered to use both organizational (the organization of: a) interaction between subjects, including in the form of technological platforms; b) increasing the prospect of new production's development; c) the legal relations between subjects) and economic (tax regulation, subsidizing, insurance, planning, stimulation, accounting and control) methods of new production' development management. As part of the management methods' implementation at various stages of new products' development under the influence of other model' elements measures have been developed to bring together the functions of subjects: the organization of a marketing Bureau at the state bodies, the formation of a Bank of ideas, crowdfunding sites, venture organizations, improving the legislative framework, providing tax incentives to activities with a high level of prospects for innovative development, financing the scientific organizations for promising projects etc. **Conclusion.** Organizational and economic new products' development management model based on industrial organizations' innovative development particularity is justified. Its novelty consists of motivating factors at various stages of a new product's development stages, which correspond to the key innovation development subjects' aims.

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5. Ecological way of running a business

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Introduction. We all know that there are a lot of serious troubles with nature which are made by people's arms. And business field touches with it a lot. Being eco-friendly is the best way to save our home – our planet.

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 foreign authors, materials published in periodicals, etc.

Results. Businesspeople should understand that they do much for the planet by their activity. Now the planet requires thoughtful business behavior, people's thinking and eco-awareness. There are some ecological principles of nature:

- Cycles: all living systems are interconnected, one species' wastes can become another species' food. The main issue of this principle is waste sorting. We only need to separate glass, plastic, paper, metal, organic, batteries.
- Partnership: people should cooperate, tell each other about eco-habits, and inspire each other by actions done for clean oceans, green healthy forests and blue sky.
- Diversity: our planet needs different living species'. It is so fantastic that we are all different and we have so many places and living species to touch, to see and to be surprised by.

Today it is time to transform businesses into eco-conscious way. Before starting business entrepreneurs have to think about all the potential influences of their activity on the planet. Businesspeople can take into consideration next issues:

- World water crisis: demand for water has never been as great as it is today, and it will only rise with population growth and mobility, improving living standards, changes in food consumption, and increased energy production. The solution is to integrate water resource management strategies created by government with business development plans.
- Planetary limits: today we are using more resources than our planet can produce. At the same time, we are weakening ability of natural systems to regenerate and to produce.
- Wasting valuable resources: we are actually wasting resources that are very difficult or impossible to replace. A sustainable consumption of resources is directly linked to the way we produce. Products have to be produced in order to be used again and again.

Conclusion. Eco-friendly way of life starts only with us. Businesspeople have to start running their businesses consciously, thinking about influence on living species', polluted places and air, spreading this idea of eco-awareness among their consumers.

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6. Economic Cycles

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Introduction. The Economic Cycles are fluctuations of economy in the long-term period, which could also be characterized as the periods of time consisting of a single expansion and decline in sequence. They often include shifts over time between phases of comparatively quick economical upsurge and phases of comparative stagnation or recession.

Materials and methods. Methods of comparison, analysis, generalization, synthesis are used in the research. Information base of the research is represented by materials taken from the Internet sources.

Results and discussion. There are four economic cycles, differing from each other by the length, with the shortest one lasting for 3-4 years (Kitchin cycle) and the longest one for 48-55 years (Kondratiev cycle, also called Kondratiev wave of supercycle).

Although every cycle is discern from each other by the length and some specifics regarding it, there is still one criterion applicable to all four of them – phases. Each economic cycle can be divided into 4 phases: expansion, peak, recession and recovery.

The phase of expansion can be characterized as phase, where an increase in the production occurs, as well as decrease in the unemployment, it also goes after the phase recovery. The phase of peak is a period, where unemployment almost disappears and productivity rate is at its highest point. During this period the inflation starts to grow quickly and due to strong competition the average income of firms is going down. The next phase – recession – is a phase, which can occur due to various reasons, such as: drop in prices, stock exchanges crash, inefficient economic policy and many other, sometimes unpredictable, reasons. During the phase of recession, there is a decrease in productivity, rising unemployment and overall decrease in demand for consumer goods due to decrease in incomes. The phase of recovery is a phase, where the credit interest-rates are relatively low, which stimulates the rise of entrepreneurship, which also starts booming due to rising demand which was depressed in a previous phase. This period is also associated with the stocks recover due to previous fall in prices and incomes.

Conclusion. The existence of the economy, as a collection of resources for steadily growing consumption, has an oscillatory character. Economic fluctuations are expressed in the economic cycles. Even though it's not always possible to predict when the next economic downturn would occur, a general understanding of economic cycles is a useful knowledge for businessman and investors when planning long-term projects.

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7. Estimate and optimization of logistics costs

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Introduction. Logistics management sets one of its goals - the most efficient operation of logistics systems. Achieving this goal is realized through the planning, accounting and reduction of logistics costs. Logistics costs - a set of costs for managing the movement of material flows throughout the logistics system from suppliers of raw materials through a manufacturing enterprise to the final consumer.

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. To determine the effectiveness of the logistics system of the enterprise, a comparison of internal and external costs. It determines which activities are performed better than those of other manufacturers, compares the structure of the logistics costs for the enterprise and its competitors.

It should be noted that the company has two main areas in the framework of logistics costs. The first direction is associated with logistic costs arising in the framework of the organization of the movement of material flow within the production process. The second is the costs arising in the process of sales of manufactured products. Thus, in the framework of the first direction, the diversity of costs arising from the moment of purchasing raw materials or materials until the creation of finished products and the preparation of these products for sale will be considered. That is, the costs arising in the framework of procurement logistics will be considered initially. Next, we turn to the works in the framework of the production process and the subsequent creation of finished products. There is a need to form any orders for the end user, i.e. preparation of necessary resources for shipment. Once the finished batch, or load, is formed, we turn to the costs directly related to the movement of resources to the final consumer. These include:

- the costs of moving those resources that the buyer purchased from the company;
- the need to maintain stocks from intermediary organizations, from third-party companies that procure the necessary resources;
- questions on the storage and transportation of these resources;
- costs associated with a shortage of any resources.

Under the deficit are those costs that arise in connection with the failure to fully meet their obligations to the client, and the losses incurred by the company in this case.

The criterion for evaluating the effectiveness of logistics costs is the total profit figure for the enterprise. Profit is influenced by many factors, including the share or level of logistic costs. To make an assessment of logistics costs, you need to consider the costs associated with handling the material flow, and the costs associated with the movement of finished products to the final consumer. When evaluating these cost directions, the main goal is to minimize them. And this minimization will be considered in the framework of two aspects of logistics activities: procurement and production. It is also necessary to evaluate alternative management decision making options. For example, how an increase in warehouse costs compensates for possible losses from a shortage of certain resources within a certain period, and on the other hand, how this increase will affect the immobilization of funds and the company's overall financial performance.

Conclusion. In general, the effectiveness of logistics activities depends on the cost of all its elements. Therefore, costs should be assessed as a whole and then the company should consider the possibility of reducing them at the expense of the company's existing reserves, or at the expense of making alternative decisions in the framework of logistics activities.

8. Good design is good business

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Introduction. "Good design is good business," said Thomas Watson, president of IBM [1]. To build a good business, it is necessary to evaluate, measure and plan, including design in the plan. Design-management is an important issue of measurement of design's contribution to the business process for decades.

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. "Money buys, but emotions sells", said Hartmut Esslinger, founder of the design consultancy Frog Design. This is especially true with emotional effect of design [2]. The brand sells emotions by using a unique design, which connects the customer and the product. Old good example which can be attributed to several categories of value creation is Starbucks. In the late 1980s, three players - General Foods, Nestle, p & G - dominated the American coffee market. Coffee was sold in eateries, cafes and canteens. It was usually cheap – \$ 1 per cup. When Starbucks had come on the market, it sold a cup for 3\$, but in luxury and elegant interiors. The coup was created by the strategy and its competent embodiment in design. Then, brands were selling not coffee, but a "place to meet" and "creative atmosphere." People are willing to pay high prices for emotions, so good design helps to create added value [1].

Design can enable business strategy and enter new markets. Designer James Dyson spent 5 years and 5127 prototypes to create a fundamentally new design for vacuum cleaner, but it is not impressed Hoover, Philips and Electrolux. He had to start his own company and enter a new market. Now Dyson's annual turnover is more than 300 million dollars, the brand is represented in 24 countries. As admitted by Dyson, design helped him to become a pioneer, develop a new strategy and open up a new market [1]. British Airways is another example of company that has utilized design to create products and services that have differentiated it from others in the market. British Airways set out to increase long-haul international flights. After extensive studies designers came up with the first seat that could recline completely flat. This increased sales and profitability for British Airways [2].

Design builds brand image and corporate reputation. Brand and branding strategy are embodied in the design of a product or service. Design performs strategic tasks at the level of communication with the consumer. Good examples of the role of design as image are almost all premium brands.

Conclusion. These categories of design measurement help to identify and measure the contribution of design to the business process. Understanding of this contribution creates space for effective design-management, for building a business strategy, which increases the chance of company's success and its competitiveness.

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9. Errors of the strategy of enterprises

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This article discusses the main mistakes made in the development of a company strategy affecting its success are shown. Recommendations to improve the strategy of the enterprise are given.

Introduction. The market economy requires the solution of many problems. To solve this problem, solutions and tasks are needed, as well as to achieve their goals. The development strategy of the enterprise is based on the internal resources and traditions of the enterprise, as well as the capabilities of the external environment.

Materials and methods. This article discusses the main mistakes made in the development of a company strategy affecting its success are shown, which were identified from materials for personal planning and planning the work of the company. Accordingly, the method of reducing errors in the elementary production strategy was used. Recommendations to improve the strategy of the enterprise are given.

Results. If you have a definite goal, then it must have a goal. American economist Michael Porter believes that the idea of creating any kinds of activities, coordinating the selected levels. Levels, types and types of strategies are known, but errors are rarely mentioned. Typical mistakes made when developing a company's strategy:

1) Only a few people from the top management team are involved in the development. In extreme cases, the strategy is written by the first person of the company.

2) The basis of those who have strengths.

3) The strategy can be focused only on the achievement of any indicators, mainly financial ones.

4) Strategy is an order. Such a strategy is developed as a rigid plan and is always overly detailed.

5) The individual preparation of the document and its subsequent editing are conducted alternately, which reduces the full potential of the management team as an expert group.

6) The main thing is to set the direction. The development of benchmarks is conducted in isolation from the development of the implementation plan for the strategy. Often, management believes that a good strategy will be implemented automatically.

7) Sometimes not enough attention is paid to risk assessment and the availability of necessary resources.

From each error, you can extract the opposite recommendation. In order to properly develop and successfully implement a strategy, it is necessary to analyze market factors that are constantly and strongly changing, which can adversely affect the success of the enterprise and contribute to its crisis. Therefore, first of all, a microeconomic analysis of supply and demand is carried out, and the level of competition in a certain system of indicators is also studied. It is necessary to build clear, pragmatic and feasible strategies. After all, this is the key to success.

Conclusion. Constant changes in the market lead to the need to apply a strategic approach to the enterprise's business system. And the most important task of the strategy is that it is necessary to raise the enterprise from its present state to a new level.

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10. Role of projects in company management

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Introduction. Nearly a third of projects are not considered successful. Nearly 20% of projects in general remain incomplete. Such situation is directly connected with questions of strategic project management.

Materials and methods. The analysis was carried out on the basis of information provided in printed and electronic sources of foreign and national authors.

Results. Main idea of strategic management: it is correct to implement the correct projects. If the first part belongs to a classical triangle, then the second sends to questions of strategy. But today we see not only strategy. From where there is a problem of the choice of the correct projects.

Everything begins with strategy formulation, that is definition of the general action program. Follow strategic initiatives – the actions of single character connected with reorganization of structure of the company, radical change business of processes, implementation of information technologies, etc. Any important project has the political background. Here it is about organizational policy.

The organizational policy is an action of certain people or groups for receiving, development and uses of the power and the resources aimed at certain results when there is an uncertainty and inconsistency of the choice.

Examples of political approaches to projects are "A sacred cow" when process happens in the political interests of one of the top officials of the company and there are out of criticism, and "Friends in the highest authorities". This example implies receiving resources, formation of the positive relation to the project, protection of the project at critical stages of development is based not so much on the facts and common sense how many on belief and the power. One more example carries the name "Project as Means of Promoting". Case when the ambitious manager seeks to receive (to impose) politically favorable project quickly to promote on a corporate ladder.

The functional customer is responsible for justification of need of the project, confirmation of its compliance to strategic objectives of the enterprise; formation of requirements to a project product – IT to a system, the building or a construction; consultation of third-party performers during implementation of the project; coordination and acceptance of results of works of third-party performers.

For the resource party responsibility is born by that operating unit which will implement the project. This role corresponds to a role of the general customer.

The general customer is the division of the enterprise managing implementation of the project. He is engaged in definition of a possibility of implementation of the project (existence of necessary resources – people, competences, technologies); account and control of the course of work; assessment of quality of results of works according to conditions of contracts; acceptance of work and documentation.

Conclusions. The role of projects in the world raises. The scope of design methods of management increases. In the West growth of interest in difficult and large-scale projects is observed. Projects become the field of competition of the commercial organizations, however today it becomes fair at the level of international policy.

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11. Special features of drinking water production

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Introduction. Business based on the production of drinking water has several advantages. Currently water delivery to the offices and people's houses is very popular. Therefore, human needs for water, and accordingly, the demand for it in bottles increase all the time.

Materials and methods. The methods of analysis, comparison, and generalization have been used in this research. Information base of the research is represented by the articles of domestic and foreign authors, materials published in periodicals, etc.

Results. This is a very profitable business, if properly founded. Therefore, it is necessary to create a rational business plan in great detail and correctly select equipment in order to produce high-quality products in the future. Therefore, this reason may be a turning point in this business.

Before starting a water production business, it is necessary to consider in detail all the advantages and disadvantages of this activity, since the invested funds are not refundable and everything may initially turn out to be a mistake.

For production of water it is necessary to have a good starting capital and to invest money into high-quality equipment, production premises and advertising because all these factors will greatly affect the success of the business. An entrepreneur must have such documents as, for example, the certificate of a private entrepreneur and a license for entrepreneurial activity, as well as a certificate from the sanitary-epidemiological service about the quality of the produced water.

The most important thing in such a business, as in any other business, is to put in order the system of product sales. Produced water can be sold in bulk to supermarkets and delivered on request. The ability to create the exact route of delivery of water will give the company a chance to get rid of the extra cost of gasoline.

Conclusion. Thus, we can make a conclusion that success of the business on the production and sale of water depends on the number of competitors and the condition of the water consumption market in your region. The more we invest in business, the faster it will pay off.

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12. Errors of the strategy of enterprises

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Introduction. The main mistakes made in the development of a company strategy affecting its success are shown in this article. Recommendations how to improve the strategy of the enterprise are given. The market economy requires the solution of many problems. To solve this problem, solutions and tasks are needed, as well as to achieve their goals. The development strategy of the enterprise is based on the internal resources and traditions of the enterprise, as well as the capabilities of the external environment.

Materials and methods. This article discusses the main mistakes made in the development of a company strategy affecting its success, which were identified from the materials for personal planning and planning of the company's work. Accordingly, the method of reducing errors in the elementary production strategy was used. Recommendations how to improve the strategy of the enterprise are given.

Results. If you have a definite goal, then it must have a goal. American economist Michael Porter believes that the idea of creating any kinds of activities, coordinating the selected levels. Levels and types of strategies are known, but errors are rarely mentioned. Typical mistakes are made when developing a company's strategy:

1) Only a few people from the top management team are involved in the development process. In extreme cases, the strategy is written by the first person of the company.

2) The basis of those who have strengths.

3) The strategy can be focused only on the achievement of any indicators, mainly financial ones.

4) Strategy is an order. Such a strategy is developed as a rigid plan and is always overly detailed.

5) The individual preparation of the document and its subsequent editing are conducted alternately, which reduces the full potential of the management team as an expert group.

6) The main thing is to set the direction. The development of benchmarks is conducted in isolation from the development of the implementation plan for the strategy. Often, management believes that a good strategy will be implemented automatically.

7) Sometimes not enough attention is paid to risk assessment and an availability of necessary resources.

From each error, you can extract the opposite recommendation. In order to properly develop and successfully implement a strategy, it is necessary to analyze market factors that are constantly and strongly changing, which can adversely affect the success of the enterprise and contribute to its crisis. Therefore, first of all, a microeconomic analysis of supply and demand is carried out, and the level of competition in a certain system of indicators is also studied. It is necessary to build clear, pragmatic and feasible strategies. After all, this is the key to success.

Conclusion. Constant changes in the market lead to the need to apply a strategic approach to the enterprise's business system. And the most important task of the strategy is that it is necessary to raise the enterprise from its present state to a new level.

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13. Business via the internet

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Introduction. Nowadays skillfully made advertising is one of the most important factors in developing your business. And it is obvious that advertising is the engine of progress. Convincing you in buying goods is one of the main tasks of advertising. The Internet is the most popular place for producing advertisements for commercial products or services because people first turn to Google for the information about businesses and products. Also, you have the opportunities to make interesting, colorful and dynamic advertisement, and create something really attractive for potential customers.

Materials and methods. First of all, a method of observation was used, as it is the basis for further theoretical actions. The description and generalization of the key points were made during the analysis of modern business trends

Results and discussion. The main benefit of a virtual shop or a website is communication of your product consistently. A website can provide hundreds of consumers with your company information all the time. A website can promote your product or service at any given location, place or time. A website is the most loyal employee because it never quits and will always work 24 hours a day, 7 days a week, and 365 days a year. No employee will do that. Thanks to having a user-friendly navigation system and understandable catalog a customer will be able to make a purchase in a few clicks. There are lots of traditional ways to advertise your products or services, but advertising via the Internet is the most effective method, besides it will cost much cheaper. It takes us several minutes to find out and buy what we were looking for after seeing targeted advertising on the Internet.

A really successful and profitable website should possess particular qualities: a utility for customers and information filling in accordance with their requests (for it you should analyze your customer's wants and needs before). Next step is designing a website for mobile devices as nowadays people access the Internet from their mobile phones more than any other gadgets. A site should be able to make users feel such emotion that they want to share with their friends or family. You need innovative ideas to create something worthwhile that will remain in a person's memory for a long time. It is important to realize that the trend of modernity is simplicity and brevity. You should understand clearly the needs of each social group of your potential customers and consider their tastes and wishes. All this is vital in order to meet demands as clearly as possible and give a person exactly what they are looking for at the moment.

A buyer is a basis of earnings; it means that the level of customer's satisfaction influences directly businessman's wellbeing. Therefore, it is important to avoid common mistakes in site's operation. A web-site must work quickly as nobody will wait long for loading a page.

Conclusion. Trading via the Internet is our present and future. Actually creating a website or an online shop is simply, but it is not an easy task to do it well. The best way to found an online business is to set up something special, something that will highlight the products among competitors and make your customers loyal.

14. Logistic controlling within the enterprise strategy

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Introduction. Controlling assumes a complex approach towards an enterprise, so as to detect bottlenecks in time, design methods to eliminate them and, in the case of deviations from the planned volumes, to suggest the correction activities. A significant of controlling is the preparation of information adjusted to the recipient, whereas profitability is the main condition. The most important tools of controlling are the integrated planning of the enterprise activity and the actual deviation analyses.

Materials and methods. When creating a new enterprise, its founders set themselves priorities and goals, the main of which is to maximize profits. To achieve these goals, the company, in turn, should work effectively, and that means with maximum profit and minimum losses. That is why in the course of its activities, to maintain its successful performance and productivity, organizations use various methods to improve their efficiency. In the implementation of the plans involved various units with different levels of tasks. In this regard, there may be a discrepancy between the final goals of the units and the final goal of the entire enterprise. For example: the Purchasing department wants to purchase high-quality raw materials, which is quite expensive, and the task of the Finance department is to reduce costs, etc. In such cases, you can use a management system such as controlling.

Main part. Controlling itself is an idea of enterprise management based on the system of control, planning and management of the process of achieving the final goals of the enterprise.

The causes of controlling are such factors as:

1. Increasing the instability of the environment and the introduction of new requirements for the enterprise management system.
2. Shift the focus from the control of the past to the analysis of the future.
3. Increased response to changes in the environment.
4. There is an urgent need for constant monitoring of all changes occurring outside the enterprise.
5. The need for the reasonableness of further tactics of the enterprise in order to avoid crisis situations.

There are several types of controlling: strategic, operational, financial, personnel.

So, in turn, strategic controlling involves tracking the impact of certain actions on the enterprise itself. Thus, it is possible to find out in a timely manner whether this or that action leads to the assigned goal of the company or, on the contrary, distances from it.

The task of operational controlling is to make timely decisions that will bring the company closer to achieving the goal and comply with the management system inherent in this company. Also, the task of operational controlling can be an achievement of short-term goals of the enterprise: increasing productivity, profitability, etc.

Financial controlling in the company is aimed at the analysis of profit and loss, and the factors affecting their increase or decrease. It identifies the sources of enterprise success through profit controlling.

Personnel controlling analyzes the structure of the personnel of the enterprise, the effectiveness of funds invested in training, staff development, the impact of social development of the team, productivity, wage costs and the dynamics of its increase. Within

the framework of this controlling, dismissal, search and hiring of specialists, relocation, additional training of specialists and other procedures are carried out.

