

## ABSTRACT AND REFERENCES

## TECHNOLOGY AND EQUIPMENT OF FOOD PRODUCTION

**ANALYSIS OF VITAMIN AND MINERAL COMPOSITION OF PEANUT VARIETIES COMMON IN UKRAINE (p. 4-7)**

Antonina Dubinina, Svitlana Lehnert, Olga Khomenko

Despite numerous research of scientists from many countries around the world on the chemical composition of peanut, the factors, such as improvement and introduction of new technologies to the agriculture, emergence of new varieties and their genotypes, require constant study of the content of nutrients in food raw materials and peanut in particular.

Taking into account that there is no data on the qualitative and quantitative mineral and vitamin composition of peanut varieties, which are widespread in Ukraine, its studying is of current importance.

The analysis of vitamin and mineral composition of 19 peanut varieties, widespread in Ukraine, is first provided in this paper. It was found that peanut satisfies the daily requirement of such vitamins as E, B1 and B3 more than by half. By mineral substances, the studied peanut varieties are an excellent source of magnesium, phosphorus, manganese and iron, providing from 30 to 50 % of daily needs. It is shown that the vitamin and mineral composition of peanut varies depending on the variety.

The obtained data give grounds to state the preventive properties of peanut, that makes it a promising food product.

**Keywords:** peanut, vitamins, minerals, daily requirement, biologically active substances, preventive properties.

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**CHARACTERISTICS OF NEW SOURCES OF FOOD FIBERS FOR THE ENRICHMENT OF FLOUR CONFECTIONERIES (p. 8-13)**

Kateryna Kasabova, Olga Samokhvalova, Svitlana Oliinyk

Theoretical and practical approaches to the enrichment of flour confectioneries by food fibers were considered. For this purpose, it was proposed to use secondary plant raw materials, such as products of processing of wheat germs and beet pulp, produced under the trademarks "Wheat germ meal" and "Beet fibers". The chemical composition and functional-technological properties of additives were defined. The additives contain a significant amount of minerals, as well as substances with antioxidant properties (polymeric and low-molecular polyphenolic compounds). It is important that the wheat germ meal is the source of protein and vitamin E. Polysaccharides of beet fibers are presented by pectin-cellulose complex mostly, and wheat germ meal – by cellulose-hemicellulose complex. The additives have different grain-size composition, on which beet fibers can be attributed to fine powders, and meal - to coarse ones. It was found that unlit (dark) beet fibers have the greatest water absorbing and oil-binding abilities, and meal - the smallest that can affect the dough structure for flour confectionery.

**Keywords:** food fibers, flour confectionery, beet fibers, wheat germ meal

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## THE REGULARITIES OF FRACTIONATION OF SUNFLOWER OIL OF PALMITIC TYPE WITH THE USE OF AUXILIARY SUBSTANCES (p. 14-19)

Ekaterina Kunitsa, Elena Litvinenko, Fedor Gladkiy

The paper deals with studying the regularities of fractionation of sunflower oil of palmitic type using auxiliary substances. The data on the terms of fractional crystallization of saturated oil with auxiliary substances (crystallization initiators) was obtained and method of palmitic sunflower oil fractionation control is given. The obtained results can be used in solving the problems of control and management of crystallization in processing of fat stock and optimization of heat transfer processes which provide the required quality. It was determined that the proposed initiator leads to faster crystallization process. Rational quantity of the initiator for the process of fractional crystallization is 0.5 % to the weight of oil. Due to applying the specified amount of initiator, the crystallization duration is reduced by 3.4 times and constitutes 20 hours versus 68 hours without the initiator. The increase of oil crystallization rate in the presence of initiator leads to less coverage of the liquid fraction and allows achieving higher melting temperature of high-melting fraction. It was found that the value of optical density of the liquid fraction during crystallization varies to a greater extent and optical density is more sensitive to the changes in feedstock composition and crystallization conditions, while monitoring of the change in the value of refractive index during fractional crystallization is insufficient.

**Keywords:** sunflower oil of palmitic type, fractional crystallization, refractive index, optical density

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## RESEARCH OF TECHNOLOGICAL AND CONSUMER CHARACTERISTICS OF EMULSION SAUCES ENRICHED WITH IODINE (p. 20-23)

Nicolay Golovko, Maxim Serik, Tatyana Golovko, Myushfik Bakirov

The solution to the problem of preventing diseases caused by iodine deficiency is considered in the paper. Iodination of food products by the additives, in which iodine is in a bioorganic form was selected as the main direction. Based on the conducted researches, the additive on the basis of egg albumen and mineral compounds of iodine (iodine-protein additive) was developed.