Conducting a comparative characteristic between the American and German controlling models can reveal a lot of differences. Controlling in English-speaking countries mostly understood as the management and accounting. The differences can also be seen in the nature of the tasks performed by controlling. The purpose of the American controlling model is to focus on external users (Supervisory authorities, investors, etc.), here controlling is more closely related to management, more focused on market requirements and customer needs. If we consider the German model of controlling, here the theoretical development of this system is considered first, while the solution to problems is taken into consideration as secondary.

With regard to logistics controlling – it is an ordered, if possible, continuous process of processing data on the logistics system in order to detect deviations between the planned and actual values of material flow indicators, as well as analysis of these deviations to identify the causes of discrepancies.

The advantages of controlling implementation increase the efficiency of enterprise management, its costs, increasing profitability, reducing the time of management decisions, in other words, achieving goals and objectives with minimal losses.

Conclusion. Summing up, I would like to note that the introduction of controlling in domestic enterprises will be able to provide managers with reliable data on the results of the implementation of the planned plans, to increase the level of validity of management decisions. Controlling is the key to successful management, in addition, creates favorable conditions for improving the efficiency of the enterprise and economic growth in the long term.

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15. Application of behavioral economics in modern world

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Introduction. Behavioral economics deals with systematic deviations from rational behavior called biases, among people who face economic challenges. It is vital to pay attention to the irrational principle that lies behind human thoughts and feelings, in order to understand how the economy functions and how to manage it effectively.

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

Results. Studies in the field of behavioral economics have revealed that, in reality even competent, informed and successful people start to act unreasonably and illogically, which leads to the damage of their own long-term interests. One of the discovered behavioral biases is the endowment effect. This effect shows that if some item belongs to a person, then a person evaluates it higher than the same thing that he had nothing to do with. This effect has been shown in a number of experiments [1]. There are many options for using this effect in real life. For example, in marketing, when a person is given something to hold or for a test drive. Another effect is mental accounting, or subliminal accounting. It lies in the fact that people treat different money differently [2]. It turns out that people do not value easily earned money as well as money earned by hard work. Moreover, the same rule applies to spending money on different purposes. A person may have several "checking accounts" for the same resource in his mind. Almost every person is prone to the planning fallacy, which means that people tend to be overly optimistic and underestimate not only the time that is necessary to complete a task, but also the costs and risks of future actions. Thus, the planning fallacy also means that people incorrectly estimate the amount of all resources required to complete a task [3]. Hyperbolic discounting is the effect that refers to the tendency for people to increasingly choose a smaller reward over a larger reward if they can get the smaller one much earlier than the bigger one [4]. The observation of hyperbolic discounting is used to study saving for retirement, borrowing on credit cards, and procrastination.

Conclusion. The study of cognitive and behavioral biases helps in solving economic problems and making economic decisions. In this way, behavioral economics is a new promising line of research in the field of economic science.

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16. Improving the quality of logistics services

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Introduction. We live in the digital age and this allows companies to learn about the needs of consumers and the requirements of different groups of people or even other companies, better understanding how to offer products and services. Logistics services play a significant role in our time.

Materials and methods. In this paper, I used the method of analysis and synthesis, idealization, induction and deduction. Improving the efficiency of logistics is possible if there is a well-functioning transport and logistics system and the transition from "clean" auto services related to the movement of goods to the processes of providing transport and logistics services that reduce the specific transport and logistics costs per unit of output.

Results and discussion. This goal determined the need, formulation and consistency of the following tasks:

- analyze the state of the transport and logistics processes of his enterprise, investigate the transport and logistics characteristics of the generated traffic on a number of factors and develop a methodology for organizing transport and logistics interaction;
- substantiate directions for optimizing transport and logistics systems and processes enterprises of agro-complex based on an integrated logistic approach.

The conducted studies allowed me to establish that an integrated assessment of the level of competitiveness of road transport organizations in the services market can be carried out with the interrelation of the following indicators: the efficiency of transport and logistics services; marketing effectiveness; financial sustainability. The management structure of transport and logistics processes with the use of a mass service system (MTS) for motor transport services for enterprises using a functional and logistics transport center will ensure system transport and logistics interaction and the efficiency of use of trucks. The application of the concept of transition from pure transportation to the provision of transport and logistics services requires from carriers a clear understanding of the processes taking place, their interconnection and interdependence; awareness of work in the interests not only of their own, but, above all, in the interests of all enterprises of the supply chain.

In this regard, the importance of organizing the functioning of transport and logistics processes and their interaction increases:

- firstly, the autocarrier ensured the efficiency of the profile production of the services provided by the consumer;
- secondly, the consumer of the provided services organized his main production taking into account the possibility of using the haulier to use the most efficient transport schemes for both sides, which allow reducing the cost of transportation and the size of transport tariffs.

Such a "counter" movement in the system allows to achieve a synergistic effect, reduce the transport capacity of products, thereby increasing its competitiveness and affordability for buyers.

Conclusion. As a result of the work done, in order to improve the efficiency of logistics services, it is necessary to adjust the functioning of the transport system: it is necessary to obtain a synergistic effect and reduce the transport capacity of the products produced at enterprises.

17. Human capital

Tatyan Moroz

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Introduction. Human capital is a collective stock of knowledge, skills, capabilities, expertise of employees which play an essential role in improving the productivity of the company [2]. Human capital is opposed to physical capital and it is the most important asset because just human capital is active asset of the company.

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. There are five parameters for measuring the return on investment: cost (amount of money which was spent); time which was spent on the job; quantity (for example, the amount of work which was performed); quality of work which was performed; and the last, is a human reaction (how the employee feels about the work which was done). And these five parameters you can use almost everywhere [1].

Example: TMI (Talent Management Intelligence) system. Today we need a holistic three-dimensional system. Talent Management Intelligence model is just such a system. Its integrity means that we analyze all the organization's functions, production, sales and distribution, customer service and administration, before a company decides on new investments. The three-dimensionality of Talent Management Intelligence model means that each investment considers structural, human capital and capital relationships. For example, Talent Management Intelligence model can be used to train employees of the customer service department. Usually, training is conducted irrespectively of other functions of the company. The trainer needs to link the content of the training program with production, sales and administration issues in the Talent Management Intelligence model. This encourages the customer service department to move away from those ways of interacting with customers that contradict the production schedule, promises of the sales department or administrative capabilities. The trainer thinks in three dimensions, striving to ensure that the effect of training is extended to both the organizational structure and the company's external relations and the worker's abilities[1].

Conclusion. Human capital is the most important asset of the company. Companies need it to take the next step in growth and innovation. Companies runs with the help of individuals who contribute in their own way in its success and productivity.

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18. Building productive workplace

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Introduction. The problem of comfortable workplace creation is actual for all industries. The result of production process depends on employee feelings. The author would like to explain importance of work environment which department managers should create for their subordinates.

Materials and methods. Universal corporations' (such as Google, Microsoft, Apple) activity observation from interviews with their employers and personal blogs of workers; analysis of articles and lectures about office design; comparison the situation in the West and post-Soviet countries.

Results and discussion. Analysis of materials help to understand direct dependency between employees' productivity and comfortable workplace design. Universal companies take into account both human and professional needs of workers. Global corporations should present new functional ideas more often than other companies. Inventions are the main work of creators, so they need not standard workplace, where they can find inspiration, change their way of thoughts. Google, for example, construct unusual architecture forms of office space; maintain work zones, where you can work individually or with group of people. Different spaces, which look different from each other, help people not to get tired from their environment and not to lose productivity.

If to compare the situation in the West and post-Soviet countries, we will see that second one only start to understand the necessity of workplace design. Big amount of offices with different activity spheres looks the same. Focus on corporate culture, symbols and colors help to make process of new workers' introduction to the teameasier, to feel corporate culture and its goals, to be motivated for work process.

Next problem of ill-conceived offices is abundance of small things. Employees fill the room with lots of personal items and make space congested in the result. People can't concentrate on their tasks and get tired quickly. Some of employers prefer to refuse décor at all. Consequently, they build 'cages' with computer. Empty rooms don't promote productivity and increase employee fatigue. The best decision is to create well-balanced décor space.

Open-plan office is the most popular design decision and problem of modern offices. Managers try to build solid work team and gather all department workers together. But, according to the research of psychologists, it has a bad effect on moral statement of people and can lead to depressed state.

Conclusion. Offices' design has a great importance today. Managers should take into account the specifics of the department or company. Well-organized workplace will help to strengthen the functioning of corporate policy, to improve the productivity of production processes.

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19. Internal environment of the enterprise

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Introduction. Special attention to the factors and conditions that affect the work of the organization externally and internally is an issue of great importance for economy.

Materials and methods: The survey is based on analysis of the work of several Minsk (Republic of Belarus) enterprises.

Results: Factors affecting the state of the external environment of the enterprise may be different. Moreover, the state of the internal environment of the organization depends on the external environment. All companies set the task of making a profit and the state of the internal environment is very important because the internal environment of the enterprise is a set of activities that must transform resources into commodities that the market is ready to use.

The internal environment consists of two parts: operational and resource. Each part has its own characteristics. The resource part deals with the funds for implementation their activities. The operational part consists of different types of analyzes performed to determine the capabilities of an enterprise in a competitive environment. Analyzes are carried out in different areas and directions. The first direction is production. It characterizes the volume, speed and quantity of manufactured products; quality of equipment and scale of use; resource availability. The next direction is employees. Important points are the qualification of specialists, labor productivity, payment of wages, a collective atmosphere, the needs and interests of the staff. One more direction is marketing analysis that plays great role as it determines the quality of the goods produced at this enterprise, awareness of market qualities, marketing plans, advertising, etc. The latest area of analysis is financial sustainability. The analysis reveals current sustainability and future prospects for a more rational use of resources that are limited in both qualitative and quantitative terms.

By analyzing the financial stability and solvency, the company can identify which characteristics can contribute to the organization's work in the long run, as well as what factors can affect this ability. The balance sheet helps to control this performance and work out a set of inventories.

For an enterprise growth and making profit it is necessary to identify constantly the existing and potential opportunities that contribute to development. An organization will also be able to use its resources more efficiently and expediently, to monitor the quality of production, research and control its capital. The company will be able to highlight its strengths and become competitive in the labor market. The internal environment reveals the technical and organizational issues that are the result of managerial decisions. It is important to know not only the strengths, but also the weak sides, in order to find an opportunity to eliminate them and build the best strategy for development.

Conclusion: The state of the internal environment of the organization is an issue of special attention. Analyses should be carried out and plans should be developed to improve the work in this place. All that is the base for the work and success of the enterprise.

20. Electronic human resource management system

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Introduction. Many HR departments are charged with company's development and generate the culture of the company. They build teams empowerment policies. New technical knowledge, skills, experiences and abilities require HR managers who are flexible and willing to deal with the changes and difficulties in the global workplace [1].

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. Technological development, innovations, electronic applications lead today employees to a greater awareness, capability, opportunities. New technologies have created a new generation of employees. The new concept of E-HRM has become the part of human resources. This concept is suitable for managers, who keep all departments under control and play an important role for the company. E-HRM is worked out by information technologies. It helps companies to get well-educated human capital. It includes information about business, finance and personal activities in addition to saving resources. It provides HR with support for future planning and empowerment [2].

Transformational E-HRM includes the duties with workforce. It develops the company's strategic choices [3]. E-HRM provides access to the employee information: skills, award, education, membership, experience, information from previous working place. It helps HR-managers to communicate with employees from different departments, with colleagues from different countries. Today the Internet has become a means for employers to search for candidates and for applicants who look for a job. Companies usually hire the candidates using the Internet as a medium. Most employers will recruit their employees from the online job search engines and new selection process are keeping tests online by testing their level of knowledge, behavior and etc. [4].

Also, companies try to reduce costs. E-HRM allows organizing training inside the company, making it available "any time", "anywhere" reducing direct costs, for example, instructors, training facilities, and indirect costs (travel time, lodging and travel expenses). Managers can communicate with employees via the Internet, mainly e-mail, and reduce costs too. It means using the Internet or organization's Intranet to facilitate the training for the workforce. Getting the online modules of training, a large number of employees can be a part of working process. One of the most critical success factors for implanting an E-HRM system is the support and involvement of top managers in the project during its life cycle. Also an executive sponsor should be appointed to coordinate, communicate, and integrate all aspects of the project between the development team and top management. The executive sponsor should communicate, integrate and approve the shared vision of the organization and the responsibilities and a structure of the new E-HRM system [5].

With the growing awareness for environmental sustainability, many companies are looking for ways to "go green." Implementing a E-HRM will help reduce almost all of the paperwork associated with HR tasks we can save money and time.

In order to implement and develop the E-HRM system in global setting the following items should be considered:

Try to hire part-time and full-time professional and knowledge-oriented employees, develop computer skills and knowledge, paying attention to new technological environment

in companies is one of the necessary functions of the E-HRM, increase the number of managers and experts in utilizing worldwide web in order to save time and costs [6].

Conclusion. E-HRM is a web based tool to automate and support HR processes. It allows using an empowerment policy. E-HRM is a business solution which provides a complete online support in the management of all business processes for managing human resources in any company. It is efficient for managers to have information about employees, colleagues with the help of this tool. Companies should progress gradually. It means they should go through all operational, communicational and change processes of the E-HRM [7].

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21. Advantages and disadvantages of doing family business

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Introduction. The idea of building and running a business with your family is thrilling. If you start or join a family business, as a family member you're likely to benefit from a range of advantages which you often don't find in other enterprises. On the other hand, you may also face some difficulties that specifically relate to family businesses.

Materials and methods. There were used such methods as: comparison, analysis, structuring and systematization of information. Application of these methods allowed to determine the main advantages and disadvantages of family business.

Results. One major advantage is trusting and really knowing your business partners. Unlike typical workers, family members working at family firms are willing to contribute their own finances to ensure the long-term success of the organization. This could mean contributing capital, or taking a pay cut. This advantage comes in particularly handy during challenging times, such as during economic downturns, where it's necessary to tighten the belt or personally suffer in order for the business to survive. Family members are willing to wear several different hats and to take on tasks outside of their formal jobs in order to ensure the success of the company.

Another benefit of running a family business is that you can sometimes cover for each other when the need arises. One truth about running a family business is that some of the family members might become too comfortable, knowing that they are in the business with the people closest to them. The result of this nonchalant attitude is poor performance, lack of formal planning and budgeting.

It can be easier to make big decisions in a family-run company. Instead of having to wade through multiple layers of bureaucracy, which are common in larger organizations, family-run businesses are often more flexible. If you need approval for a project, you're more likely to get a quick decision.

When a family runs a company, the desire to keep things profitable and stable for future generations is usually very strong.

To be successful as both the company and the family grow, a family business must meet two intertwined challenges: achieving strong business performance and keeping the family committed to and capable of carrying on as the owner.

One of the biggest challenges for family businesses is managing a working and personal relationship. Individuals who work with family may have problems setting boundaries so the business doesn't take away from family time.

Sometimes, family members aren't truly interested in joining the family business, but do so anyway because it's expected of them. The result is apathetic, unengaged employees. In the public sector, employees that fit into this category would simply be fired. It's not so simple at the family firm.

Another challenge frequently encountered by family businesses involves paying salaries to and dividing the profits among the family members who participate in the firm. To ensure that salaries are distributed fairly among family and non-family employees, business leaders should match them to industry guidelines for each job description.

Conclusions. A family business might have several disadvantages but a tight-knit family can easily overshadow them with the advantages.

22. Freelance in Belarus

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In Belarus, freelancing has become a lifestyle for people of different professions. Journalists, programmers, translators, designers, photographers refuse from stable office work and successfully earn a living in freelance sphere.

Today in Belarus there are already a sufficient number of freelance exchanges where you can start earning, for example, such as Globalfreelance.by, ITFreelance.by, Belfreelancer.by. The most unusual freelancing project is Global Freelance, which allows our compatriots who know English to earn money. From the features of the service, it is possible to single out the fact that all tasks come only from foreign customers, and most tasks are relatively simple and have an academic focus. At Globalfreelance.by, both students and specialists from various fields, such as economics, mathematics, programming, philology, English, and others, will be able to do the job. The functionality of the resource is accessible and understandable, concise and facilitates the search for profitable orders, perhaps the only drawback is that only foreign customers can place jobs on this service. In terms of popularity and earnings, previous resources are slightly inferior to the resources Freelancer. ITFreelance.by that is popular in a certain segment. It will be useful for freelancers who specialize in website development and advertising services. Many novice freelancers face problems caused primarily by lack of experience. In order to avoid serious mistakes in work, you must follow a few key rules. To begin with, any freelancer needs to make the most accurate daily schedule and general schedule. The second rule of a good freelancer is to try to avoid stereotyped work. It is precisely stereotypical thinking of many freelancers that causes many customers to reject their services. Workers who have chosen freelance do not have work records, paid sick leave and vacations. And there is not always a guarantee that the work will be paid for - however, these risks can be minimized with proper registration of the relationship with the customer. Belarusian freelancers can use three basic schemes of working with a client:

1. According to the contract agreement - the document to perform a specific kind of work for a specific payment. In the contract it is necessary to prescribe the amount you earn, the obligations of the customer and the contractor, as well as the obligations to ensure safe working conditions.

2. With the registration of a sole trader. All taxes are borne by the freelancer. It is worth noting that not every job is considered an enterprise - for example, tutoring can also be done by an individual without registering an individual entrepreneur. But you have to be aware of the tax in any case.

3. Without paperwork. This option is the most risky. Firstly, there is a possibility that the customer will not pay for the work. And secondly, there is the danger of getting a penalty for illegal business activities and tax evasion.

Today, freelancers in Belarus can earn good money and at the same time not be parasites, and for this you need to understand the importance of quality approach to work and competent registration of the contract.

23. Modern methods of personnel motivation in textile production of companies

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Introduction. This article determines the significance of competent staff motivation for the overall development of the company and to achieve the goals of the organization; compares various methods and techniques of personnel motivation on the example of the company «Conte».

Materials and methods. More often, when speaking about the management of a company, one may encounter the fact that one of the most difficult goals is personnel management, and in particular, personnel motivation. At present, this issue remains the most serious and relevant also because motivation directly affects labor productivity.

Work related to the production of textile products often encounters changes in customer demand for these products, inconsistency of customer requirements and the study of new equipment and technologies. Achieving the ultimate goal is possible only with an effective work of each team member. That is why you need the right system of motivation, which will satisfy the interests of everyone.

Main part. Of course, material benefits were always the best motivator. The right approach to pay for work increases productivity and quality of work. The economic motivation of staff can be both tangible and intangible. Examples of material remuneration include additional payments for overfulfilment of work plans (bonuses, interest on transactions), encouraging people who lead a healthy lifestyle, paying for the gym tickets; medical and social insurance; material support for holidays (birthdays, weddings, anniversaries), in emergency situations (death of loved ones, robbery, fire). And examples of non-financial incentives are free or partially paid vouchers for holidays in a sanatorium for all members or to recreation centers, discounts on acquisitions of various things, products; flexible schedule of professional duties.

However, in modern realities, the question of what besides money is capable of motivating staff is becoming increasingly important.

According to a study conducted to determine the most effective ways of non-financial incentives among Conte employees, it was revealed that the main incentives are interest (28%), a good team (16%) and pleasure (13%). No less significant for people were such factors as a lack of control and pressure, deep moral satisfaction, the prospect of business, its usefulness, self-realization and the need for creativity. [1]

A special role is played by mental and moral methods of motivation. These methods help to develop employees professionally and improve their performance. The most popular methods are:

1) Mental and social diagnosis. This will make it possible to show gaps between employees and help to resolve these gaps. 2) Conduct various trainings or competitions that will allow to identify leadership skills in staff.

3) create an atmosphere of the enterprise. For example: change the design of cabinets, add photos of the whole department to the wall, and add relaxing music that will allow you to show creativity in your daily work. [3]

As moral praise use:

- 1) Praise the employee in front of all the staff;
- 2) Personal gratitude verbally or in writing from the manager.

Any of the above methods of motivation is applied daily at domestic enterprises in the Republic of Belarus, including the company Conte. However, there is no single rule or the

best method of motivation. Often, intangible methods of reward help to achieve the desired result much faster than cash payments.

It is impossible to achieve high results in personnel management using only 1 of the presented methods. The most correct solution is to use immediately a set of measures aimed at stimulating work of the staff.

Probably, most will disagree with the statement that intrinsic motivation is not always the strongest. But despite this, it is often one of the factors that prompts action. Particular importance has an internal motivation of staff in companies for the production of textile products, because not every specialist will agree to do work that he does not like. That is why a person needs self-motivation.

Self-motivation is an ability to motivate yourself to perform any action that does not cause any interest. A person with self-motivation does not wait for orders, but sets goals and tasks on his own, and also seeks to fulfill them. A person needs to learn how to tune himself to perform the necessary work, setting clear prospects in front of him. Each employee may have his own goal: to buy a new car, become a deputy of the department, or open his own business. No matter what this goal will be - the main thing is that it is. [2]

Thus, it can be noted that today it is important for the manager to rely not only on motivating staff with material benefits, but also to pay special attention to social and psychological motives.

Conclusion. In order for a company to be competitive in the labor market, it is necessary to offer employees not only decent wages, but also to take into account relations within the team, the need to ensure a system of professional growth and development, and especially to listen to the opinion of employees.

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24. Promotion of small businesses, recommendations and types of promotion

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Promotion of small business is a difficult task, much more difficult than working with large companies. In recent years, small businesses have undergone very serious changes, many enterprises have been forced to close because they did not generate income, and the level of competition increased. Sales fall together with income, if not to engage it in effective promotion.

Most of the promotion methods used in the global market will not help small firms. In addition, the problem is that they are very difficult to implement in our market. But some methods can be adapted to the format of a small business and be engaged in its promotion. What are the options for promoting small business?

1) Local newspapers, magazines. This is a relatively inexpensive form of advertising, which in the era of total dominance of the Internet began to be ignored, but in vain. With well-written message text, this type of advertising can be effective.

2) Billboards. This is a good way to inform potential clients not only that your business exists, but also about all sorts of promotions, discounts, special programs.

3) Advertising in public transport. It is cheaper than billboards, but not always suitable for the target audience. If most of your clients use public transport services, then this can be an effective way to promote a business.

4) SMS distribution. This is a great way to tell your customers about the new promotion, discounts, product receipts, or simply to wish a happy new year and strengthen the loyalty of the target audience.

5) Local TV. You'd be surprised, but advertising on TV may not always be the most expensive. Moreover, sometimes you can get it for free! How to do it? You have to give TV people what they want - material for broadcast, news release, etc.

6) Distribution of leaflets. This is one of the cheapest ways to advertise a small business. Its effectiveness is controversial among marketers, but why not try it? The main thing is to keep track of the number of customers who came through the leaflets and correlate the profit with the costs in order to understand whether the game is worth the candle.

7) Free trial copies. Usually this is organized in the hope that satisfied and delighted consumers will go to the right and left to recommend this product, thus contributing to the spread of rumor (word of mouth effect). This method of promotion is able to bring you loyal customers who will make multiple purchases.

8) Sponsorship. Usually this kind of advancement is associated with something costly. But again, if you approach this creatively, you can reduce costs. Suppose your store sells baby products. Give a little help to the local creative house, kindergarten or children's club.

9) Participation in local exhibitions, fairs, business forums, conferences, symposia. This is a great opportunity not only to find new customers, but also business partners, suppliers. This is a chance to explore competitors, to identify their strengths and weaknesses.

10) Using the Internet. Even if you have a purely traditional type of business that has nothing to do with web technologies, you should not neglect the opportunities offered by the world wide web. There is a huge amount of Internet marketing tools: contextual advertising, social networks, e-mailing, SEOContextual advertising - these are advertisements that are displayed in response to a user request in a search engine, as well as on thematic sites that are part of an advertising network.

Social media marketing (SMM) is the attraction of traffic or attention to a brand through social networks.

SEO or search engine optimization are measures that help to raise a site to higher positions in search results for certain user requests.

11) Hold an unusual event. Scientifically, this is called event marketing - when you organize an interesting and exciting event that involves a large number of participants, and perhaps even the local press.

For example, the organization of a sports competition bike store. Or holding a local cafe for eating hamburgers. Or the organization of a literary evening, a contest of stories or poems by a bookstore. The main thing here is fantasy and creativity.

This is far from exhaustive practice, but a basic list of forms of promotion of small business. In order to achieve the desired result from advertising, it is desirable to apply an integrated approach, that is, to use several types of promotion at once. And, of course, you need to analyze what returns, what does not, and adjust your marketing strategy.

25. Flexible working hours as a tool to increase productivity

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Introduction. In the time of rising global competition and technological development it is imperative for managers to try and meet his or her clients and employees needs in order to create the most productive and efficient environment for the best possible results.

Materials and methods. The analysis was conducted on the basis of information provided in electronic sources of foreign authors.

Results and discussion. Flexible working hours contain large number of benefits for both employees and their employers sometimes even proving its beneficial qualities for customers.

Such a scheme not only reduces daily commute therefore lessening expanses and saving valuable time that can be spent on work, but also puts employees in control of their own time schedule to meet their personal and family needs. Hence the increase in motivation, engagement and job satisfaction which are all highly valuable for employers, who will be able to enroll skilled personnel regardless of their whereabouts. Moreover, flexible working hours make it possible for customers to be serviced twenty-four hours a day all week.

Undeniably, despite its considerable merits, this working solution as all others has its downsides. Not every employee has a desire to work from home or even do it successfully without supervision. Working from home not only proves communicating with other workers difficult but almost entirely erases the line between home and work life, which puts unnecessary pressure on employees and can be responsible for decrease in quality of work itself. If there is no clear definition between work hours and leisure time it's easier for an employee to start working all the time and fall victim to stress and work overload. For that reason, it is vital for every worker to reach healthy work-life balance for themselves no matter the working hours.

Not every work can be done remotely and not every worker is willing or capable of working outside traditional working hours. It is therefore necessary to make sure that there is definite positive impact of flexible working hours for specific company and organization and its staff.

Nonetheless, possible negative aspects of executing flexible working hours if done right can be reduced to a minimum.

Conclusion. Implementing flexible working arrangements correctly can be extremely successful and irrefutably profitable. Therefore, realistic expectations put on workers and healthy working relationship between them and their supervisors is the key to success.

26. Attraction of foreign investments taking into account national security

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Introduction. Nowadays foreign investments influence economies of countries on the planet. One of the main roles among the conditions that impact on financial formation of the country is direct foreign investments.

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. Foreign investments are very significant for effective formation of economy of the country. Investments can become rising in some fields of the industry and agriculture, and an economic situation in general. These processes promote strengthening of the general basis of economic and national security of the country.

At this stage of economic development of the Republic of Belarus questions of increasing investment attractiveness of industries of the national economy and improvement of the economic mechanism of distribution of investment resources play a significant role. The lack of complex approach in a dispersal of investments for the last 5 years resulted in disproportionality of formation of certain spheres of economy.

Economic security of the country is the main high-quality component of concept of national security that guarantees security of national economic interest from challenge, dangers and threats predetermined by globalization of the international economy.

Elements of structure of economic security are:

- 1) economic independence,
- 2) stability and reliability of national economy,
- 3) ability to self-development and progress.

Besides, it is necessary to consider a definition of economic independence. Economic independence means the probability of monitoring a system or national resource, providing competitiveness of national economic system at world level. Stability of economy characterizes reliability and durability of its elements, ability to resist to internal and external threats. The ability to self-development and progress assumes the development and formation of innovative potential, formation of suitable investment that becomes the integral condition of stable formation of competitive economy.

It is necessary to allocate that communication of national economies with transnational corporation and involvement of these corporations on the territory of the country, respectively a current international trend.

Conclusion. The policy in the sphere of direct foreign investments has to be directed to attraction of investments into the taking priority areas with high added value and the export-oriented enterprises, and ability to formation of super technological productions.

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27. Keys to success of «Kommunarka» these days in the international market

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Confectionery factory "Kommunarka" is one of the largest factories on the territory of the Republic of Belarus. Its story began on January 11, 1905. Every year it changed its name, but in 1929 it was renamed "Kommunarka", and still bears the name. The factory was very popular not only on the territory of the Republic of Belarus, but also on the territory of the entire Soviet Union, besides, the company has managed to main tour its leading position nowadays. "Kommunarka", starting from the 50s, produced more and more new varieties of sweets and chocolate, thanks to the fact it was gaining popularity among consumers more and more quickly. The introduction of new packaging design and unusual taste have attracted more and more buyers as compared to the Soviet period.

Even after the collapse of the USSR, "Kommunarka" confectionery factory has not lost its sweet image, so to this day it is the most popular factory not only in our country, but also on CIO territory. It is part of the Belarusian State Concern of the Food Industry "Belgospisheprom". Every year the company produces about 25 thousand tons of sweet products. A wide range of factories has more than 200 items of confectionery. Currently, the factory has opened four main shops: candy shop number 1, candy shop number 2, candy shop number 3 and a chocolate shop. Caramel, sweets, cocoa powder and various chocolates - all this is produced by Kommunarka confectionery. As since the foundation of the factory, to these days, Kommunarka uses only natural products and carries out full processing of cocoa beans in order to improve the quality of the production. The factory places great emphasis on the introduction of modern and multifunctional technologies, which contributes to the acceleration of production, as well as the increase in its volume. The well-deserved quality of Kommunarka confectionery products is valued not only in the territory of the Republic of Belarus, but also abroad. The company exports products to different countries of CIO such as Russia, Georgia, Kazakhstan, Turkmenistan, Azerbaijan, Uzbekistan, Ukraine, Moldova. Tourists from CIO countries, visiting our country, acquire a huge amount of confectionery products of the factory, which greatly affects the economy of our state. Today, the company is introducing into the market not only new packaging design for sweets and chocolate, but also new tastes, surprising consumers more and more, thereby attracting a large audience. The Republic of Belarus is trying to export the products of the factory in large quantities to the entire territory of the CIO countries, and the export of products has expanded to the territory of the United States, Canada and China. Kommunarka brand shows itself worthily at national and international food and confectionery exhibitions such as «All candy» in Chicago, «ISM» in Cologne, «World Food» in Moscow, «Prodexpo» in Minsk, etc each year. The confectionery factory is the winner of many international exhibitions, the owner of a large number of diplomas and medals. Therefore, we can safely say that Kommunarka significantly raises the economy of our country.

To summarise the above, one can say the keys to success: constant search for ideas to create new confectionery products, introduction of modern production technologies, commitment to high level of quality (which originated from USSR), innovative marketing which is based on word-of-mouth, but still needs further improvement, perfect customer service when they under promise but over deliver. As a result, the confectionery factory Kommunarka is one of the most famous enterprises - sweets manufacturers, which loved by many generations and has potential, which allows Kommunarka factory to constantly develop and expand both in the Belarusian and CIO markets and satisfy the tastes of a large number of consumers.

28. Why you should pay attention to the Belarusian dairy brands

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Introduction. The dairy industry of Belarus represents a wide range of products: different types of milk, butter, sour cream, kefir and other sour-milk beverages, cottage cheese, yoghurts and desserts, ice cream, cheeses. The largest Belarusian producers of dairy products are Savushkin Product, Grandma Krynka, Milkavita, etc.

Mainbody. Financing of dairy enterprises has been actively pursued since the beginning of the 2000s, and state support for the industry amounted to more than \$ 1 billion. Serious technical equipment of livestock farms allows increasing milk production, and traditional Belarusian recipes are used in product development, but improving the new, bright assortment list is one of the main features Belarusian dairy products. Dairy products are made in accordance with the requirements of state standards.

Belarus continues to be a recognized leader in foreign trade in dairy products. Its share in the global dairy trade is 4–5%. Today, the Republic of Belarus successfully sells its products to many countries of the world: Syria, Saudi Arabia, Mongolia, China, Singapore, Turkey, Serbia, the countries of the former USSR. In Syria, they are often equated with the concept of “excellent quality”, and interest in raw materials — dry milk (whole and skimmed), butter, etc. — is simply huge. For the development of new markets in the Middle East, many enterprises have been certified by the certificates of HALAL and KOSHER, work is underway to expand the range of dairy products for deliveries to China. However, at the same time, many campaigns do not perceive marketing as something serious, so the whole strategy of winning the market for many is based on the fact that, when sending their product for export, manufacturers think that everyone already has the general impression that high-quality dairy products from Belarus. You can not sell the product in its classic sense, because the consumer needs a sense of confidence, good quality of life and satisfaction. Competent strategy, communication, advertising are what the Belarusian dairy brands lack. At this stage, it is difficult for Belarusian campaigns to compete in the world market with transnational corporations, which have huge budgets and large teams of professional marketers.

Food consumers are looking for the best taste: independent tastings allow the participant to freely express their opinions, not hesitating. Therefore, the results of such tastings are especially valuable. Thus, OJSC “Savushkin Product” for more than 14 years consistently ranks first in the rating of the most preferred dairy brands by Belarusians.

The Belarusian dairy market has great prospects, but it is worth considering the content of a large amount of sugar and fat in the product, as now in Europe there is a tendency to use healthy products, with a content of beneficial substances, as well as convenient in consumption - for example, on the go. In addition, of course, with environmentally friendly packaging.

Conclusion. Belarusian dairy enterprises should pay attention to the issues of waste-free production of products, the continuation of work on technical re-equipment, the development of quality marketing: market research, the proposal of new ideas, tastes, bright packaging, etc.

29. Rationale of stereotyping in advertising

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Introduction. Advertising is more than just a means of marketing communication or a technique for increasing sales. It's an absolute storyteller that has been dedicating the terms of normal human life, offering standards of well-being. Generalizing different values, attitudes and habits may result in stereotyping.

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 and materials published in periodicals.

Results. Advertisements are frequently based on the utilization of already existing social ideologies that basically have a specific structure of integrated common beliefs. Those beliefs are sometimes considered as stereotypes that in some occasions are negative.

Negative stereotypes have the most impact when it comes to ethnic and racial differences. However, they are still used in advertising, targeting at specific demographics in various aspects.

Reasons for stereotyping in advertising can be correlated with the 'mirror' and the 'mold' argument articulated by Pollay in 1986. According to the 'mirror' argument, advertising reflects values that already prevail in a cultural context. The rationale behind this argument lies in the existence of multiple interrelated factors of socioeconomic and political environment that influence the value system of a society. Otherwise, the 'mold' argument states that advertising enthralls and impacts on a society, thus encourages stereotypes that are formed by media.

The 'mirror' and the 'mold' argument is a continuum. Advertising is a visual representation of different aspects of real life, which creates opinion within culture that in turn reflects and contributes to a society. It is the indissoluble process of periodic operations, called cycle.

The cycled structure allows detecting severe problems on the initial stages of their origin and solving them on time. Marketers should be aware of the potential to cause serious or widespread offence when referring to different races, cultures, nationalities or ethnic groups. Not only advertisers should be aware of the possible consequences, but media consumers. The assumption of them becoming more conscious of the role of media in forming sense of values and social reality is that consumers will be able to process information correctly. Therefore they will be less likely to be influenced by explicit and reciprocal notions of racial groups.

Conclusion. Stereotyping has the power to refocus people to live their lives driven by hate, and can be the cause of victims of those stereotypes to be driven by fear. It took us much time to get to understand we have the opportunity to avoid conflicts, disagreements, quarrels and discords, just sorting out the information surrounding us, paying attention to the details, investigating more and being tolerant world lovers.

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30. Different Psychological Types of Consumer's Behavior on the Market

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Introduction. The seller can take a significant share of the market of the goods or services provided only by relying on individual preferences. Characteristics of consumers' nature affect the ability of perception of advertising, so it becomes relevant to consider the typology of their division.

Materials and methods. The material for the study was taken from the statistical data on the influence of the psychological factors on the ability to make a purchase.

Results and discussion. The market is characterized by buyers who have different tastes and needs. Nowadays, buyers are spoiled by the choice of goods and it becomes more and more difficult to please them. In such circumstances, the attitude towards the consumer is to suit his or her tastes.

The division of the market into segments is carried out on the basis of geographical, demographic, psychographic features of consumers. However, the consumers of the same segment can behave differently. Therefore, it is necessary to take into account the fact that each consumer has his own type of temperament and way of thinking. Based on this, each representative of a certain temperament looks at the same things differently, has its own view of the world. When analyzing these features, you can develop a promotional strategy on the market that will definitely be determined to succeed. The purchase of goods is carried out under the influence of motives. The task of the marketer is to identify these motives. The consumer's research allows us to create a competent advertising that can attract attention and surpass the competition. Advertising must meet the expectations and perceptions of the representatives of the segment.

The basis of consumer's behavior is a psychological type, which depends on his or her lifestyle. It develops on the basis of not only individual features, but also under the influence of ambient factors. All these components shape the consumer's behavior on the market and his or her attitude to advertising.

Let's consider the psychological types of consumers that react differently to advertising, according to RISC. Among them, there are: traditionalists, home students, rationalists, sybarites, wrestlers, switchers.

The first type is influenced by the cultural characteristics of their country. Supporters of the second type rely on kinship, in communication they distinguish softness. The third type is people who are not afraid of difficulties in life, they always take risks. The fourth type of consumers prefers emotional experiences. The fifth type chooses such values that are consistent with the dynamics of society. The sixth type of people is those who value spontaneity.

There are a lot of other typologies for the formation of consumer groups. For example, division may occur according to the prevailing traits of character.

Conclusion There is no accurate list of psychographic features of segmentation. Most studies use a unique set of features, which is a significant problem for comparing the obtained results with data from other studies. It becomes impossible to obtain complete information about the segment relying on only one typology of consumer's separation thus the result will not be justified. You can rely on success, only by building a relationship with the consumer and realizing his or her true desires.

31. Advertisement Specifics Of The 21st Century

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Introduction. Advertisement is a crucial aspect of doing business. This especially applies to our modern world, which is dominated by information of all kinds. But one should think ahead in order to avoid many inconveniences caused by advertisement which can potentially ruin your business.

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

Results. The increasing support of equality and social justice in the western world have created a tempting niche of potential customer base that can be attracted by changing ideology of the company. Companies often try to attract such political and social activists by making their advertising campaigns appealing to such people, but those attempts tend to fail very often. Prime examples of such failures have occurred fairly recently, and in my opinion are worth noticing.

The first is one of the recent Pepsi ads, which was originally supposed to carry a message of peace, unity and understanding, but instead turned out to be a media disaster. The ad features a reality-TV star giving a can of Pepsi to a policeman to end the protest over police brutality towards the black people. The ad was perceived as disrespectful and 'tone-deaf' towards the problem. Needless to say, such advertising campaign has failed to achieve its purpose. While doing advertising campaign it is also important to not only attract new customers, but to not lose your old ones. This is especially true if your product specifically targets at one group of people. That takes us to the second example of carelessness. Recently one of the most famous personal care products manufacturer, Gillette, made an attempt to appeal to the politically correct movement with a questionable message, accusing all men of "toxic masculinity". This caused a major backlash and a large boycott movement for all Gillette products. According to YouGov BrandIndex, Gillette's buzz score – which is a balance of the positive and negative things people have heard about a brand – has fallen by 5.8 points over the past week to -3.4. That shows more people have been hearing negative things about the brand than positive and takes it from seventh in a list of 45 health and beauty brands to bottom.

Conclusion. Although advertisement plays an influential role in the modern world of business, it is very important to keep your cool and to not lose your head while chasing new trends for potential customers. Sometimes it can do you more harm than good.

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32. Negative and positive effects of humor in advertising

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Introduction. Many advertisements that are placed on television, on the Internet or on the street, include humorous elements. The effectiveness of advertising often increases with the use of humor. It becomes the most pleasant for understanding and viewing, involves the viewer and remains in his memory. But also, humor can reduce the interest of the viewer to the product, which can lead to the ineffectiveness of the advertisement itself. The main goal of the advertiser is not only to attract the attention of the consumer, but also to convey to him the meaning of this message.

Materials and methods. Such methods as scientific abstraction, synthesis, analysis, extrapolation, comparison and deductive methods were used. It can be noted that each person learns humor in his own way, this can significantly affect the result of advertising. For example, opinion can be divided between women and men. There are jokes that they understand in their own way, mostly about obscenities and gender inequality.

Experts Millward Brown found that in advertising, where parts of the body come off people, the response of the male and female sex is different. For example, men rated the material extraordinary, specific and funny, while women condemned, calling it monstrous, disgusting and outrageous.

Results. You can highlight the positive and negative points of humor in advertising.

Pluses of advertising with elements of humor:

- Advertising of this type forms a positive view on the product;
- Advertising with humor attracts a wide age contingent;
- If funny moments are remembered by consumers, then advertising is effective;
- If the product has a lot of substitutes in the market, then the creation of creative comic advertising will be a chance to stand out;
- If you know your audience and are confident that it will understand your humor, then you can successfully bring to the market a new product.

Cons of advertising with elements of humor: if potential buyers do not understand humor in advertising, then, firstly, it will not work, and, secondly, it may cause negative emotions on the product.

As they say, "humor is a delicate matter." Based on this, before you release an advertisement, it is necessary to conduct a study on how the focus group will appreciate the advertising you created.

To negative moments were not, there are several rules for humor in advertising. First of all, the shorter the joke, the faster it is remembered, it can be used even in a simple dialogue. The following rule states that if you use vulgar jokes, this advertisement will cause distrust and outrage. And one of the main rules, you should not laugh at the consumer, but with him. As you know, death, disease and religion are taboo topics.

A product that is advertised always affects product policy. That idea, which can be used in advertising chocolate, in any case can not be applied if you advertise tractors. In this regard, in 1994, Weinberger, Campbell and Brodie created a product color matrix.

In the matrix, products are divided into groups based on their functional or emotional needs and financial risk. The creators highlighted four groups of products and marked each with their own color (table 1).

Table 1 - Color Product Matrix

Financial Risk	Functional	Emotional
Big and medium	White goods	Red goods
Minor risk	Blue goods	Yellow goods

To the group of white color belong goods that satisfy functional needs, as well as their acquisition may require large material costs. For example, cars, laptops, televisions, etc. The red group of goods is a product for the soul, a fairly high cost. These may include jewelry, branded items, luxury cars, etc. The blue group of goods is the goods that meet the needs of a person, not requiring significant expenses, as in the group of white. For example, detergents, building products, etc. The latter group is yellow, it is also called "little pleasures", for example, cakes, cigarettes, alcoholic drinks, etc. Although these goods are inexpensive, they bring pleasure to consumers.