The developed iodine-protein additive is a powdery system and can be used in a wide range of food products of health-improving purposes, in particular in technologies of emulsion-type sauces.

The technological scheme of production of emulsion sauce based on the iodine-protein additive was developed. On the basis of the conducted studies it was found, that adding the additive to the formulation of emulsion sauce has no negative influence on the physicochemical, organoleptic and consumer properties of the sauce, and due to stabilizing effect it increases the emulsion stability to 98...100 % compared with a control sample. Using the additives 0.5 ... 2.5 % by the iodine mass from 0.01 % can provide up to 50 % of the daily human need of iodine.

It was proposed to use the iodine-protein additive in the production of emulsion sauces with partial replacement of egg powder. It is caused by its popularity among the population, and a wide range of possibilities of varying its composition for creating health-improving food products.

This additive has passed a number of studies that indicate compliance with regulatory and technical documentation requirements. New regulatory documents on the additive (TS U 10.8-01566330-281:2013 "Additives enriched with protein and minerals", hygienic conclusion, the act of researches, etc.) were developed and approved in accordance with established procedure.

**Keywords:** iodine-protein additive, emulsion sauces, health-improving products, organoleptic evaluation.

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### STUDY OF INTERACTION OF IONOTROPIC AND THERMOTROPIC POLYSACCHARIDES IN GEL-LIKE PRODUCTS (p. 24-27)

**Oksana Moroz, Yevgen Pyvovarov, Olga Neklesa, Pavlo Pyvovarov, Raisa Plotnikova**

The paper considers the possibility of the combined use of the thermotropic (agar, carageenan) and ionotropic (sodium alginate) gelling agents in the creation of a mixed gel, the properties of which can be used in the technology of structured products. The purpose of the research was to determine the regularities of the influence of the gelling agents (agar, carageenan, sodium alginate) in the composition of the mixed gel of systems "sodium alginate - carageenan -  $\text{Ca}^{2+}$  - water" and "sodium alginate - agar -  $\text{Ca}^{2+}$  - water", for what the studies of infrared spectroscopy were carried out.

The research results, given in the paper, are the basis for the development and introduction of technologies of new products, in particular granulated semi-finished product, the structure of which is based on the mixed gel that will provide further necessary characteristics of ready semi-finished products, where the latter can be successfully applied in the food industry.

The use of the obtained results allows creating the characteristics of food systems, which allow ensuring the necessary structural and mechanical properties of products.

**Keywords:** sodium alginate, agar, carageenan, structure formation, granules, desserts.

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### RESEARCH OF STABILITY OF MAYONNAISE EMULSION BASED ON FERMENTED WHEAT MALT (p. 27-30)

**Tatiana Arutyunyan, Lyudmila Danilova, Fedor Gladky**

The purpose of the research is to obtain a stabilizer of mayonnaise emulsion and study its stability. According to the research results, it was proposed to obtain the stabilizer based on the fermented wheat malt. The method is more efficient from the point of view of saving energy resources as compared to receiving the stabilizer from the modified wheat malt. The obtained stabilizer performs a functional role. At the same time, it promotes the extension of storage time due to the content of natural antioxidants (vitamin E and carotenoids). Also, the use of the stabilizer prevents biological and oxidative spoilage. The stability of the studied mayonnaise emulsion, obtained on the basis of fermented wheat malt meets the requirements of DSTU (State Standards of Ukraine). Evaluation of the emulsion system quality, from the point of view of the optimum content of the stabilizer in a mayonnaise recipe, was conducted according to the size of particles of a dispersed phase. The use of the stabilizer allows not only to make a product with the improved indicators of biological and physiological value, but also to replace in the recipe a certain part of more valuable component - egg powder.