Conclusion. Based on the above, we can conclude that the use of humor in advertising has both negative and positive aspects. You need to fully understand what you are advertising, where you can joke, and where you can not. If you use the appropriate jokes in advertising, you can achieve a significant increase in profits by attracting new consumers. To determine advertising for a particular product, you can use the color product matrix, which is widespread in the world.

33. Psycho-emotional impact of advertising on human

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Introduction. Nowadays advertising plays a significant role in every person's life. Scientific and technological progress is not static and is developing quite quickly. And, unfortunately, the modern generation becomes slave to this progress, and advertising skillfully uses it.

Materials and methods. The analysis has been carried out on the basis of information provided in printed and electronic sources of foreign and national authors.

Results and discussion. Advertising is a type of activity that combines art and science, which are based on psychology, mathematics, statistics, logic and sociology. As an independent science, the psychology of advertising appeared over a hundred years ago. The founder of this science is the psychologist Walter Dill Scott, who in 1903 published his work "The Theory and Practice of Advertising", which describes the main issues of the impact of advertising on the buyer.

Psychology of advertising, as a psychological science, studies the basic tools of influencing a person, as well as the peculiarities of people's perception of color, image, text, graphic design, and so on. Using this science allows to create certain conditions under which a "dialogue" is formed between the advertiser and the consumer of the goods, and as a result, it leads to effective sales of goods or services. Advertising, as the main marketing tool, uses the means of persuasion to ensure the interest of potential customers to the offered products by distributing through public channels. The psychology of advertising pays considerable attention to influence, trying to force us to buy one or another product, which was useless for us before viewing advertisement. In order to avoid such situation, it is necessary to be aware of all the methods of influence that create the basis for advertising. Any product or service must satisfy an existing need. According to A. Maslow, there are five groups of needs. He suggested that a person satisfies needs in the following grade: 85% – physiological, 70% – safety and protection, 51% – love and belonging, 40% – self-esteem, 12% – self-actualization.

Based on this structure, marketers use certain methods to create advertisement. The first method is the effect of gratitude. Nobody wants to feel like a debtor, that's why receiving a gift, we have a desire to give something in return. The second method of attracting buyers is the effect of imitation. It is one of the most common ways that marketers use. The trick is that in Internet advertising they use photos of potential customers' friends, who previously bought a product or service. The next method is the effect of attraction. It's a well-known fact that in various voting nice people win. Thanks to that, marketers use in their projects popular actors and models. The next is the effect of authority, which implies from the previous method. As the following example we can consider a doctor, who advertises tooth-paste. People, seeing an actor in a white coat, undoubtedly begin to trust this advertisement [3]. Neuro-linguistic pro-gramming method is also used by marketers. This method is a way of imposing on customers visual images, that ex-press emotions, associations, and as a result, desire to purchase goods.

Conclusion. The main aim of marketers is to identify the buyer's need, which he had not previously noticed, and then he should be convinced that target product can fully satisfy this need.

34. New tendencies in modern marketing

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Introduction. Today the term “blockchain” is generally associated with bitcoins. But in fact - this is a technology through which cryptocurrency has become possible. All of its benefits can be used in marketing. So, why, does blockchain still not become a popular trend and very slowly merge into digital marketing?

Materials and methods. Theoretical methods such as abstraction and literature analysis were used in this article.

Results and discussion. There are two reasons why blockchain has not yet become a popular trend and very slowly merges into digital marketing.

1) Adequately assess the benefits of the system, poorly understanding its pros and cons, is unrealistic.

2) Most marketers do not want to introduce these technologies. It seems to them that they are associated only with Bitcoins, and will not bring any benefit to marketing.

Let's see what are the prospects for the blockchain in Internet marketing and how it will change the advertising campaigns.

What is a blockchain? Blockchain is a data storage method that lives up to its name - “locked circuit”. This kind of register can store data on financial transactions, contracts, rights, loans, sales. [1]

This is a database in which all participants contribute information in real time.

The main advantage of the blockchain system is the impossibility of hacking. The data about each participant of the “chain” and its actions are stored at all members of the system and are updated simultaneously. Therefore, even if 99 computers with data from 100 are disabled, it does not harm the system. Each user has access to all information about the actions of the participant. [2]

In addition, blockchain technology provides:

1) Transparency of all operations. You do not change the data so that other participants in the chain do not know about it. If you made a transaction on someone's account, information about this will appear in each block.

2) High level of trust to all participants in the chain. For example, the Ethereum resource, created on the basis of blockchain, works with smart contracts. The transaction is made automatically only when both participants perform their duties.

So, how can blockchain be used in marketing?

Blockchain can change the relationship between the client, the advertiser and the sites for placing ads. Let's look how:

1) Show ads to real customers

Due to the fact that advertisements can be shown to bots, a part of the advertising budget would be wasted. With blockchain you will not lose your money, because to work with the system you need a digital signature of the user. User may not even reveal his real name, and you will be sure that he is real, and that it is not a bot who clicks on an ad. Even Microsoft is already developing a blockchain-based identification system, because this chain guarantees the security and integrity of each transaction. [3]

2) Show ads without intermediaries

The company, about which you know nothing, invites you to place an announcement on its sites, assuring that millions will see it. Will you believe these promises? Scrolling clicks, you can even fake statistics on site traffic.

How to make your transaction with the advertising platform verified?

There are two options:

1) Automate the purchase of advertising through the guarantor. For example, Facebook, Google and other companies that have no attendances have impressive attendance. By placing ads through them, you will be sure that the ad will see the right number of people. But this method has a minus - the intermediary company needs to pay a percentage.

2) Use blockchain technology. You know that you are placing ads on a site that does not generate clicks and visits, but do not pay interest to the guarantor. And this is thanks to the digital identification of blockchains. The authenticity of the user is verified with an accuracy of 100%, so bots do not break through such encryption.

Conclusion. If you understand the subtleties of the blockchain, then its advantages for marketing become obvious.

Blockchain will help: Get away from the monopoly of social networks and Google and reduce their impact on online advertising. Make safe deals without guarantors. Pay for services, advertising and other services without intermediaries and interest. Place any data in the chain so that it cannot be deleted or edited without the consent of the users.

35. Concept of product in modern marketing

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Introduction. The concept of marketing is a management system that focuses on the buyers' market, an analysis of their needs and interests. In the market arena, terms such as inquiry or interest are closely related to the concept of goods.

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.

Results. A product is a means by which a consumer can realize his ideas and intentions. The main reason for the purchase of goods is the need to implement ideas. Feeling a lack of something is unpleasant, and the person wants to eliminate it as soon as possible. In this case, the product acts as a solution to this problem. To understand this, you need to present the consumer in the form of a traveler who has a long way to go. As long as the traveler is full, nothing bothers him; he travels the route thanks to a tight snack before the trip. But after a while he becomes hungry and begins to look for a source of food. As in this example, the consumer behaves like this: feeling the lack of something, he begins to act like a traveler, looking for something that can satisfy his needs. If the shortage is noticeable, the consumer has no choice how to buy the product, but if it is insignificant, then he can live without it. By controlling the scale of demand, we can control consumer behavior. So we can say that in order to manage the consumer, we need to manage and control this level. In the new economic realities, the product in marketing should be considered solely as a liquidator of the deficit. If we consider the consumer from a standard point of view, when there is no need for a product, it comes to the understanding that the product cannot be sold on the market. But if you look at the consumer through the prism of nano-marketing, everything will become much more promising. No matter how spoiled the modern buyer is, he can always evoke a feeling of need and make him buy a product. All you need is to find the right tools. In the interests of the company to force the consumer to come to the conclusion that he needs a certain brand. It is known that the deficit can be of different types, which means that we need different products. The consumer buys the goods - only if he satisfies the need to the full. Thus, before offering a product, you should know which niche needs are most relevant. In this operation, an important role is played by marketing research, which will help either to occupy this niche or create it yourself. Every day, companies have to deal with the fact that there is a good product, but this is not necessary. As a result, a promising product does not find its customers, and the company producing it becomes bankrupt.

Conclusion. Today the world is dynamic and it is necessary to change together with it in order to occupy a decent position in it. It is necessary to change the idea of what a product in marketing is. Anyone who does not adapt in time is waiting for a bankruptcy and ruin. The only real way is to invent something new.

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36. Analysis of the methods of staff motivation

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Introduction. The relevance of the chosen topic is explained by the fact that one of the main reasons for the "survival" of the company in the conditions of modern market relations is effective personnel management.

Materials and methods. The analysis was carried out on the basis of information provided in printed and electronic sources of foreign and national authors.

Results and discussion. To get one hundred percent return of the company's personnel, it is necessary to use (apply) certain methods of motivation, these methods are individual for each enterprise or organization. First, motivation is a psychological process that affects a person and allows to get the planned result. Therefore, staff motivation is a process that is directly related to the working conditions and incentives within the company (enterprise or organization) that encourage employees to perform their duties most effectively and efficiently, as well as to achieve the goals and objectives of the company.

First of all, it is necessary to divide employees into categories according to their degree of productivity and interest in work. To do this, classify the staff on the principle of ABC-analysis:

1. Category A – the most productive employees of the company;
2. Category B – working "bees" of the company;
3. Category C – "ballast" of the company.

Employees belonging to category A, bring 25% of the company's success, due to their productivity, they compensate for the laziness of employees of the lower category. Category C affects the company on the contrary, these employees reduce the success of the enterprise by about 15%, reducing the effectiveness of the company, which pulls it to the bottom. Therefore, category B is the middle link between categories A and C.

Based on the above, the following methods can be identified to stimulate specific categories of staff. Methods of stimulation of the personnel based on categories:

1. Bonuses on indicators (for example, for category A – 40-50% of wages, for category B – 20-30%, and for category C – 10%);
2. Non-material incentives for employees: support of personal interests; comfortable working conditions (recreation areas, free gym, medical services, massage); gamification;
3. The need for managers to encourage "bees" to move to the highest category;
4. Enable employees to improve their competencies and climb the "career ladder" (e.g. distance learning system);
5. Reflection of the shortcomings of workers belonging to the lower category (visualization of wages of workers in category A, B and C);
6. Make operational decisions in relation to employees in category C (for example, if the employee is in the lowest category for 4 months – recommendations for dismissal).
7. Payment of expenses for travel home and work, payment for mobile communications (for example, for the category of payment 100%, category B – 50%, category C – 10%).
8. Introduction of payment for any innovation proposal. All offers are accepted and a small reward is paid immediately.

Conclusion. Successfully developed system of employee motivation can significantly improve the efficiency of the enterprise, improve competitiveness and further growth.

37. Role of information technologies in human resources management

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Introduction. In recent years the considerable attention is given to adoption of numerous decisions in human resources management. Development and adoption of similar decisions are inseparably linked to the processes of information processing.

Materials and methods. These processes are based both on the analysis and revaluation of traditional ideas of the management sphere in general and on carrying out the corresponding scientific research. For this article were used open sources of the Belarusian and Russian websites.

Results. Today the problem of the choice of the optimum software for successful existence of the company is particularly acute. Competition is emerging in the software market and the number of the released software is rather high. In order to disclose the role of information technologies in personnel work it is necessary to state stages of specific tasks automation in an enterprise. They include search tasks, assessments and selection of staff as the most important functions of activity of any enterprise.

An integrated approach of personnel hiring and selection consists of five stages: 1) clarification, what is vacant position, that must be filled; 2) definition of professional, personal and business skills of employee; 3) search of sources and methods of suitable workers hiring; 4) definition of the methods allowing to estimate suitability of candidates to concrete work; 5) ensuring adaptation of the new worker in an office.

Enrollment starts with detailed definition of the one who is necessary for the organization. Many enterprises prepare the documents describing the main characteristics that the worker has to possess: the qualification card and the card of competences reflecting requirements to a position which serve as the basis for preparation of the plan of an interview with a candidate. The automation at this stage is a drawing up of job descriptions forms by means of the computer. Also a special base of job descriptions, that can be edited in case of change of requirements must be edited. At this stage the staff of HR departments looks if the vacant position already exists in the staff list there is no need to change the job description.

Significant documents in the analysis of work of the employee are the qualification card and the card of competences. They are prepared together with the head of divisions and specialists of HR department on the basis of duty regulations and represent a set of qualification characteristics, the "ideal" worker has to possess to hold this position.

Enterprises form a database where necessary data is brought from all sent summaries, then the selection criteria for candidates, on the required data are put in. The program issues a sheet of those candidates who meet the requirements. The data from other summaries can be entered another database. The staff of HR departments can address it in case of need. A candidate from the shortlist is invited for an interview. So the automated processing of personnel data, individual personnel procedures give a considerable gain in time and advantage in competition. Naturally, it is impossible to estimate candidates completely by means of a computer – such as ability to communicate with people, tactfulness, politeness, punctuality are impossible to estimate, without personal contact with a candidate. Computer models involve the use of some form of additional information.

Conclusions. From the previously mentioned it is possible to draw a conclusion that in the sphere of search and selection of personnel the final decision must be made by the manager, responsible for that, based on the best recommendations issued by the computer.

38. Emotional intelligence as one of the tolls of employee efficiency

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Introduction. If you want to occur in an interesting company or position you shouldn't wait when it happens. Tendencies of a modern working sphere say that you should be flexible, follow trends of the sphere, improve yourself, have a desire to be dedicated and have good emotional intelligence

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. Emotional intelligence is an ability to identify, evaluate and operate people's emotions and manage a relationship. Emotional intelligence is a key to stand out from other applicants as recruiters always find people to fit comfortably in with the team [1].

Emotional intelligence most often includes 5 components: self-knowledge, self-control, empathy, motivation, social skills. You recognize you own emotions and understand how they influence your thoughts and behaviour. You have a confidence in your forces. You are able to control impulsive feelings, operate emotions in relations, take the lead, follow obligations and adapt to the changing circumstances. You see the purpose and accurately understand each step to realize it. You can understand emotions, requirements and problems of other people, distinguish nonverbal signals, define a status of the person in a group or the organization and solve the conflicts in a team.

You know how to develop and maintain good relations, it is easy to communicate, inspire and direct other people.

The research found out the advantages of recruiting employees with high emotional intelligence:

- inspiration and morale can increase by 46%
- leadership has improved by 45%
- better cooperation within teams (37%) as the major benefits.

Emotional intelligence is not essential for all staff but it helps with team building. It's absolutely essential for a manager because a company has serious problems if you cannot bring people together [2]. HR-manager should distinguish whether a candidate has emotional intelligence.

Conclusion. For many jobs, specific technical knowledge and skills are important. Talented employers must find the balance between skills and personality, evaluating what characteristics are required within the team and what skills can be taught [3].

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39. Characteristics of the enterprise

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Introduction. Entrepreneurship is free management in various fields of activity (except those prohibited by legislative acts), carried out in order to meet the needs for products, work, services and profit for the self-development of the enterprise and its relationships with partners and budgets.

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. In accordance with the law of the Republic of Belarus of May 28, 1991. No. 813-12 "On entrepreneurship in the Republic of Belarus" entrepreneurship refers to the initiative independent activity of citizens and their associations aimed at making a profit. The Law establishes that an entrepreneurial activity is carried out by citizens at their own risk and under property liability within the limits determined by the legal form of the enterprise.

Although today there is no USSR, it is impossible to re-weigh the definition of the essence of entrepreneurship, which is formulated in the Law of the USSR "on the General principles of entrepreneurship of citizens of the USSR." "Entrepreneurship is an initiative independent activity of citizens aimed at obtaining profit and personal income, carried out on their own behalf, at their own risk under the property responsibility of a legal entity - enterprise."

Consequently, entrepreneurship is based on the principle of self-introduction of cases in order to make a profit to meet the needs of the products (work performed, services provided). However, not only making a profit is an end in itself of civilized business, as well as saturation of the market with high quality goods. Entrepreneurship is based on the principles of self-financing and exceeding the results over the costs (otherwise the entrepreneur will go bankrupt), self-government, responsibility and high motivation of employees, on the principles of initiative and reasonable risk.

In Western countries, entrepreneurship is now characterized as a special, innovative, anti-bureaucratic style of management, which is based on the constant search for new opportunities, focus on innovation, and the ability to attract and use resources from a variety of sources to solve the problem.

In the Republic of Belarus entrepreneurship activity is following the best tendencies of this activity, existing in the world and putting in it national peculiarities and our possibilities. Entrepreneurship gets comfortable conditions for its development in our country.

Conclusion. The formation and development of entrepreneurship in the country is an objective need for the formation of new production relations based on the economic laws of the market economy.

40. Advantages and disadvantages of introducing the principles of holacracy in the management system

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Introduction. The relevance of this topic is that the efficiency of the company largely depends on its organization and management system. One of the main resources of the business is its employees. The better they are organized, the more effective the business itself is.

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

Results. Holacracy is an integrated company management system where employees create separate, independent but symbiotic teams to fulfill the company's goals and objectives. The basis of this concept is the rejection of a large number of hierarchical levels. It is replaced by a flat organizational structure, where all members of the team have an equal voice and importance, while responding to the direction of the general concept.

Traditional departments in a holacratic company are replaced by a hierarchy of "circles" — teams that can be assembled for a specific project or for solving similar tasks. Instead of the usual positions there are the roles that employees themselves distribute within their "circle". They decide how to organize their work. Holacracy replaces the management hierarchy and simplifies decision-making process at every level of the organization that sets clear expectations from work.

Despite this, there may be difficulties in implementing the principles of the holacracy: the reluctance of management to let go of control and the unwillingness of many employees to take on additional responsibility. Another obstacle is the employees themselves. They are responsible for the result, constantly generate, and most importantly, implement new ideas; the employee must have the thinking of the entrepreneur.

Conclusion. Nowadays our society is not ready for radical changes in traditional management style. That is why holacracy model is inferior to the classical management system with a very clear division of functions, levels of responsibility and rights.

41. Fast fashion and its effects

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Introduction. The number of people on the planet is increasing rapidly. Bloggers and fashion designers, shops and manufacturers encourage you buy more. An abundance of advertisement is on streets. This encourages an excessive consumption in a fashion sphere.

Materials and methods. At various stages of the research, a wide range of methods, such as logical analysis, structuring, generalization, were applied. The research is based on modern electronic and printed publications.

Results. The phenomenon of frequent fashion changes is called "Fast fashion". Despite the fact that people like Fast fashion, the Earth does not. Dyes, starches, detergents, salts, toxic organic chemicals, biocides and the ionic metals from textile wastewater cause massive water pollution. On the top of the environmental impact, thousands of workers (primarily women in developing countries) suffer from poor work conditions and low salaries because producers are required to cut cost to stay in the Fast fashion segment [1].

Despite the magnitude of the problem, people are barely informed. Today the apparel industry is responsible for 10% of global emissions. An average American throws away 31.7kg of clothing every year [2]. The situation of unconscious buying manner is getting bazar on Black Friday – the beginning of America's Christmas shopping season and the day of huge discounts. There have been reports of violence occurring between shoppers on Black Friday. The web-page blackfridaydeathcount.com claims 12 reported deaths and 117 injuries because of the Black Friday in the United States. Also it is common for prospective shoppers to camp out on the Thanksgiving holiday to occupy a place in the line and therefore a better chance at getting desired items. This makes a significant safety risk [3].

To make the situation better individuals should take some time to look around and look at a quality before a price tag. Often garments made to last are produced in far higher quality working conditions and wage rates (but this is still something to look into). Moreover, consider local brands. They do not only use less fuel to deliver goods to the nearest selling point, but are famous for self-made and natural materials garments.

Conclusion. Some individuals can't afford goods made to last. As mentioned previously, quality usually correlates to higher price. However, those, who are able to pay a little more, should pay a closer attention to what they are getting next time when shopping.

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42. Neuromarketing as an innovation in marketing

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Introduction. Neuromarketing is a new field of marketing to explore the brain's responses to marketing incentives by using medical technologies (such a Magnetic Resonant Imaging). This science tells to the markers what the consumer reacts to, whether it was the sound the box makes when its open or the color of the packaging.

Materials and methods. Such methods as analysis, scientific abstractions, comparison and deductive methods were used.

Results. Contemporary neuroscience allows not only to explain thought processes of consumer, but also successfully influence on them. It increases effectiveness of marketing companies and amount of sales at a lower cost. Researches of human brain have shown that 95% of all emotions and thought beginning to appear before the human aware it. The basic goal of neuromarketing is to understand a real reaction of consumer to a special marketing influence and to develop an effective marketing campaign based on the data received.

The main task of neuromarketer is to appeal to consumers readiness to buy a certain good by using specific smell, image, symbols, sounds and tactile sensation. The most successful marketing strategies encompass all five senses of the human. According to Martin Lindstrom, brands, that appeal to several senses are more successful than the ones that appeal to one or two. Smells also influence on actions of buyers. Test that was held in casino has showed: consumers left in fruit machines 45% more money when they were feeling pleasant aroma. There should not be too saturated. It is important to point out the fact that aroma should harmonize with the environment and situation. Aroma of caramel in butcher shop will decrease desire of the consumer to buy a meat product.

Studies have shown that three systems are responsible for the work of the human brain:

1. reticular brain (instincts);
2. limbic system (learning, managing emotions, short-term and long-term memory);
3. neocortex (integrated thinking, logic, development of writing skills).

When a person begins to think actively, the neocortex is activated and up to 25% of the body's entire energy is consumed, which is a lot. That is why the brain tends to work at the level of instincts, using the reticular brain and the limbic system spending around 10% of energy.

Neuromarketing is able to explain the following:

- 1) the reasons for making irrational and impractical purchases;
- 2) ways to increase sales of expensive goods;
- 3) influence of product design and the buyer's desire to use them;
- 4) the reasons for the formation some brands are cult.

Conclusion. Techniques of neuromarketing in some cases helps to identify ineffective advertisement and problem goods. This science allows to identify subconscious desires and preferences of consumers, knowledge of which promises to increase effectiveness of product promotion.

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43. Influence of advertising or their own choice

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Introduction. It is impossible to imagine modern society without advertising, as it is used all over the world. It also affects our subconscious and perception of the world around us. Intelligent advertising contributes to the evocation of consumer impulse because of which people begin to purchase the product.

Materials and methods. So, advertising is an information about the object of advertising, distributed in any form by any means, intended for an indefinite circle of persons, the formation and maintenance of interests in the object and promotion in the market.

Results. The most important task of advertising include informing, it is provision awareness of the range of available goods, reminding, the existence of some goods isn't new, as well as make a seasonal purchase, and exhortation which is a call to purchase goods, arousing interest in the purchase of goods.

Each new product, when released to the market, is accompanied by advertising, which causes the consumer to gain a sense of benefit from its acquisition, a sense of its usefulness. But often this is only the result of its psychological impact.

There are also different stereotypes of people. Many people think that the best product is more expensive one; deficit of goods is also a stereotype, mostly. The public opinion on this is if a certain product is not enough, the demand for it will increase and create an assumption exactly advertising; most purchases made by the popularity of the product or brand. And many of them do not even notice what they purchase, for example, German dishes, made in China; opinion that there is a "Standard" instinct of buying goods. Many people choose a particular brand because they found out about it from a person they know.

Any advertising, as you know, has its both positive and negative sides. Speaking of the benefits of advertising, it is worth noting the efficiency of company's increase. Advertising also contributes to technological progress, creates an increased demand for advertised goods, it helps society to focus on certain social programs and stimulates labor activity.

But there are also some disadvantages, like: it imposes on the consumer goods and services, the needs of which are not, for the most part, viewing ads is not desirable, exposes the negative impact of consciousness and subconscious of people. Advertising costs lead to increased consumer prices and promotes monopolization of the market.

From the government's point of view, advertising gets much attention. Advertising used to solve huge problems of economics and cultural sociology, it is turning not just into a smart step towards good's or service's providence, but into a main kind of social communication. Thanks to advertisement, someone can tell the world about some global ecological problems or about any problems in social sphere, which can be dangerous as well as: alcoholism, drug addiction, human market, domestic abuse etc. Thereby, the most important and sore topics to discuss are now partly an advertising's responsibility. Concerning the Republic of Belarus such aspects as national: history, language and traditions are also considerable. Nowadays all the problems can be reflected through advertisements.

It is worth noting, that the Republic of Belarus is now purposefully making efforts to attract more tourists. Because of this government developed a number of events and activities that are orientated on the familiarization with our national treasures. However, just a few advertising agencies do social advertisement in Belarus.

To evaluate an advertising's affection on society a number of people took part in a poll. They include: 50 of respondents, where 15 are students, 20 are workers and 15 are retirees.

It was found out that 50% of interviewed will tune channel right after commercial starts, 20% of respondents will not even mind it. Only 30% will watch a segment till the end.

Also, most of the interviewed noticed, that, from their point of view, underground commercial is the most relevant one, since it already became a part of our everyday life and has a massive impact on us. It becomes our quality time while we are on our way.

Conclusion. Thereby, advertising is one of the most effective ways of affecting a potential customer, that is hugely depends on psychological aspects of an individual. In addition, advertising, while informing us about different goods and services, becomes an integral part of our cultural base making a certain contribution.

What about social advertising, it is dedicated to refresh or change society's point of view on some social problem.

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44. Special features of Japanese business culture

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Introduction. Special features of doing business frequently depend on the country's traditions and conditions through which the country has gone through. Japan is one of the best examples.

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

Results. In 2018 Japan occupied the 39th position among 190 countries with favorable conditions for doing business. Nevertheless, that is not a problem for companies like Apple, Mercedes-Benz, Google, etc. to enter the Japanese market. Nowadays any company can succeed with the right approach and taking into consideration special features of doing business in Japan.

Start of a business does not have to be either expensive or difficult. Good quality, unique product or service with discipline and careful control of the market can help make profit in its first year. Understanding of Japanese business culture is enough to make a decent start or proper entry into the market. A successful business can greatly increase the company's value. If the company is successful in the Japanese market it will be able to succeed in any modern market. That is the reason why Japan is number one on the list of countries where to start a business.

There is a suggested strategy for a business start-up for the first three months which are decisive. Firstly, it is networking. Secondly, it is important to choose the right market entry channel. Thirdly, negotiate partnerships. Fourthly, hire key bilingual staff and introduce corporate culture to the staff.

Conclusion. To have a successful business in Japan it is vital to take into consideration special features of doing business there and follow business rules of the country.

45. Computerization of audit of liabilities

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Introduction. Computer Information systems of audit - an environment of computer applications is closely interlinked between accounting, audit and management, provided that the use of a computer of any type or size in the process of processing an entity of financial information essential for the audit regardless of whether the software product or computer is used by the last or third party.

Materials and Methods. For writing theses we used works of different authors and books of theoretical knowledge and practical skills of Ukrainian scientists.

The main methods are: actual audit (audit of qualitative and quantitative state of objects, which is established by examination, inspection, measurement, calculation, weighing, laboratory analysis and other methods of checking the actual state of assets); documentary audit (audit of documents and notes); - confirmation (written reply to confirm the accuracy of the information).

Results. As result we have implementation of information systems enables to optimize accounting of obligations by improving the processes of collecting, processing and checking accounting information, which leads to the efficiency of automation of audit.

Automated audit of obligations of business entities solves the following tasks: speeds up the receipt, duplication and verification of documentary information developed by the auditor during the verification; conducts systematization of analytical data using spreadsheets, audit programs; creates databases, uses functionality of graphic editors, performs text editing, etc.

Computer audit controls information provision and accounting data, therefore its practical application uses parallel processing of credentials with simultaneous accounting.

The main stages of computer auditing of commitments are: preparatory stage, audit planning, obtaining audit evidence and forming an auditor's conclusion.

Perspective directions of development of software for computerization of audit of current obligations are: integration of audit software with the accounting system; implementation of an instruction on reporting based on imported company accounting data; constant updating of the audit methodology in the part of the auditor's working documents, base of potential (typical) violations and distortions. Also, computer auditing allows you to check large database volume.

Conclusion. Consequently, the commitments require constant control, since they have an impact on the financial stability and solvency of the company. A computerized commitment audit allows you to increase the effectiveness of such inspections through the use of advanced analysis systems.

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46. Biggest financial violations in Ukraine in 2016-2017

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Introduction. The aim of the study is to establish quantitative and qualitative characteristics of the most widespread financial violations in the economy of Ukraine in 2016-2017 years.

Materials and methods. In this study, as a part of the information materials, used published public statistical data of the State Audit Service of Ukraine (the SAS) in 2016 and 2017 years from the official site of the SAS. The regular method of research is the comparison of data and the analysis of the accompanying factors and theoretical generalization.

Results . According to the data of Public reports on the activities of the State Audit Service of Ukraine for 2016 and 2017 years, the most widespread financial violations (see Table 1), which resulted in loss of resources, are:

Table 1

The most widespread financial violations in Ukraine in 2016-2017, (in UAH.million).

Financial violations	2016	2017	Change
1. Illegal expenses as a result of payment of overestimated cost of performed works and / or services rendered, as well as overvalued quantity or value of purchased goods;	264,6	435,7	+171,1
2. Use of cash loans, loans from international financial institutions, received under the guarantee of the Government of Ukraine, contrary to their purpose;	-	almost 410,5	+410,5
3. Non-payment and non-transfer (incomplete transfer) of revenues to general and special (except special fund of budgetary institutions) funds of the budget;	almost 206,6	almost 144,8	-61,8
4. Realization by subjects of management of goods, works or services (except for use, rent) free of charge or on the understated prices;	almost 351,8	almost 121,2	-230,6
5. Conduct of illegal (superfluous) payments from the salary;	more than 111,7	more than 120,4	8,7
6. Write-off of money on the charges/of expense without the receipt of commodities, works or services or in volumes higher from their actual cost;	more than 138,6	more than 93,8	-44,8

Conclusions. Moreover, the above data demonstrate that the magnitude of the financial violations in Ukraine in 2017 amounted UAH. 435,7 million and increased by UAH. 171,1 million in comparison with 2016 year. The most frequent financial violation in 2016 and 2017 is illegal expenses as a result of payment of overestimated cost of performed works and / or services rendered, as well as overvalued quantity or value of purchased goods. Also considerable is the non-payment and non-transfer (incomplete transfer) of revenues to the general and special (except for the special fund of budgetary institutions) budget funds.

47. Using methods of integrated economic analysis as an instrument for increasing the quality of audit

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Introduction. Nowadays economic situation creates an enormous competition among companies. In order to stay afloat a business has to constantly evolve, change its strategies, improve the entire range of products and provided services in order to offer the client the most profitable option of satisfying the requirements at the most attractive price.

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. In order to attract investor's attention, a business should first demonstrate its financial soundness and long-term vision of future opportunities. The evidence is financial statements. Often investors find it difficult to judge the quality of such information on their own. A positive audit report solves this problem, ensuring the reliability of the provided data.

Audit is more than just inspection and control. It provides not only verification of financial indicators' reliability, but also proposal development for optimizing business operations in order to rationalize costs and increase profits.

The application of analytical procedures is aimed at identification of atypical situations in the activities of the enterprise and its reports. Further detailing of audit procedures depends on the presence of atypical situations. If the sum of unusual fluctuations is large, then the auditor should establish the reasons and determine whether this is a result of an impact of normal economic phenomena or an error.

An essential part of the audit work is financial audit. It can be identified as an independent assessment of past accounting information in order to guarantee its accuracy, reliability and thoroughness. Either testing of statements on the whole as a set of economic entity's performance indicators, or verification of individual accounts by using representative samples with the help of specialized statistical software is generally conducted as a part of a financial audit. If financial information is tested as a whole, first of all, information from the balance sheet, profit and loss statement and cash flow statement should be compared with correspondence from previous periods. The comparison can be made using absolute models or key performance indicators. Later the indicators can be benchmarked against similar enterprises in the industry. This will help to identify unusual deviations and the required sample size for verification of individual postings [1].

Conclusion. Evolution of the audit is manifested in a steady trend of increasing the analytical services' share in the activities of audit firms, which improves the quality of the audit as a whole. The auditor should aim not only at identifying individual errors and deliberate distortion in accounting, but rather at finding systematic mistakes in accounting, from the analyst's point of view.

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48. Computerization of audit of liabilities

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Introduction. Computer Information systems of audit - an environment of computer applications is closely interlinked between accounting, audit and management, provided that the use of a computer of any type or size in the process of processing an entity of financial information essential for the audit regardless of whether the software product or computer is used by the last or third party.

Materials and Methods. For writing theses we used works of different authors and books of theoretical knowledge and practical skills of Ukrainian scientists.

The main methods are: actual audit (audit of qualitative and quantitative state of objects, which is established by examination, inspection, measurement, calculation, weighing, laboratory analysis and other methods of checking the actual state of assets); documentary audit (audit of documents and notes); confirmation (written reply to confirm the accuracy of the information).

Results. As result we have implementation of information systems enables to optimize accounting of obligations by improving the processes of collecting, processing and checking accounting information, which leads to the efficiency of automation of audit.

Automated audit of obligations of business entities solves the following tasks:

1) speeds up the receipt, duplication and verification of documentary information developed by the auditor during the verification;

2) conducts systematization of analytical data using spreadsheets, audit programs;

3) creates databases, uses functionality of graphic editors, performs text editing, etc.

Computer audit controls information provision and accounting data, therefore its practical application uses parallel processing of credentials with simultaneous accounting.

The main stages of computer auditing of commitments are: preparatory stage, audit planning, obtaining audit evidence and forming an auditor's conclusion.

The basic conditions for the functionality of the software of the obligation audit, taking into account the specifics of the domestic audit, are: flexibility - the ability to adapt to the conditions of economic activity by enterprises of a particular industry; ergonomics - the possibility of comfortable keeping of credentials, prompt and accessible reporting; interconnection with databases of accounting programs; ease of use of the software and its professionalism.

Perspective directions of development of software for computerization of audit of current obligations are: integration of audit software with the accounting system; constant updating of the audit methodology in the part of the auditor's working documents, base of potential (typical) violations and distortions. Also, computer auditing allows you to check large database volume.

Conclusion. Consequently, the commitments require constant control, since they have an impact on the financial stability and solvency of the company. A computerized commitment audit allows you to increase the effectiveness of such inspections through the use of advanced analysis systems.

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49. Benefits and risks of using bitcoin as a payment instrument

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Introduction. The model predicting Bitcoin price formation remains a mystery to academia and investors. Bitcoin system is built on a transaction database that is distributed across a network. However, this system has certain risks, as the irreversibility of transactions: If bitcoins are sent due to error or fraud, there is no built-in mechanism to undo the error. Nevertheless, this technology is looking forward for future development and to widespread in the context of global economic system.

Materials and methods. The research is based on methods of analysis and synthesis.

Results and Discussion. Bitcoin is a digital currency in which transactions can be performed without the need for a credit card or central bank. Compared with conventional payment systems, Bitcoin lacks a governance structure other than its underlying software. This has several implications for the functioning of the system: Bitcoin imposes no obligation for a financial institution, payment processor, or other intermediary to verify a user's identity; Bitcoin imposes no prohibition on sales of particular items; in contrast, for example, credit card networks typically disallow all manner of transactions unlawful in the place of sale; Bitcoin payments are irreversible in that the protocol provides no way for a payer to reverse an accidental or unwanted purchase, whereas other payment platforms, such as credit cards, do include such procedures.

Bitcoin's design presents distinctive risks that differ from other payment methods and stores of value. Any user holding bitcoins faces market risk via fluctuation in the exchange rate between bitcoin and other currencies. The relatively low weekly trade volumes suggest that Bitcoin users also experience a shallow markets problem. The irreversibility of Bitcoin payments creates heightened transaction risk. If bitcoins are sent due to error or fraud, the Bitcoin system offers no built-in mechanism to undo the error. In a world of competing payment methods, irreversibility puts Bitcoin at a disadvantage: all else equal, consumers should favor a payment system that allows reversal of unwanted or mistaken charges.

Conclusions. Bitcoin transactions do not clear (and hence are not final) until they have been added to the authoritative block chain. Transaction batches are only added every ten minutes on average. This creates at least two potential avenues for abuse. Bitcoin raises certain privacy risks, most notably the risk that transactions can be linked back to the people who made them. Bitcoin transactions are not truly anonymous: instead, they are pseudonymous. Finally, Bitcoin systems face numerous legal and regulatory risks across countries.

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50. Concept and structure of primary and secondary income

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Introduction. Income takes an important place in the economic sphere of each modern state. It is the most important indicator in market economy which allows evaluating possibilities of the person or family.

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. The income of the population represents a cash and material benefits, received or made by households for a certain period. Growth of cumulative income at constant prices and taxes demonstrates an increase in the ability of the population to meet their needs. Their role in activity of a person is defined by the fact that level and structure of consumption of the population directly depends on the amount of income.

Income can exist in two forms - monetary and natural. In a natural form payments can be made from social funds. Monetary income of the population includes all receipts of money in a payment type of work of the working persons, an entrepreneurial income, pensions, grants, various benefits, a property income in the form of percent and so on [1].

In addition, incomes are divided into secondary and primary. Secondary income is income, which is gained by workers of the non-material sphere and also a disabled part of the population in the course of redistribution of primary income. Such redistribution is necessary at a stage of distribution of national income requirements of education, health care, culture, defense of social protection of a disabled part of the population. Redistribution of a national income is performed through fee, a price system, contributions to social pension funds, charity, religious foundations, etc.

Unlike secondary incomes, primary incomes are formed in the sphere of production of goods in the course of creation and initial distribution of the newly created cost. Such distribution is performed directly at the enterprises and in the industries where it is created. One its part goes into the individual disposal workers in the form of the salary. The second part is appropriated by owners of means of production and the capital in the form of entrepreneurial income, percent on the capital, dividends, a land rent. Such incomes are called primary because they are received directly by those who create a national income. Also primary incomes include the following income types, such as:

- 1) Compensation of workers;
- 2) Production duties and import;
- 3) Profit and the mixed income;
- 4) Property income [2].

Conclusion. Thus, income represents resulting financial performance which characterizes production business activities of all enterprise, which is a basis of economic development of an enterprise.

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51. Cryptocurrency as an innovation of digital economy

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Introduction. A number of global, geopolitical, state, crises, a decrease of the level of reliance on traditional financial institutions, the active introduction of information technologies inspire us to look for alternative means of keeping and increasing money. And such an alternative can be a cryptocurrency.

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. There is no common definition of cryptocurrency at the moment. According to the classification of Financial Action Task Force on Money Laundering, cryptocurrencies are distributed, virtual (or digital) money using mathematical and cryptographic methods and open source code that do not have a common management, tracking or control center [1].

There are no common international rules for the regulation of cryptocurrency, this question is solved individually within each individual state and the attitude to cryptocurrency in the world is very different: from full legalization, for example, in the Republic of Belarus, to almost total ban.

The advantages of cryptocurrency include its decentralization, anonymity of transactions, issuing a limited number of coins, rapid growth in value, low susceptibility to political risks and so on.

The disadvantages of the cryptocurrency are the lack of a guarantee for the preservation of electronic crypto-wallets, the inability to recover money in the wallet in case of loss of the password, the low speed of processing transactions (for example, Visa processes 65 thousand operations per second, while Bitcoin is less than 3). Some of the advantages of cryptocurrency are disadvantages at the same time. Thus, complete anonymity of transactions makes it possible to speculate and use cryptocurrency for criminal operations.

The Republic of Belarus followed the way of legalization of ICO, cryptocurrency and smart-contracts, as a result of which it is actually the first state in the world that opens wide opportunities for the use of blockchain technology. On December 21, 2017, the decree "On the Development of the Digital Economy" was signed. It does not include any restrictions and special requirements for operations on the creation, placement, keeping, exchange of tokens, as well as the activities of crypto-birge and crypto-platforms. At the same time, until 2023, all operations with tokens are not taxed [2]. The government has given the status of official legal documents to smart-contract.

Conclusion. The innovative nature of cryptocurrency makes it attractive for many economic entities. It is difficult to say how widespread the cryptocurrency will be, but its high potential is undeniable.

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52. Shadow economy - the unnoticed side of the economy

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Introduction The shadow economy represents all forms of unauthorized economic activity, not reflected in official statistics, which cause great harm to society. It includes 3 types of activities: hidden, informal and illegal. The estimate of its dimensions differs from one calculation to another. The hidden nature as well as the heterogeneity of the manifestations requires the use of several evaluation methods, none of which being able to provide a precise estimate of the phenomenon, and no outcome of the evaluation can be accurately verified. The state of the economy in the Republic of Moldova can be characterized as deplorable, which is reflected in the state budget. Legalizing, even partially, the unnoticed economy would allow for a better situation in the domestic economy and an increase in payments in the consolidated budget.

Materials and methods The research is based on methods of analysis and synthesis. Some of the specific methods used in the estimation of shadow economy were: The monetary method and The method of Comparison between Income and Costs in the national accounts.

Results and Discussion The shadow economy is based on the ongoing desire of limitless enrichment and domination of category of people. In other words, these forms of illegal activity arise because of: greed, cruelty, selfishness. As from an economic stand point of this phenomenon, its causes change from one epoch to another and even from one country to another.

According to the calculations of Schneider F [1]., In Moldova, the level of unobserved economy (44.5% of GDP) during the period of 1999-2007 was higher than in the neighboring countries: Romania (by 11.9 percentage points), Russia 0.7 percentage points), but lower than in Ukraine (5.2 percentage points). But the result obtained by the German scientist is higher than the estimates made by the National Bureau of Statistics. The level of analyzed indicator is 27.4% of GDP (average for the same period) [3].

The reason for the difference between the obtained results are the applied methods, the number of elements taken into account and the weighting of the elements.

Although they differ from one country to another according to their weight and importance, the phenomenon of the unnoticed economy spread around the world are: corruption; tax evasion; smuggling or illegal import-export transactions; manufacture and sale of counterfeit products; counterfeiting of money and securities; illicit privatization; non-repayment of currency obtained from export operations; pay illegal work; prohibiting access to market competitors and maintaining high monopoly prices; the unlawful exemption of private companies from paying taxes; racketeering.

Among the directions for diminishing its level we list: applying higher fines (so that hidden activity becomes unprofitable); lower taxes; tax exemptions for small businesses, opened within 3 years; implementation of fiscal and institutional reforms; banning of governing representatives from having businesses; installation of video cameras and permanent monitoring of government employees; Encourage card payments for those who work officially; implementing reforms that will reduce administrative barriers, simplify the procedure for obtaining different authorizations, strengthen public confidence in the sustainability of the pension system, deploy online platforms where people can check how public money is spent, encourage entrepreneurial activity, and so on.