**Keywords:** mayonnaise emulsion, fermented wheat malt, vitamins, antioxidants, stabilizer, egg powder

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### EFFECT OF PROTEIN-MINERAL SEMI-FINISHED PRODUCTS ON STRUCTURAL AND MECHANICAL PROPERTIES OF MEAT PRODUCTS (p. 30-34)

**Nicolay Golovko, Maxim Serik, Tatyana Golovko, Valentin Polupan, Inna Shurduk**

Taking into account the deficiency of digestible calcium compounds in nutrition, the need for the creation of food products, in particular meat products, balanced on a chemical composition was proved. In this regard, protein-mineral semi-finished product (PMSFP) – a carrier of bioorganic calcium compounds, was developed, and the feasibility of its use in the technology of meat products was proved. The obtained results of the research of structural and mechanical properties of minced meat systems and finished meat products from PMSFP showed that the addition of PMSFP significantly affects their rheological properties. Probably, it is caused by the high water-binding and moisture-retaining capacity of the protein-mineral semi-finished product. In particular, form of moisture binding in the minced meat from PMSFP (adsorptionally and capillary bound moisture) and the interaction of meat proteins with PMSFP are of great importance. The obtained data on the change of rheological characteristics are positive in the view of providing the

products with specified functional and technological properties and improvement of the quality characteristics of the finished products, namely pliability to mechanical influence, tenderness and juiciness.

**Keywords:** protein-mineral semi-finished product, minced meat products, sausage products, digestible calcium compounds.

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## THE PROCESS OF WAX EXTRACTION FROM SUNFLOWER OIL IN THE PRESENCE OF CRYSTALLIZATION INITIATORS (p. 35-37)

Anna Netreba, Fedor Gladkiy

Despite numerous researches of the crystallization process, the question of its improvement remains open, rather difficult and insufficiently studied. Since this process takes a lot of time and requires careful attention to the observation of its conduction parameters, it becomes necessary to improve the process of crystallization of wax and wax-like substances from oil. This paper proposes a new method of crystallization, namely a method of effective cooling of oil, and filtration improvement by using filtering polymeric fibrous materials. The possibility of the use of crystallization initiators with the formation of large crystals during the traditional winterization process is proved in the paper. It is also shown that the seed materials do not affect the process of effective cooling of oil in any way. However, when using the effective method of cooling, the rate of the extraction of wax-like substances is much higher than when using the traditional method. Besides, the use of fibrous filtering materials simplifies the process of filtering the smallest wax crystals, which are formed under the effective method of cooling. The obtained data will be used for the development of new advanced technologies of winterization of sunflower oil.

**Keywords:** wax-like substances, crystallization, crystallization initiators, sunflower oil, perlite, filtration.

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## ANALYSIS OF THE DRYING METHODS AND EVALUATION OF THE QUALITY OF DRIED GRAPE POMACE (p. 38-41)

Volodymyr Potapov, Evgen Yakushenko, Maxim Zherebkin

The paper gives the results of studying the process of grape pomace drying in the mass transfer module (MTM) with conductive heat supply, allowing to obtain high porosity, fast restoration of dried products with a high ratio of efficiency and quality.

During the experiments, the modules, which differed by the arrangement and design of the heater such as an internal flat heater, inner tubular heater, heater, which is located on the mass transfer surface, were studied.

The quality of dried products is influenced by chemical and biochemical reactions in the drying process, which lead to the change in nutritional and biological value of food raw materials. Having determined in the experiment the relative losses of BAS, initial temperature, average temperature of the product during drying and the duration of the drying process, it is possible to calculate the energy of activation of chemical reaction, which causes the change of the content of BAV in the process of drying.

The conducted analysis and research results allow to recommend the use of drying in mass transfer modules with conductive heat supply, which provides the minimum losses of vitamin C in the dried grape pomace at the level of 3..8 %.

**Keywords:** drying, mass transfer module (MTM), conductive heater, vitamin C.

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#### TECHNOLOGICAL ASPECTS OF DETERMINATION AND DISTRIBUTION OF PESTICIDES IN OILS, CAKE AND MEAL (p. 41-45)

Irina Levchuk, Nikolay Oseyko, Vladimir Kishchenko, Elena Litvinenko

The paper deals with the problem of determination of pesticides and the study of their distribution in oils, cake and meal. The necessity of monitoring and rapid response to critical points of the content of pesticides in oil crops and products of their processing is shown. The data concerning the influence of oil extraction conditions on the residual amount of pesticides within the chemical class of some pesticides, which are commonly used in the cultivation of oil crops, was obtained taking into account the properties of a particular preparation and oil extraction technologies. The results of studies of the distribution of residual amounts of metalaxyl, imidacloprid and thiacloprid in seeds of sunflower and the products of its processing - cold-pressed unrefined oil, cake, extraction oil and meal in relation to sunflower seeds are given. The dependence of the "behavior" of pesticides on their polarity within the same class (nikotinoids) and other chemical group (fenilamids) was found.

**Keywords:** pesticides, problem, critical points, monitoring, oil crops, vegetable oils, cake, meal

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