Conclusions. The shadow economy is part of the national economy that can not be completely removed. The consequences it bring are: decrease of GDP; insufficient resources for development in the state budget; risk in society due to counterfeit products that are not verified and certified; chaos in society; increased corruption; injustice; increase of poverty and a low standard of living; obvious and big differences between social categories, especially through the lack of middle class among the rich and the poor; lost confidence of the society in the government; mass migration; etc.

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53. Robots are taking over the hospitality industry

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Introduction. There's no denying it: robots are becoming common helpers in hospitality, showing up in hotels and restaurants around the world. From Japan's all-robot hotel, to Hilton's robot concierge, to Savioke's autonomous delivery robot, Relay, robots that serve hotel staff and guests are a growing trend. Robots are proving their value in restaurants, too, preparing meals, taking orders and even delivering food.

Materials and methods. The Possibility of robots are: "Robot" Check-Ins and Check-outs, Robots as the receptionists, Robots as the concierge, Robots room service, Provide 24/7 support through online chat

Results and discussion. The robots can perform the tasks which the humans find them dangerous, boring or difficult. Robots also can save a lot of time and even create a large number of jobs. Faster operation by robots compared to humans will reduce the wait time in lines for check-in/check-out. Moreover, robots can collect data about the customer's behavioral patterns. Hotels can benefit hugely by making alterations to the operations to match their customer's behavioral patterns. As well, robots are less prone to errors than humans. Implementation of robots enhances efficiency, security, and performance and thus cutting labor costs. Even though it seems like hotels save money by replacing staff with a robot.

Nevertheless, all the benefits that work can bring to the hospitality industry, prevailing lack of interaction with people, which adversely affects the "experience" of the guest, the overall satisfaction and the probability of return. The works have no emotions, they can not understand human interactions, and their performance is limited by the fact that they are programmed. Replacing the robots on the staff will lead to a sense of loneliness due to the lack of interaction with people. Therefore, replacing staff robots is the poorest thing a hotel can do because it destroys guest experience and overall satisfaction with staying.

Whether sweeping a carpet or busy in a factory for the vast majority, a robot is a construct of the future. However, in the cut-throat world occupied by hoteliers, it seems like that future is now. Many of the leading brands are adopting robot technology to improve the experience of the guest. In fact, a few have been testing it for some time. And that has led to the dawn of the robot bellman, butler, and concierge.

One study concluded that as many as 65 percent of jobs in Las Vegas could be vulnerable to automation. The tourist-dependent city is seen as the American conurbation where employment is most at risk.

Some disappearing jobs would be back office functions. Others would be dealing with the public, whether it be restaurant hosts, cooks, waiters or hotel staff.

Certain roles including housekeeping and maintenance seem destined for some form of automation. In these areas, robots and AI could be used to help increase operational efficiency, decrease staff costs and improve the guest experience. Other jobs such as the front desk and concierge may involve a merging of roles. Tasks may be shared and distributed between humans and machines depending on the particular skill set they offer. Ultimately, the human touch can never be replaced by a machine.

Conclusions. For that reason, the hospitality sector will almost certainly be one of partial automation. Yet it's clear that as the technology continues to advance, the hotel of the future is one where artificial intelligence and humanoid robots will almost certainly play an increasingly crucial role.

54. Microbiological researches of butter paste with a complex of hepatoprotective purpose nutrients

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Introduction. First of all, the quality of any food depends on quantitative and qualitative composition of microorganisms in it. Under favorable conditions, the number of them increases, causing rapid deterioration of food - fermentation, rotting, mold growing and decomposition of fats, etc. To keep food fresh for a long time, special conditions are created in which the growth of microorganisms are excluded, slowed down or stopped. To keep this purpose, various methods of "conservation" (the long-term storage of perishable products and development of microorganisms in them) are used. In order to make the right choice of factors that have influence on microorganisms to increase the storage terms of finished goods, we need to know the microbiology of these products, the pattern of development and the ways of impact of these factors on microorganisms.

Materials and methods. The objects of the study were the samples of butter paste with the complex of nutrients (whey protein concentrate 80%, inulin, fructose rose-hip syrup), which have been kept at different temperatures +5 °C, 0 °C and -15 °C. Samples that were stored at 5 °C – were examined every 3 days for 21 days, the samples were kept at 0 °C - every 7 days for 2 months, and samples were kept at -15 °C - every 2 weeks for 6 months.

Results and discussion. As a result of microbiological studies there were obtained the following results: during storage the control at +5 °C the number of microorganisms, regardless of group membership, gradually increased. Thus, at the 18th day of storage, the level of MAFAnM consisting in butter paste made with classic recipe was on average by 0.9 items higher than in butter paste with a complex of hepatoprotective purpose nutrients. The number of BGKP has increased by 1.6 items, proteolytic active microorganisms - increased only by 0.6 items. In the control butter paste stored at -15 °C, we have observed a certain increase in the number of MAFAnM, BGKP, but the number of proteolytic bacteria had changed a little. In butter paste with the complex of additives stored at 5 °C during 18 days, the number of BGKP microorganisms groups and proteolytically active is almost at baseline. The number of MAFAnM during storage decreases by 0.3 items. In the sample that was stored at -15 °C, we have observed decrease in the number of microorganisms all studied groups. There is most intense decline of MAFAnM and proteolytically active microorganisms - by 0.5 items. BGKP number stays at baseline, ie close to zero.

Conclusions. Analyzing the results of the research we can make a conclusion, that addition to the butter paste the complex of nutrients additives leads to inhibit the microbiological processes during storage of the butter paste. This can be explained by several factors caused by the interaction of components in multicomponent systems in butter paste with additives. First, it is consistent with the changing the dispersion of moisture in the structure of the butter paste. According to previous researches, the basic volume of plasma in these samples are in droplets with a diameter up to 8 microns, including diameter up to 2 microns, which are virtually inaccessible for microbial growth; and the number of plasma droplets with the diameter greater than 8 microns is significantly reduced, also plasma volume they contain is reduced too. It is known that the greatest effect on microbial spoilage has plasma volume contained in the drops with a diameter greater than 5 microns. The important factor is that the complex of hepatoprotective additives contains polysaccharide inulin and whey proteins in the native state, which bind the moisture, which leads to reduce the amount of free moisture which is dispersing in the structure of butter paste on the micro level.

55. Determination of iodine content in curd and yogurt fortified with KI and β -cyclodextrin-iodine complex

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Introduction. Dairy products are traditional dietary sources in many countries around the world. Consumption of these products has a strong beneficial effect on human health due to a presence of a wide range of essential nutrients in milk. Dairy products and milk are able to provide polyunsaturated fatty acids, calcium, iron, phosphorus, zinc, copper, iodine, selenium, vitamin A, C, and D, essential amino acids etc. Unfortunately, lactose intolerance causes limited intake of milk and dairy products. Dairy products have been used as a vehicle of active substances, especially iodine and selenium. Iodine deficiency is a one of the major nutritional problem which affects up to 2 billion people in the World [1]. Several disorders caused by deficiency of this trace element may be prevented by food products consumption fortified with iodine [2,3]. The purpose of this work is to modify a method of iodine determination in liquid and semi-solid dairy products.

Materials and methods. Curd and yogurt were produced according to standard formulations. Potassium iodide and β -CD- I_2 complex were selected as iodophores. The iodine levels were measured in a laboratory of epidemiology department of V. P. Komissarenko Institute of endocrinology and metabolism (Kyiv, Ukraine) using a modification of the classical Sandall-Kolthoff reaction after digestion with hydrochloric acid, followed by 100-fold dilution with hydrochloric acid and ultrasonic treatment. The limit of qualitative determination of iodine concentration was 5 μ g/mL.

Results and discussion. The method described above is a standard method of determination of iodine level in urine. Mild changes in the method were introduced in order to evaluate the possibility of method application for the purpose of iodine determination in food products. Curd and yogurt were chosen as a semi solid and liquid vehicles of iodine, respectively. Standard portion of curd (36 g) and yogurt (150 g) were able to provide 250 μ g and 1000 μ g of iodine after the dairy products consumption. This corresponds to recommended daily intake by pregnant women and upper limit level of iodine intake by adults, respectively. It was found that iodine retention in the samples of fortified yogurt and curd, which contained 250 μ g of iodine and 1000 μ g were 106 % and 84.9 %, respectively. Essential (2.5-fold) rise of iodine level in the samples of fortified yogurt and curd resulted in the marked decrease of iodine retention. We found that retention of iodine in these samples were 44.9 % and 52 %, respectively. Also, decreased iodine level resulted in significant drop of iodine retention in these dairy products. At the same time, the samples of curd with added standard quantity of iodine were characterized by good iodine recovery, which were within the range 83.6-89 %. We didn't observed any significant changes in iodine retention in the samples fortified with KI and β -CD- I_2 .

Conclusion. In conclusion, this study proved that modified method of iodine determination in liquid and semi-solid dairy products has very little application. We cannot suggest usage of this method for the purpose of iodine determination in food without additional changes.

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56. Treehouses on the scenic route in Ukraine

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Introduction. Nowadays hiking in Ukraine became more popular. There are lots of scenic route there. People go in mountains with or without guide. In case of that more people are interested in that, but not each of them could join hiking because of health. That is why treehouses is good idea for them or for people, who gust do not admire camps.

Materials and method. When you were 10, camping out in a treehouse -- where "room service" was just your mom with brownies, interrupting your game of truth or dare at the WORST possible moment -- made for some pretty sweet overnight lodging. Fortunately, hoteliers around the world are happy to indulge your childhood nostalgia. These are the world's most spectacular treehouse hotels you can book for the night; amenities are a step above a sleeping bag and flashlight, and the views are wildly better than your backyard.

Results and discussion. As kids, most of us have dreamed of having a tree house as a safe haven – a secret place where we could establish a top-secret club house away from our pesky parents. Some of us still do. Interestingly, people in some countries don't see tree houses as exotic, but as every-day parts of their lives. Luckily, the tree house has become more than just a fairy tale-like hideout or an exotic living place in far-away lands. For those who seek to realize some of their greatest childhood dreams and are looking for a unique way to recharge and relax, architects and designers now offer some unbelievable tree houses and hotels for holidays. These have long outgrown the tradition wooden cabin concept, featuring multiple floors or even glass and mirror elements.

You could see such tree hotels in Harads, Sweden. They were built in 2004 by Britta. Britta is a woman, whose idea is tree hotel.

A tree house, tree fort or treeshed is a platform or building constructed around, next to or among the trunk or branches of one or more mature trees while above ground level. Tree houses can be used for recreation, work space, habitation, and observation.

So through the path which is calculated for example for 3 days on the special distance would be located those treehouses. Inside of them there would be food, sleeping places, rest rooms, bath room, and sockets.

Whether you're looking for an adventure, a relaxing break or simply to wind down in nature, Treehotel invites you to experience nature in the most unique and memorable way you can imagine.

Conclusion: So, for those, who want to have great hiking, but who does not want to lose benefits of civilizations, or who could not do that, there is amazing offer as treehouses.

57. Diversification of additional services at congress hotels

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Introduction. Nowadays the business tourism, as a special form of the tourism industry, has a significant share in the global tourist movement. According to the International Congress and Convention Association in 2015, only 5 major international congress events were held in Ukraine. Since 2016 their number has increased to 8. According to the State Border Guard Service of Ukraine, in 2016 13.6 million tourists arrived in Ukraine, 14.4 million in 2017, and over 12 million people in the first half of 2018. A significant proportion of tourists, indicated the purpose of their trip - business or official. About 9% of all international travels are business.

Materials and methods. The dialectical method and general scientific methods of knowledge: the method of theoretical generalization, system analysis and synthesis (for the study of additional services in different hotels) were used in the process of research.

Results and discussion. There are a lot of interpretations of the concept of "business tourism". The most common is the following. Business tourism is concerned with people travelling for purposes which are related to their work. As such it represents one of the oldest forms of tourism, man having travelled for this purpose of trade since very early times [1].

The leading role in the organization of business tourism infrastructure in Ukraine is played by business-hotels or congress-hotels. These hotels should be able to provide businessmen with a complete set of necessary conditions for business meetings and provide a wide range of additional services.

The most important requirements put forward by businessmen to hotel services are: comfort of living, speed of service, reliable transfer, convenient location of the hotel. However, every year the demands of business tourists are increasing.

Standard industry practice postponing guests until 14:00 and requesting departure until noon does not always meet the needs of business travelers. For example, some USA hotel chains (Four Seasons, Montage) offer check-in time at 7:00 and departure-at 18:00, and many hotels have a 24-hour check-in / check-out policy.

Now about 75% of tourists want to continue their business trip for a day or two for their own holiday. Since there is not much time in business trips for entertainments and leisure from businessmen, the starting point here will be the hotel itself. In view of this, modern congress hotels should consider creation of a hotel based department on the organization of excursions in the city. In this case, Ukraine has an enormous potential, because each big city is permeated with a long-standing, interesting history, it has many places of interest and cultural monuments.

In recent years about 50% of tourists tend to take their families on a business trip with them. In the USA and in many European countries, most business hotels offer service packages like "Mary Poppins" at a conference service level. The hotels work closely with children's centers and nanny hiring agencies. This allows parents to work, and children at this time are provided with appropriate care and entertainment.

Conclusions. In the conditions of constant growth of competition, the tasks of modern hotel enterprises are to satisfy new, and sometimes even more meticulous requirements of potential customers. Therefore, it is important to study both the market hospitality sector and the modernization of the hotel itself, as well as to expand and diversify all services offered by it.

58. Complexity of personnel management in tourism in the high season

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Introduction. A lot of establishments of tourist industry have many problems with the recruitment of additional staff during the seasonality period, so the research is conducted to find a solution to this problem by minimizing the cost of staff, while not losing the high level of service.

Materials and methods. The best solution for solving this problem is found in the use of the Solver, which is part of the supply of the Excel program. The process of constructing linear programming in MS Excel is divided into 3 stages: writing and checking the symbolic model, creating and debugging the task table model and optimizing the model with the help of the add-in.

Result. Recruitment is a set of specific actions aimed at attracting candidates for the timely and high-quality staffing in accordance with the needs of the company. There are two main goals in the recruitment – high-quality training of personnel for the season and minimization of costs, taking into account the need for the employee to adapt at the beginning of his career. So, the best way to solve this problem is to find the balance between the efficient program of adaptation of personnel and minimization of costs for this program. The best and the simplest method for such optimization tasks is the "Solver" add-on for MS Excel, where the template for changing conditions with tourism seasonality can be created.

In the work was explored the use of the "Solver" add-on, which is included in the supply of the Excel program to minimize costs of seasonal changes in the number of staff and to maximize the level of service for tourists during seasonal periods. There are main benefits to using the program: significant time savings, which is spent on performing these works; reduction of the number of errors, the probability of which is much higher when they are calculated manually; an increase of the pace of modification. It was also determined the general properties that are typical for problems solved with the help of the add-on "Solver": there is a single target cell containing a formula, the value of which must be maximum, minimum, or equal to some particular value; the formula in this target cell contains references to a number of variable cells. The search for a solution is to select such variable values in variable cells that would provide the optimal value for the formula in the target cell; a number of constraints may be specified — conditions or ratios that some of the variable cells must satisfy.

Conclusion. When the problem statement is correctly formulated, and if a solution exists, the Solver add-in dialog box will find it. This makes it possible to solve a number of problems arising in the period of seasonality in the tourist sector.

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59. Methods of labor productivity increasing at the tourism enterprises

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Introduction. Labor productivity is the driving force of tourism enterprises. Nowadays in a highly popular therefore extremely competitive environment of tourism business labor productivity plays an important role in lives and existence of tourism enterprises. So, the issue is increasing of productivity as a sign of competitiveness.

Materials and methods. The basis for researching the concept of methods of labor productivity increasing at the tourism enterprises were used such general scientific and special methods as systems analysis, expert assessments and sociological calculations based on Internet surveys.

Results. With the development of tourism, competition between tourism enterprises is intensifying, for example between tour operators developing new tours and travel companies offering a range of tours on the consumer market. Achieving the success of an enterprise in a competitive environment is conditioned by continuous monitoring of its work and competitors' firms in the market, research of strengths and weaknesses, rapid adaptation to changes in market situations, and an instantaneous reaction in line with changes in their activities.

It depends on the staff how efficiently the means of production are used and how the business entity works successfully. Therefore, the most important part is ensuring high material and moral interest of employees in the results of work.

There are some methods to increase productivity through improving of working conditions:

- to increase the qualifications of managers (to carry out professional trainings for their employees, courses for advanced training);
- to increase the salary of travel agency employees (develop the bonus system for each sold tour, developed tour, or satisfied customer);
- to involve an employee in improving the quality of his work, in increasing the productivity of labor, and, consequently, increase sales volumes on the services provided.

Also, there are methods that will definitely make employees satisfied and motivated, these methods directly connected with travelling. Promotional tours, exchange programs, working trips to the country on which the employee is specialized sponsored by the enterprise on the highest level – is the best way for creation of quality tourism products and services, because employees are satisfied and motivated to do their best.

Conclusions. In the modern competitive environment of tourism business it is important to remember that the success of an enterprise and even its existence directly depends on the productivity of the employees. Therefore our task is to offer up-to-date and effective methods for improving productivity that will have positive influence on the main aspects of the tourism enterprise.

60. Contemporary concepts of greening as a factor influencing the formation of the hotel's image

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Introduction. Today, the hotel industry is rapidly developing. In order to resist the market and maintain the existing position, it is necessary to look for new implementations for providing the favorable conditions for human life in the hotel. Interiors are the organization of the internal space of a building, which is visually limited, artificially created environment, which provides favorable conditions for human life [1]. In the comfort creation it is important to consider the design of the room, where the significant role is played by sculptures, elements of decorative art and especially greening.

Materials and methods. Decorative art forms and reflects the inner world of human, his views, culture, morality, and life principles. It is also important that everything that surrounds us should combine beauty and comfort as a necessary condition for the life of a civilized society.

Result. In urban planning, planting of greenery is an integral part of the overall complex of measures for planning, building and ordering of the populated areas. It is of great significance in human life and has a certain effect on the environment. The planting of the hotel's production facilities is bound to solve such tasks as improving the microclimate, reducing dustiness, as well as creating a favorable psychological environment. Plants are an integral part of the human environment, contribute to its aesthetic and environmental education. Greening influences the interior of the room, enriching the artistic expression of its interior space. Particularly large role of living plants in the interior of rooms in hotels, which act as a means of interconnection of the interior with the environment, creating the illusion of contact with nature. With the correct selection and compilation of compositions, houseplants can change the entire look of any hotel, serve as a means of increasing the volume of space, for example, a green screen for the corner of the rest.

With the help of greening you can increase the artistic expression of the interior space, improve its functional organization. There are active and neutral greening systems. So, in the work area create a neutral system of greening, and in the recreation area - active. With the help of greening, the division of space into zones is performed. The most widely used greening types for hotel premises are greening in lobbies, halls, corridors, restaurants, cafes and rooms.

Conclusion. In this way, greening in the hotels actively influences the design of the environment. So, greening in the interior is a kind that provides comfort, both in the hotel building itself and in the surrounding territory. Through the interior, competitiveness and pricing has a great influence on the hotel business.

61. Ways of implementation of innovative design solutions in the interior of hotel enterprises and their impact on tourist flows of hotels

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Introduction: The thesis examines the development of new technologies and how they attract tourist flows. The ways of their providing in hotel industry and their influences on the clients (tourists) are also mentioned.

Materials and methods. Growth of competition in the hotel industry requires the use of innovative methods of personnel management, material resources, information, implementation of infrastructure and technological and other innovations in the activity of hotel enterprises. The world has gained a gigantic experience of successful hotel business management based on the systematic introduction of innovations.

Result. In our world, more and more hotel owners emphasize innovation in the hotel business in order to attract as many visitors as possible. To do this, the latest technology are fully applied.

The use of new technologies allows hotel owners to improve the quality of customer service, make their business more efficient, provide customers with new services, and also provide reliable protection of the property of visitors and hotel rooms.

The main and most important stage is to make a good impression on the client, therefore, enterprises have realized the need for the designing of the lobbies in such a way that allows the lobby to become the face of the hotel.

Among the improving design trends, the gardening of premises should be mentioned, because greens have a beneficial effect on the health of the client and the fresh air in the hotel.

One of the dominant opportunities and emerging trends in the modern sociocultural space for innovation is provided by advertising with Google Maps. Do not forget that in our time the problem of ecology is relevant, which elevates eco-hotels to a new level. This hotel may contain wind generators, solar panels, furniture made from recycled materials and so on.

Conclusion. The progress of innovative technologies in the modern tourism industry has become one of the most strongly influencing phenomena in the hotel business. The introduction of various innovative technologies by hotel business owners is caused not only by the desire to attract as many visitors as possible, but also to create optimal conditions for the work of the hotel staff. With the help of Internet systems and due to automation, hotel enterprises have greatly increased the efficiency of their operations.

62. Organization of provision of additional services at the enterprises of the hotel industry

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Introduction. It is very difficult to surprise a modern tourist. In our time, it is not enough for a tourist to feel the essence of usual basic services. So, the research is conducted to the importance of additional services, which are popular with people and are the essential part of hotel and tourism industry.

Material and methods. Having additional services in the hotel enterprise helps to create a modern tourism industry and different innovations are being introduced for its development.

Results. The number of additional services at the enterprise of hotel industry may be very large, and the range of varieties is varied. It depends on the purpose, on the level of comfort of the hotel and at the same time determines its classroom. Increasing the level of hotel service provides, on the one hand, the expansion of types, the range of services, on the other - improving the forms of their provision for tourists [1].

In addition to basic services, the enterprise of hotel industry can provide a whole range of additional services to meet the needs of tourists, for which there are separate units.

Many of them are represented and offered in «Radisson Blu Hotel», for example: 24-hour room service, ATM, concierge services, early check-in facilities, customer service, gym, translation services, limousine rental, mail delivery, transport services, underground parking, laundry facilities, beauty salon services [2].

Thus, the introduction of these services in «Radisson Blu Hotel» contributes to the improvement of the quality and culture of customer service, as well as the competitiveness of the world market of hotel services, a high level of comfort, reflecting the attractiveness of the hotel company itself.

Additional services makes tourist's stay as pleasant as possible in order to create a positive image of the hotel enterprise and gives a good opportunity to generate more revenue. In addition, it is aimed at the satisfaction of their needs, which also depends on the stability of income flow of the hotel, and is a key factor determining the prospects for tourism development. Moreover, at the moment, accelerated development of tourism industry, the willing of people to demand more encourage hotels to the expansion and diversification of services that makes travelers visit this place repeatedly.

Conclusion. in the modern world, the hotel industry is a considerable perspective business, which must fully ensure one's stay in the most comfortable conditions, which includes additional services. However, it is impossible to deny the fact that in the conditions of constant technical and social development the needs of people are growing. So, the additional services represented in the hotel industry should keep up with these inquiries, which «Radisson Blu Hotel» copes well with.

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63. Role of tourist consolidators in the modern market

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Introduction. A tourism consolidator is a wholesaler, sometimes described as a broker, of touristic packages such as flight tickets or hotel rooms who can benefit from significant discounts and conditions. The consolidator's role in the modern tourism market is researched in this study.

Materials and Methods. Consolidators were distinguished into three categories: Consolidators specializing in a specific region, Wholesale Consolidators and Global Consolidators (Multi-Stop / Round). Using regional and international tourism statistics, the roles of each category were analyzed and discussed separately. In addition, to validate the assumptions, published information regarding different consolidators was gathered and analyzed.

Results. The three distinguish categories of consolidators are defined as follows:

1. Consolidators specializing in a specific region:

Companies which have arrangements with the local providers on special terms, so they can offer their customers airline tickets or accommodations at a certain region at favorable rates, often even below the cost of the airline companies or hotels.

2. Wholesale Consolidators:

Companies which are working with numerous touristic providers, and are buying very large amounts of packages. Wholesale consolidators are more focused on the intermediary market, such as travel agencies and booking systems.

3. Global Consolidators

Global consolidators also named multi-stop/round consolidators provide the opportunity to combine several single-travels to a single trip on a trans-national route, by concluding contracts with large companies operating in several areas. Thus, on a long trip, which includes several transfers, one may have the opportunity to book all package from a single consolidators, providing the full expense of services such as transfers between airports etc.

Although consolidators can clearly benefit customers in numerous ways, situation is not always as good as it seems. The usage of promotional "tricks" is not unfamiliar to consolidators companies. They often offer confusing promotions and attractive deals, for instance, advertising a very beneficial air tickets at a record low cost. While after a closer examination, it turns out in the course of booking that such tariffs does not exist anymore. As a result, the customer will be encouraged to book at a more expensive rate or agree to a waiting list, which may not really exist or delayed to an undefined time. This "problematic" way of attracting customers may sometimes works very well, customers may not notice that the price is changed or decide they like the package anyway pay the higher rates.

Conclusions. The development of the tourism market leads to the emergence of new forms of interfaces between customers and providers. Innovative solutions such as consolidators are becoming sustainably influential and should be properly analyzed as preformed in this research.

64. Evolution of views on the definition of economic stability

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Introduction. Today's economic stability is a top priority for many businesses. Therefore, understanding the evolution of views on issues of economic stability will help resolve the practical tasks of enterprises.

Materials and methods. The definition of the concept of "economic stability" was undertaken by scientists of various historical epochs. The foundations of the theory of stability were laid by mercantilists, technocrats and physiocrats. Investigation of this problem at their time engaged A. Smith, Jean-Batiste Sey, K. Marx. Currently, problems of economic stability are studied by O. Zetkina, M. Kulbaka, N. Lyubchenko, N. Shandova, M. Shpak and other.

Results. The term "stability" is borrowed from the natural sciences, where it means a stable state, the ability to prolong its existence, conservation in time. In some literary sources, stability equates to stability, sustainability, the ability of a particular system to function without changing structures and being in equilibrium. Mercantilists and technocrats who interpreted the guarantees of economic stability as a trade and production, physiocrats who claimed that the basis of stability is natural wealth, laid the foundations of the theory of economic stability. A. Smith substantiated the idea that stability arises in all sectors of the economy. He believed that the bases, breaking the economic stability, can be both objective and subjective, namely: war, the laziness of the nation, government, etc.

Jean-Baptiste Sei investigated economic stability at the state level and characterized it as a state of the economy, in which balanced consumption and adherence to the principles of economic liberalism are ensured. In his view, stability is not only a balance, but also a mechanism that provides such a state of the economic system. Modern researcher N. Shandova proposed her own concept of economic stability, which is the maximum value of the growth of the economy of the enterprise with a minimal deviation of the economic system of the enterprise from the state of equilibrium [3].

Another scientist N. Lyubchenko [2] under economic stability understands the state due to the combination of properties of the most important constituent elements of the subject of economic activity: production activity, organizational work, financial and monetary circulation, material and technical base, resource supply, personnel and intellectual potential, which determines the ratio of the subject of management to a complex external environment, its interaction with economic entities of different levels and allows us to form a dynamically balancing holistic system, which independently determines the purposeful movement in the present and foreseeable future. M. Kulbaka characterizes economic stability as a regulated state of equilibrium of economic resources, which provides stable profitability and favorable conditions for expanded reproduction and fixed economic growth, taking into account the influence of the main external factors [1].

Conclusions. Thus, economic stability is a stable state of the enterprise, which is in a dynamic equilibrium situation; at the same time, there are no problems of financial stability, inherent in competitiveness and preventing bankruptcy.

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65. Philosophy of marketing in the development of milk processing enterprises in Ukraine

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Introduction. The philosophy of the company is one of the main factors influencing the quality of the marketing strategy, therefore planning of the innovative development of the enterprise ensures the possibility of taking into account future tasks, identifying the main needs of the market.

Materials and methods. The research is based on the use of scientific philosophical works on marketing and its impact on the development of enterprises in the food industry. When writing the work were used general scientific methods of research - analysis, synthesis and synthesis.

Results. Implementation of influence on changes in the external environment, forcing enterprises to constantly carry out innovative activities aimed at the development and implementation of modern equipment, state-of-the-art equipment, technology, projects for determining the output of products on the domestic and foreign markets through strategic management and analysis. The tasks of the dairy industry are usually formulated as follows: "Production of high-quality dairy products in order to maximize the needs of consumers". But such a "mission" is not effective, since it is determined in the indicators of goods and does not specify the needs that the firm satisfies. Therefore, in our opinion, "mission" can be specified in the philosophy of the firm and must be transformed into specific strategic objectives of the firm, its corporate purpose.

When developing goals, the following requirements must be met:

- Definition in time and geographically;
- reality of achievement;
- logic (interconnection between levels and structures of the enterprise);
- hierarchical combination (ranking according to importance);
- Flexibility: adaptability to possible changes.

The philosophy of the company's development, in our opinion, should emphasize the modification of the company's product, its qualitative parameters (style, image, expansion of the assortment line) for the existing consumer circle, that is, the company offers advanced goods, or expands its range [1].

This strategy is implemented by improvement of the quality of goods, development of new product models, development of new packaging of goods.

The market for dairy products is currently developing most dynamically and most stable. Its annual growth rate is estimated at 10-12% in recent years [1]. These figures, according to marketing forecasts, will be stable in the future.

The main factor of survival and development in the market is the adaptability of enterprises to national and world standards. This requires the involvement of highly skilled personnel who are capable of reorienting the enterprise to a systematic and consistent achievement of the company's purpose and mission.

Conclusions. For the dynamic development of the enterprise, it should have a clear, systematic plan for its activities, which should include, in our view, a marketing strategic plan for the enterprise philosophy.

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66. Philosophy of company

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Introduction. The philosophy of the enterprise is a set of principles and rules of relations between workers and employees, a peculiar system of values and beliefs, which is perceived voluntarily or in the process of education by all personnel of the enterprise [2].

Materials and methods. The research is based on the use of scientific works on the philosophy of organization of enterprises and companies belonging to the food industry, in particular milk processing enterprises. When writing the work were used general scientific methods of research – analysis, synthesis and synthesis.

Results. At a certain stage of development of each organization there is a need for the use of new management tools and approaches. One of these tools is the philosophy of the organization. Managers of different organizations are increasingly coming to the idea that for each of their headed structures need to have a well-considered corporate philosophy, which should become one of the most important factors in its strategic development.

The philosophy of the organization can be considered as a "moral code" of the behavior of all employees of the enterprise. Therefore, non-compliance with the code of conduct (the philosophy of the enterprise) leads to conflicts between the administration and employees, to reduce the company's image and even its collapse.

The philosophy of the firm, its spiritual environment is characterized by a joint search for innovative solutions to enterprise development. This can only be done when the administration accepts polyphony of thoughts, patiently treats discussions, allows others to be different [1].

Formation of the philosophy of the organization is considered as a tool for managing its activities and is a strategic means of formulating the mission, the goals of functioning and creating the image of the organization. It allows you to create a positive image of the organization in the external environment and make it more attractive to employees. The philosophy of the organization serves as a form of presentation and clarification of the goals, principles and objectives of management, values, norms, rules, stereotypes of behavior and the creation of socio-psychological climate in the team. With their help, the corporate culture of the organization is formed. Philosophy of personnel management organization, as a set of goals and rules of conduct of employees, arose in the large Japanese companies Mitsubishi, Tayot, Sonia, and then was widely distributed in the United States and countries of Western Europe. Therefore, the development of the philosophy of the organization is a new approach to management and a very important business for Ukrainian managers and owners.

In Ukraine, the rationally constructed philosophy of the organization today is developed only at large enterprises and enterprises with foreign capital.

Conclusions. When developing the philosophy of the company it is necessary to take into account: national composition of employees, religious specificity (oblast, city), type of production, industry of the national economy; quantitative composition of the enterprise; living standards of workers; personal beliefs of the director.

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67. Psychological aspects of personnel management on enterprises of food industry

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Introduction. Management psychology is directed at the study of the peculiarities of the psychic processes, the states and qualities of the head, the psychological features of his management activity and the relationships in the team, performers psychological characteristics, their relationship with each other and with the leaders, the psychological characteristics of the groups and human communities, their relationships, socio-psychological processes, taking place within the framework of management. A modern highly qualified specialist can fully demonstrate himself in the work, only actively interacting with colleagues and managers, possessing the necessary culture of communication [1].

Materials and methods. The conducted research is based on the use of scientific national work on the psychology of personnel management and work organization in the enterprise. In writing the work used the general scientific methods of research - analysis, synthesis, generalization.

Results. The main task is to analyze the conditions and psychological peculiarities of managerial activity of the manager in order to improve the efficiency of the whole social management system. The effectiveness of production and management processes depends on how creative, active and selfless people work. An important condition for increasing the activity and initiative of employees is the widespread introduction of research results in management psychology into practice, which allows you to evaluate team and group psychological characteristics in order to create healthy socio-psychological climate, psychological requirements for the work of executives and managers and their official behavior. The most important psychological aspects include: social analysis in the team of workers, social planning, creating a creative atmosphere in the team, employee participation in management, team social stimulation, spiritual and cultural needs satisfaction, team formation, creation of a normal psychological climate (adaptation in the team), establishment of social norms of behavior, development of initiative and responsibility of employees, establishment of moral sanctions and incentives [2]. The psychological aspects of management are based on the use of the social management mechanism (the system of mutual communication in the team, social consumption, etc.). Their specificity lies in the significant share of the use of informal factors, the interests of the individual, the group, the team in the process of personnel management.

Conclusions. The psychological approaches to the consideration of the technology of work with the personnel allow to introduce a "system" that provides a permanent resource for the development of the organization in all phases of its life cycle.

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68. Role of the curator in the process of adapting first-year students of higher education schools

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The building and development of student relationships takes place more in the student group. That is why it is important to create humane interpersonal relationships in a student group. Creating a favorable microclimate in a group depends on the composition of the group, the presence or absence of a leader, the activities of the curator of the group. These factors are the most important in shaping the structure of relationships in the academic group.

Curator (lat. curator from curare - care) organizes a system of relations through various types of educational activities of the academic group, creates conditions for the individual self-expression of each student and the development of each individual.

The ability of the curator to regulate the process of interpersonal communication contributes to the humanization of student relationships, the correct perception and evaluation of the relationships in the team. The system of relations in the student group is formed spontaneously, especially at the beginning of its creation. The nature of the development of student relationships may be multilateral, sometimes even controversial (informal microgroups may spontaneously occur, which will have a negative impact on the team). Purposeful humanization of student relationships should be promoted by the curator, who directs development in the group of unofficial friendly and business relations between students, corrects and influences the psychological atmosphere, the system of values and standards of behavior. He studies the level of student activity in the process of activity, the status of a student in the system of relations between the group, emotional well-being in the group, establishes reference groups, studies the value orientations, organizes joint activities, regulates and corrects interpersonal relationships in the group. We distinguish the following directions of work of curators in the process of humanization of student relationships: the expansion of knowledge about the formation of interpersonal relationships; inclusion in joint activity with group members; formation of the desire to make suggestions, to show initiative, activity, creativity; development of the desire to participate in affairs, focused on communication, contacts, interaction.

Thus, the humanization of the relations of the members of the team positively affects the microclimate of the academic group, which influences the professional training of students. And it is the curator, who controls and adjusts the activities of the group, plays a decisive role in this important process.

69. Monitoring and Treatment of Sewage in Food Industry Enterprises

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Introduction. The largest consumers of water are food companies. They spend several times more water than processed raw materials to get finished products. Despite the significant flow of water, the waste water of the enterprises is classified as highly concentrated. Such drains represent complex polydisperse systems and contain various contaminants by nature.

Materials and methods. The purpose of the study was to increase the level of water purification in food enterprises using modern methods of information technology.

Results. The methods and technologies for the treatment of highly concentrated wastewater used to date are imperfect, and in some cases do not provide the necessary degree of purification and disposal of all by-products. The modern energy-saving system for the treatment of highly concentrated waste water and the recycling of by-products of production with the subsequent extraction of biogas is at the moment optimal solution of the problem of sewage of food industry enterprises.

Cogeneration is a technological process of simultaneous production of two types of energy, basically electric and thermal. The average efficiency of conventional cogeneration units is approximately 38%. It is very low. It is proposed to create a decentralized cogeneration unit in milk processing enterprises. In this case, the production of electric and thermal energy occurs in relatively small block biomodules, through which will be passed highly concentrated waste water. Significant advantage is also the installation of modules in the immediate proximity of the consumer, the enterprise itself. Due to this, the losses of electric current and heat during transportation are minimized, and the efficiency increases.

The largest share in contaminated wastewater in dairy enterprises accounts for milk whey. Qualitative and quantitative characteristics of sewage depend on the capacity of the enterprise and the range of products released, with the consumption of fresh water on average 3–12 m³/ton of milk. Biogas with a methane content of 70–85% from a methane anaerobic reactor under continuous pressure enters a cogeneration unit, where heat and electricity are produced in the process of combustion. Or gas can simply be burned at its own boiler house for the needs of the enterprise.

The organizational chart of sewage monitoring should include sampling of the object and performance of measurements, control on the reliability of the results, creation of information bases, systematization and data analysis, transfer of information to the database, analysis and generalization of data, identification of trends in changes in the quality of sewage, preparation of the necessary solutions and recommendations.

Conclusions. Implementation of this technology and the introduction of an information system at the enterprise will allow to increase the level of water purification at food enterprises; to produce thermal and electric energy for the needs of the enterprise itself; discharge of waste water into the reservoir without any significant consequences in the future.

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70. Monitoring and Analysis of Water Quality at Food Enterprises

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Introduction. Refined water at food enterprises is a guarantee of high quality and safety of goods. In the food industry, industrial water treatment is one of the most important processes that affects the organoleptic properties of food and increases the microbiological and physical and chemical parameters of the finished product.

Materials and methods. The purpose of the study was to determine the advantages of the method of preliminary sound and ultrasonic coagulation of sewage and preliminary coagulation for the method of flotation of sewage treatment from pollution.

Results. At the moment, reverse osmosis plants, biofilters, and environmental information monitoring systems installed at enterprises are one of the best means for wastewater treatment, water purification from different types of impurities for further use or safe disposal in local bodies of water, as well as for water quality monitoring. High-tech industrial reverse osmosis plants partially or completely soften and remove almost 100% of salt from water, remove silicon, ammonium, fluorine, boron, nitrates and sulfates from it. In the process of food production, industrial water purification with the use of reverse osmosis system allows cleaning of the treated environment from various impurities, such as salts, microbes, mechanical contamination, bacteria and other organic compounds.

In the water purification system, an ultraviolet water lamp completely disinfects the treated medium. Biofilters, which significantly simplify the water purification process, play a significant role in purifying water in the food industry, as well as wastewater treatment plants. Biofilter is a structure, usually cylindrical or rectangular, about 2 m high, containing loading (claydite, glass, rubber balls, plastic), covered with a biofilm that oxidizes the waste water passing through the loaded layer. Highly loaded biofilters (loaded layer is increased to 4 m) and disk biofilter are considered to be the most productive.

The processes of oxidation in the biofilter are similar to processes occurring in other biological treatment plants, primarily in fields of irrigation and filtration fields. However, these processes proceed much more intensively with biofilters. An important stage is the measurement and quality control of the results. It is important to form a general information base, systematize, analyze, and summarize data, identify trends in changes of water qualitative state, which can be the basis for managerial decisions and recommendations.

The very important part of the developed system is that the imported data can be viewed via web based interface. You can organize the data as needed, create dashboards. Real time displays, graphs, alarms can give others access to the data and much more.

Conclusions. Modern automated water treatment systems that use reverse osmosis plants, as well as biofilters, are the leaders in water treatment in the food industry, as well as at other enterprises. These methods of water purification are more productive and intensive than other methods. Besides, they allow not only water purification that is used at the enterprise in future, but also carrying out qualitative and quantitative analysis, making decisions and giving recommendations.

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71. Module of Face Recognition

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Introduction. Thanks to the "Intellect" platform, a complex of various security systems transforms into a single information environment. It has functions of processing and intelligent information analysis which responds flexibly to different events. A customer can choose exactly the features needed to build an effective security system for a particular object, thus obtaining a system with the optimal set of functions at a minimal cost.

Materials and methods. The principle of an open platform not only allows integration of new equipment, but also makes it possible to create new solutions based on the "Intellect". All this can be done by both the company AxxonSoft and their partners — independent software developers — using an SDK. "Intellect" is ideally suited for uninterrupted work in a large, distributed structure. These properties help to build complex and effective security systems based on the "Intellect". The intuitive interface allows to enter the workflow quickly, and any necessary function is available in a few mouse clicks.

Results. The process of video capture of a person, further picture analysis, and comparison with the database is automatic, and decisions on further actions can be taken by an operator or by the system itself. A system based on the "Intellect" platform implements the functions of video recording and audio registration. Video subsystem has distributed architecture, powerful video analytics functions, ability to record sound, and it also allows to connect telemetry devices to the system. Face Detection Module is designed to automatically identify a person by a video image. It produces facial recognition captured by the "Intellect" Face Detector, comparing them with a pre-created base of reference images. The new face detection unit works now in Kyiv as a part of the KyivSmartCity project.

In settings, there are three similarity zones: low, medium, and high. The module captures the camera number, response time, percentage of similarity and the image itself. The data is displayed on the operator's screen, highlighting the color of corresponding zone.

The main disadvantage that requires urgent refinement is the complexity of processing information flows and analyzing data in real time. Optimizing information flows when disposing individuals in real time can be solved using the definition of isomorphism of graphs. The originality of this approach is based on the hash of the graph structure, where the shortest distances between all vertices are used as the invariant graph characteristic. To find the boundary points of faces in the image, the Haar signs feature method is used. The SURF descriptor is used to read the counting of the point characteristics on the image. On the basis of the calculated descriptors, graphs are made.

Conclusions. The Capture and Face Detection module provides a high percentage of recognition and can be used in conjunction with ATS to increase the level of access control at objects with increased security requirements, such as banks or state-owned enterprises. Another important application of the module is the automation of face control in casinos, hotels, restaurants and other similar objects.

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72. Expert System for Ice Cream Recipes Modeling

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Introduction. The paper studies a hybrid expert system which is aimed at the ice cream recipe modeling as one of the most complex in the foodstuff structure.

Materials and methods. Such methods, as scientific abstraction, synthesis, analysis, comparison and deductive method were used.

Results. A new method of ice cream recipe modeling was developed. Unlike traditional ones, it is based on the application of processing expert data and optimization methods. It allows to significantly expand the range of tasks. The solutions to these tasks can bring a significant economic effect. To create a database and a knowledge base, a relational database under the control of Firebird DBMS was used. IBExpert software tool was used to ease the database structure development. While creating a user interface, the integrated Microsoft Visual Studio software development environment was used. Materials for the formation of the database and knowledge, put into the expert system, were the results of the work, obtained in cooperation with scientists of the Department of Milk Technology and Dairy Products of the National University of Food Technologies.

The hybrid expert system for modeling ice cream recipes is intended to improve the existing or develop new types of ice cream in a wide range of changes in the chemical composition by applying fundamentally new functional and technological ingredients. The expert system allows, in production conditions, in a minimal time, to calculate the chemical composition of the ice cream recipes of guaranteed quality taking into account the available raw materials. The knowledge base formed in the expert system will improve the nutritional structure of the population of Ukraine due to the exclusion of chemically modified and synthesized food additives from the ice cream recipe and their replacement with natural, biologically complete ingredients of domestic production.

Using an expert system in the production environment will allow you to constantly update and accumulate knowledge of expert technicians who work in this field. The constant accumulation of new knowledge about the ice cream recipe will enable the creation and expansion of partnership programs with domestic and foreign enterprises. Using this expert system will reduce the cost of modeling new ice cream recipes.

Conclusions. A result table presents an experimental proof of the efficiency of the expert system usage taking into account the calculation of a new ice cream recipe named "Milk Ice Cream with Wheat Germs". It was based on the standard milk ice cream recipe in accordance with the standard technological instruction for the ice cream production (TTI 31748658-1-2007 to SSU 4733:2007, 4734:2007, 4735:2007). The expert system calculated a new optimal recipe, taking into account the partial replacement of the stabilizer Cremodan SE 406 (the manufacturer is the company "Danisco", Denmark) with the natural structuring complex named wheat germ. As a result, this new recipe satisfies the quality requirements of the finished product. The cost of 1000 kg of milk ice cream with wheat germs according to a new recipe made up 16713.2 UAH, which is 8.64% cheaper than the base one.

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73. Description of Information Services Model with the Use of Hypercomplex Number System

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Introduction. In connection with the steady development of information technologies in various areas, the question of the quality of the information needed to solve some problems and, as result, the necessity of the modeling of information services management systems [1] becomes all the more urgent.

Materials and methods. The main objective of the simulation information services management systems (ISMS) is defined as the search for the best or suboptimal results of process performance management. To do this, a set of components of a process, procedure, and the rules for their implementation, monitoring, and control mechanisms within the process parameters characterizing the performance of procedures and process in general, as well as the results of process performance, are to be defined.

Results. Features of hypercomplex numerical systems (HNS) for modeling processes in the ISMS were considered. This approach will allow for the formal description of the parameters, constraints, and the connections between them, taking into account all available information, as well as the well-known laws, etc., that describe the processes of information services.

It has also been found that for the effective use of HNS in ISMS process modeling there should be applied algebra that can be arithmetized, that is, it must contain a single element. Analysis of the results of the research has shown that this property is possessed by the associative algebra over the field of real numbers [2], [3], [4]. As a construction method, ways algebra on graphs is usually used. With it you can build a finite algebra over the field of real numbers by the original construction of the circuit with the subsequent generation of algebra multiplication table, which corresponds to the transition scheme above.

Also the transition from graphic representation obtained by one of the computer-aided design systems to hypercomplex representation of information about ISMS processes is presented.

Conclusions. In the study, the approach to modeling of the quality management systems of information services, which are based on the features of hypercomplex numerical systems, was suggested for searching the best results of process performance management.

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74. Monitoring Internal Microclimate Changes in the Air Gap Between Cloth Layers

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Introduction. In the paper, we used a remote system of monitoring changes in the internal microclimate in the air gap between cloth layers. The results of the research are important for predicting human comfort indicators and optimizing the quantitative and qualitative composition of sensors for the remote sensory system.

Materials and methods. Data on the conditions, namely temperature and relative humidity, are documented by a supercomputer. Data is saved into a flash memory, and during long transportation — to an external flash drive. The transmission on request occurs periodically over a cellular channel or through open access WiFi points. In the case when a terminal is located outside the area of the cellular and WiFi networks, it is proposed to use the VHF radio channel in batch mode for data transfer to the repository. Data processing was carried out using Python programming language and libraries: serial, numpy, matplotlib, and drawnow.

Results. The parameters of changes in temperature and relative humidity of the air gap between cloth layers were obtained using mobile module that is located in the air gap between cloth layers (Figure 1). The data was transferred using VHF radio channel in batch mode, a diagram of the data channels is shown in the Figure 2. Figure 3 shows dependencies of the temperature and relative humidity, which is displayed on the computer screen in real time and is written to the cloud database.

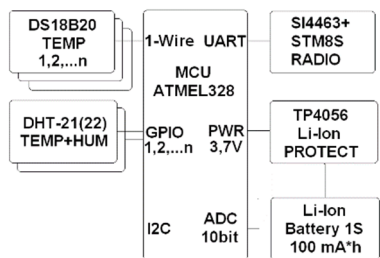


Fig. 1. Scheme of the mobile module

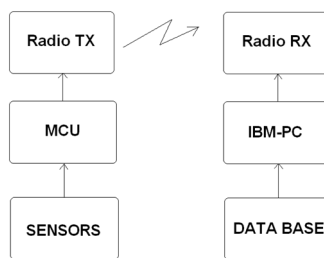


Fig. 2. Scheme of data transmission channels

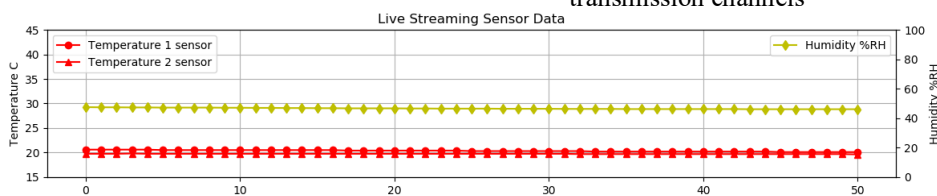


Fig. 3. Measurement of object parameters in real time

The result of this study is the development of technology for linen manufacturing with zonal arrangement of temperature and relative humidity sensors. It will be possible to carry out real-time remote monitoring and cloud storing of obtained data.

Conclusions. The research results can be used for the further improvement of clothing items and the development of new smart textile materials.

75. Front-End Web Development vs Framework Vue.js

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Introduction. JavaScript is a high-level, interpreted programming language, one of the three major technologies in web development. In JavaScript development, frameworks are used. Framework is a construction which contains different libraries facilitating the development of a software product or a web site.

Materials and methods. In the study, such scientific methods, as comparison, synthesis, and analysis, were used. The aim of the study is to determine the features of the progressive JavaScript-framework Vue.js, its market position, and feasibility of learning.

Results. Front-end web development is the practice of converting data to graphical interface for user to view and interact with data through digital interaction using HTML, CSS, and JavaScript. Front-end and back-end are terms used to characterize program interfaces and services related to the initial user of these interfaces and services. The user may be a human being or a program. A *front-end* application is one that application users interact with directly. A *back-end* application or program serves indirectly in support of the front-end services, usually by being closer to the required resource or having the capability to communicate with the required resource. Relating to the client/server computing model, a front-end is likely to be a client and a back-end to be a server.

Vue.js framework came out of nowhere in 2017 and within a short period of time it has proved itself to be the most serious competitor of React. Perhaps, it doesn't have such popularity or long history as Angular, but Vue has an advantage which exceeds the two previous parameters: the momentum.

According to the results of the 2017 poll, there are 4.6 thousand active Vue users, and 12 thousand people have heard and are interested in learning it. Meanwhile, the most popular framework React, which entered the market earlier, has 14 thousand users, and 6.4 thousand people have heard and are interested in learning it. Thus, Vue managed to jump over the marketing gap: almost every developer has heard about it.

Vue is a JavaScript-based open source framework designed for developers of interfaces and web applications. It includes an accessible root library, which primarily solves tasks at the presentation level, and the ecosystem of additional libraries, which allows the creation of complex and bulk single-page applications. During the analysis and comparison on the market of frameworks, we have found the following benefits of Vue: simplicity, flexibility, productivity, and compatibility with the previous versions.

Despite the tendency to reduce the use of React and Angular, they still have high positions at the market. Vue is used less often, but the slowdown in the use of React and Angular can point to the transition of users to this framework. As for the documentation, React has more useful information than Angular or Vue.

Although it is unlikely that Vue will take over React soon, its development may be more stable. After all, when it comes to full support for the framework, Vue offers official routing and state-of-the-art management libraries that are supported by the same developer group.

Conclusions. Vue.js is a developing framework. In the future, it can really become more widely used than React and Angular.

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76. Modern Use of Alternative Energy Sources at the Food Industry Enterprises

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Introduction. Modern activity of enterprises cannot exist without considerable expenses of energy resources, as they are the most important and necessary criterion of the enterprise's activity. An urgent problem for the Ukrainian economy is the problem of reducing energy costs and saving non-renewable energy resources.

Materials and methods. Implementation of energy supply systems at enterprises from alternative renewable energy sources (wind, sun, biomass, etc.) makes it possible to significantly reduce the use of traditional energy sources. And the use of an automated system for accounting and control of energy resources and energy use at food industry enterprises will allow finding ways of conservation and rational use of energy resources.

Results. The main aspects that lead to the transition to using energy from alternative energy sources (AES) have been revealed. It has been determined that ineffective and inefficient energy use causes loss to enterprises.

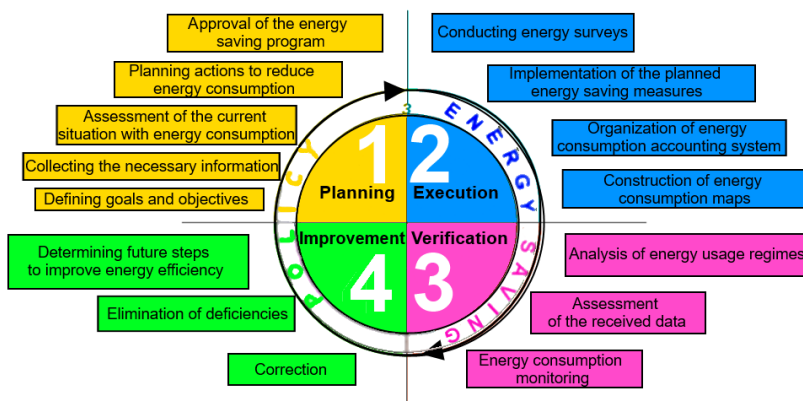


Fig. 1. Stages of ensuring the efficient use of energy resources

On the basis of the analysis, positive and negative qualities of AES usage were indicated. The characteristics of each type of AES were given, advantages and disadvantages were defined in the process of using each of these energy types.

It is noted that the use of traditional power plants differs from alternative sources of electricity. Differences in the use of various alternative energy sources have been established: a comparative analysis of the use of various technologies of alternative energy sources has been performed. A cost-functional analysis of the use of AES was conducted.

Conclusions. The necessity and expediency of using AES, as well as investment into them at food industry enterprises in future, have been proved.

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77. Implementation of Pricing Module as a Part of Marketing Information System in the Food Enterprise Industry

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Introduction. An important guarantee of the successful enterprise operation is the involvement of information technology to establish the optimal price of manufactured products. This would then provide a regular income and competitiveness in the market.

Materials and methods. The materials and documentation of Planning-Economic and Marketing Departments of the food enterprise, methods of system analysis, methods of mathematical and functional modeling, IDEF0, IDEF3, DFD methodology of structural analysis, methods of game models and selection criteria with the use of expert evaluations method were used.

Results. The functional capacity of marketing information system is expanded by using the developed software module. This will implement the advanced pricing algorithm for the food company's products.

The software module of the pricing system is implemented according to adapted and improved price calculating algorithm based on theoretical game models' methods founded on the payment matrix, selection criteria with the use of expert evaluations [1]. Work algorithm with developed pricing module is carried out via procedural steps, starting with input data about influence factors on sales, several variants of price and sales figure, and ending with preservation of current calculated products prices.

By the use of CASE-instrument CA ERwin Data Modeler, the functional model of the food enterprise pricing system is created, an example of this is a "Meat-packing plant", by means of which the existing pricing algorithm is investigated and factors of influence on pricing are identified [2].

To create a "Pricing software module", a database (DB) is developed, in which the information about the company's products is stored and gradually accumulated. The logical and physical database models are developed on the basis of information management of the pricing system. Business processes detected by using the developed functional model [3].

Database is generated in MS SQL Server 2012 for continued use and filling with relevant information. After this, a client's application is developed that performs all processing and displays the amount of data used.

Conclusions. The software implementation of advanced pricing algorithm provides a reasonable version of the actual price of the product and the necessary volume of production for obtaining maximum results.

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78. Transportation Problem as a Component of the Information System for the Logistics Center of Fino Verde Ukraine

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Introduction. For the logistics center, the actual task of the present is the formation of an optimal route of delivery of products, which has a limited period of consumption. In fact, even an insignificant delay in delivery negatively influences the products quality.

Materials and methods. Materials and working documentation of the logistics center “Fino Verde”, methods of system analysis, functional and mathematical modeling, simplex method for solving transportation problem were used.

Results. A functional model was constructed using the CASE-tool ERwin Process Modeler for identifying and improving logistics business processes. The existing algorithm of goods delivery by the sales and supply department of “Fino Verde” company in Ukraine was explored, the factors of influencing the processes of forming the delivery route were investigated. In order to optimize the delivery of products, a program implementation of the transportation problem was formulated and implemented. The essence of transportation problem is planning of goods transportation from suppliers to consumers to ensure the minimal transportation costs. A balanced economic-mathematical model of a transportation problem with a closed type was constructed with a goal function:

$$Z = \sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij} \rightarrow \min; \quad (1)$$

and restrictions:

$$\sum_{j=1}^n x_{ij} = a_i (i = 1 \dots m); \sum_{i=1}^m x_{ij} = b_j (j = 1 \dots n); \quad (2)$$

$$x_{ij} \geq 0 (i = 1 \dots m, j = 1 \dots n), \quad (3)$$

where x_{ij} – the number of goods transported from the i -th supplier to the j -th consumer ($i = 1 \dots m, j = 1 \dots n$); c_{ij} – the cost of transporting a unit of goods from the i -th supplier to the j -th consumer; a_i – quantity of goods to the i -th supplier; b_j – quantity of goods, necessary for the j -th consumer.

The transportation problem that was built is a partial case of the linear programming problem and was solved with the help of the simplex method. The software module with the implementation of the algorithm for the optimal route of goods delivery to the customer was developed and integrated into the information system of the logistic center “Fino Verde” in Ukraine. The expected economic effect was calculated. As a result, the speed of orders execution was increased and total shipping costs was decreased by 8%.

Conclusions. The developed software module which solves the transportation problem can be used as a typical one for food enterprises whose products have a limited shelf life.

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79. Principles of applying multimedia technology in learning of foreign languages

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Introduction. Communicating in multiple languages is an urgent need in a globalised world. Foreign languages are widely used in such areas as information technology, tourism, mass media, science and many more.

Material and methods. The topic of our discussion today is the use of multimedia technology to intensify the process of learning of foreign languages.

Multimedia technology includes using computers along with additional devices such as projectors and interactive whiteboards. It has lots of advantages compared with other types of information technology training, namely:

- constant improvement of content; - support of the students; - opportunity of distance learning; - access to best ways to teach through the Internet; - organizing foreign language training according to students goals and preferences; - extensive use of graphic content; - providing an effective tool for self-studying;

On the other hand, a number of disadvantages can present inconvenience to a studying process. For example, - not all education systems can provide means to implement multimedia technology, - there are not enough programmers to develop technology, - there is not enough money to implement multimedia technology in a worldwide scale.

Introducing multimedia technology requires creating special conditions. It is also necessary to integrate the Internet to the educational process.

At present, the use of multimedia technology is restricted by the lack of appropriate and tested computer programs. There are lots of programs without a required theoretical basis. Teachers underestimate the use of multimedia technology due to absence of development of a theory of the concept of multimedia technology.

Multimedia aids must be used by foreign language teachers since they give an opportunity to create such learning conditions which bring the studying environment as close to the real-life conditions of the foreign language use as possible.

There is an idea of the extended classroom is one of that allows learners to engage in material beyond the regular class period. According to many researchers and practitioners, innovations, as any meaningful introduction of new elements for qualitative changes of educational situation, help to successfully prepare future specialists for cross cultural professional communication. Dramatic development of such technologies as web-site educational portals, telecommunications and use of the Internet resources allows us to speak that they are the future of our education. Internet technologies provide wide possibilities for international and cross cultural communication. They are: e-mail, communication in blogs, Internet — conferences, and tele-bridges. There is a great interest in the electronic or interactive whiteboard (IWB). The components of an IWB are comprised of a three-way system between data projector, computer and an electronic screen. The IWB allows the individual to interact with software at the front of a class rather than from the computer.

Conclusion: The analysis showed that in pedagogical science, and especially in the practice of the domestic university teaching, there is underestimation of the possibilities of learning software, including multimedia. This is due primarily to the complexity and the insufficient development of the concept in the theory of media as a didactic tool.

80. Plagiarism: its displays and dangers

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Introduction. Plagiarism gets to all spheres of our life, and it is begun with an educational level. Students of higher schools have the opportunity to look after distribution of the use of term "plagiarism" among teachers that fix the fact of his presence in works.

Materials and methods. We find it necessary to specify that both Criminal and Civil codes responsibility is envisaged exactly for copyright and allied rights infringement, and holds own determination of plagiarism, while in Law plagiarism is examined as one of types of copyright and allied rights infringement. In other words, there is a necessity of clarification of maintenance of this concept, as plagiarism has general lines are certain, for example, with "piracy" or co-authorship and concrete responsibility for its application.

Results. The problem of plagiarism every year becomes more actual; in fact, plagiarism is already formed at the level of market. The specialized services that engage in writing of the prepared works are created, and in business – only by plagiarism. A result is the pseudo-knowledge for students. But plagiarism is used by not only students, but also scientists. The problem of academic plagiarism is formed already at state level; that is why it needs the urgent reaction. For R. B. Shishka, "plagiarism can be and in other spheres a copyright does not spread on that, in particular in mathematics et al fundamental scientific disciplines. Mostly plagiarism shows up really as promulgation of stranger work under the name (complete plagiarism), partial borrowing of others' works, and also others' ideas without pointing out the source of borrowing (partial plagiarism or compilation plagiarism)." R. Shishka divided plagiarism in such case into two groups: borrowing without pointing of his source, in particular "ghost author," as an author gives out a work by another author without the change of its maintenance (it shows up in the type of downloading works from the Internet without the proper correction). The other way is the compilation of the material from various books – so-called 'mosaic,' or 'puzzling.'

Problems of plagiarism are relevant not only in the territory of Ukraine. Throughout the world, methods are being developed and actively used to combat plagiarism. So, in Slovakia in 2010, the Ministry of Education ordered all universities to use the national central repository of theses and theses and the national system for plagiarism. In the Czech Republic, 50% of Czech universities received funding from the Ministry of Education to combat plagiarism. In Georgia, a single base for checking scientific works on plagiarism was created. In China, the Ministry of Health requires that all HEIs be equipped with anti-plagiarism software. Since 2011 in Macedonia, the Education Minister said that at the state level, they will develop their own anti-plagiarism service [1]. And there are many such examples. Ukraine needs to follow such a policy and carry out reforms at the state level.

Conclusions. The strict following of professional ethics and norms can be one of the most effective means of combating plagiarism. The norms and components of academic culture should be promoted among students, and academics themselves who are taught at universities should be interested in this.

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Pyramids and plates of nutrition

81. Models of food pyramids, plates and the development of plates according to ancient eastern oriental food concepts

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Introduction. The purpose of the article is to conduct an analytical review of literature on existing models of food pyramids, plates and the development of plates according to ancient eastern oriental food concepts.

Materials and methods of research. Materials of the research were data on the method of rational nutrition given in the form of consumer plates and pyramids of food, including Ayurvedic appointment. During the research, the methods of theoretical generalization, scientific induction and deduction, structural analysis have been used, also the works of foreign and domestic scientists.

Results and discussion. A model of food that represents a three-level pyramid for the importance of food for human nutrition and was first proposed by Swedish scientists in 1972. The next step in the development of the pyramid is its improvement in 1992 (USA): the main differences are the separation of the dominant position of dairy products; consumption of bread, pasta, cereals and rice, which led to the need to revise the pyramid in 2007.

Pyramid of nutrition for vegetarians, depending on the type of vegetarianism (veganism and laktovegetarianism), does not contain meat and / or dairy products, fish, eggs, due to which there is an increased need for iron, calcium, vitamins B12 and D, which are consumed in the form of supplements.

The logo of the new healthy eating system also has the form of a plate divided into four sectors. The first dish of "healthy eating" in the history of Ukraine is designed to bring every Ukrainian to a healthy and balanced diet: cereals, fruits, vegetables, protein products (meat, fish, legumes and nuts). The plate is approved by the Ministry of Health of Ukraine and the Center for Public Health of the Ministry of Health of Ukraine.

Conclusions. Plates are provided for people with different constitutional features of the human body.

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