The article presents the results of the research on the creation of durable health-care nutrition system.

Using four totalities of twice-filtered expendable diets of the third generation by the criteria of balanceness of the groups of nutrients in the diet, and by the criteria of biological value ten thousand daily diets with different levels ensuring daily needs in nutrients and energy are designed. Each of the totalities of expendable daily diets includes ten items. Each totality corresponds to a specific diet - for breakfasts, lunches, dinners and suppers.

Out of ten thousand designed daily diets a thousand (10%) of the best diets in terms of daily needs' provision in nutrients and energy are extracted.

To ensure the diversity of expendable diets the sequence of a daily diet consisting of 70 elements is designed from the range of 1000 best daily diets. This sequence determines the place of various types of expendable diets in a cyclic diet, which, in fact, provides the necessary variety of nutrition. In other words, a diet for 70 days, which provides the diversity of expendable nutrition, is created. It can be called a varied diet, or more briefly – cyclic diet. This diet can be periodically repeated. The variety of nutrition is achieved due to specific duration of the cyclic diet (70 days before its periodic repetition) as expendable and daily diets, and their exact location in the cyclic diet.

Cyclic diet is designed to implement the created project supply system, characterized by the balanced content of nutrients, high biological value of protein. The system implements approach to solving fundamental problems of designing nutrition rations and intended for the prevention and treatment of diseases caused by calcium deficiency.

**Keywords:** nutrition system, cyclic diet (ration), daily diets.
STUDY OF BIOLOGICALLY ACTIVE ADDITIVE IMPACT ON LIPIDS OXIDATION PROCESSES

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An important task of the food industry is expanding the range of quality products with a long shelf life. However, lipids (including fats and oils) from plants and animals in the process of receiving, storing and the production of food products subject to different, sometimes profound, changes. Thus, fats and fatty foods depending on their chemical composition possess different resistance to oxidation, hydrolytic and other chemical transformations. The presence of oxidation products in fats worsens their quality and complicates processing. It is therefore necessary to take measures to prevent these changes, and control lipids quality in order to maintain the products’ consumer characteristics and biological value.

In this context, the solution of the problem of lipids oxidation for the prevention of destructive processes in lipids and fats protection against damage is actual. For this purpose, “passive” and “active” methods of preventing the factors that cause or catalyze processes of deterioration are used. “Active” methods of fats oxidation – substances interrupting oils oxidation, which are designed to extend their storage.

A finely divided magnetite, which was used as a dietary supplement, which exhibits antioxidant effect on lipids, is synthesized by condensation. The influence of magnetite additive on the oxidation of crude and refined deodorized oils, rendered edible animal and confectionery fats during storage at 20°C for 2160 hours, namely, addition of physical, chemical and optical properties of pure fats and oils with the addition of magnetite in an amount of 0.05 wt.% is studied. It is found that the addition of magnetite increases the storage term of fats and oils.

Keywords: magnetite, oil, fat, oxidation, stabilizer, suspension, properties.

RESEARCH OF QUANTITATIVE AND QUALITATIVE INDICATORS IN THE TECHNOLOGY OF OFFAL FRIED SAUSAGES

V. Onishchenko, G. Seljutina, O. Dromenko, A. Onishchenko

It is shown that a sufficiently long contact with the heating surface at a temperature of 180...220°C leads to the expected high losses during the manufacture and, accordingly, low outcome of fried sausages, formation of a significant amount of prefabricated fat, excessive loss of moisture and deterioration of juiciness of the finished products. In this regard, despite national traditions and high popularity of fried sausages among the population, traditional assortment have practically not been produced in recent years, since it is impossible to ensure profitability of their manufacture taking into account present day purchasing power of the Ukrainian
population. Most enterprises are trying to solve this problem through the introduction of stabilizing solutions containing hydrocolloids and flavors of plant and animal origin, phosphates and other moisture-retaining components, but they face a loss of popularity and confidence in their products. Under such conditions, expansion of the range of fried sausages may be an alternative way of solving such a problem by attracting offal raw materials, since these products are not available on the domestic consumer market.

Expansion of the range of fried sausages based on offal products – liver and heart of beef, pork and chicken is suggested. Three basic formulations of fried offal sausages – «Liver Mix», «With Heart» and «Domestic with Liver and Heart» – are developed, and technological process of their production is improved due to the purposeful combination of blanching and grinding operations in order to make the finished product a monolith.

The results of quantitative and qualitative indicators in the technology of roasted sausages, prepared with the use of offal are obtained. It is proved that output of the finished products depends on the type and ratio of used offal, which, in their turn, have different moisture- and fat-retaining abilities. A higher output of finished products for sausage «With Heart» (60,1%) is found, after which goes «Domestic with Heart and Liver» (57,8%) and «Liver mix» (55,3%). It is presupposed that the output of prefabricated fat («Liver mix» – 4,7%, «Domestic with Heart and Liver» – 5,2%, «With Heart» – 5,5%) is mainly due to its amount in the recipe and is the result of its presence in peripheral layers of loaves of offal fried sausages, which directly contact with a frying surface.

It is found that organoleptic characteristics of the proposed offal fried sausages meet necessary requirements. Mass fraction of moisture in finished products is determined. It is shown that it correlates with quantitative data of the technology: the highest content of water is characteristic for sausage «With Heart» (45,4%). Mass fraction of culinary salt in the range of 3,1–3,3% is identified, which does not exceed standard requirements for fried sausages.

Keywords: offal fried sausages, liver, heart, output of finished products.

THE STUDY OF HYDROCOLLOID MIXTURES’ FUNCTIONAL PROPERTIES

N. Kamsulina, N. Murlykina, A. Budarina, M. Pohorielov, P. Bondarenko

The stability of the production and economic state of the meat industry enterprises, their ability to operate in the conditions of competition are largely determined by the quality level of their products and its value. On the base of Ukrainian market of meat products analyzing, it is possible to make conclusion that emulsion type products occupy 60–70% of the market volume.

The implementation of technological solutions for the production of food products with the addition of emulsifiers and stabilizers is one of the effective ways of ensuring the stability of meat emulsion systems. Modern resource-saving meat products technologies provide using of various food additives which improve the
organoleptic, structural and mechanical, physicochemical indices of finished food products. For this purpose, hydrocolloids are actively used along with phosphates and emulsifiers; hydrocolloids are food additives which include wide range of substances which can improve the structural and mechanical indices of products. These ingredients act as thickeners, gel formers, structure stabilizers. Due to the fact that the use of hydrocolloids separately does not provide wide range of properties, we plan to consider the synergism, the effects of various hydrocolloids during combined use.

One of the priority ways of stabilization and improvement of functional and technological properties of the initial meat raw material is the use of polyfunctional additives which contain the phosphate part, hydrocolloids complexes, vegetable and animal proteins. A wide nomenclature series of these mixtures is formed both by different producers and brands within the limits of one producer. All above-mentioned stipulates the necessity of grounded production of the most effective mixtures with taking into account their composition, functional and technological properties and their action in particular technological process. Hydrocolloids mixture use allows changing the functional and technological properties of emulsion systems, producing products with low caloric content, while it improves the organoleptic, structural and mechanical properties and increases the moisture-retaining property of the emulsion type products.

During the research, the penetration degree of various types of hydrocolloids model compositions gels which are used in the production technological process of emulsion type meat products was analyzed. The obtained data allow recommending the use of vegetable origin hydrocolloids in the composition of complex mixtures for the emulsion meat products production.

**Keywords:** hydrocolloids, prickling, proteins, polysaccharides, mixtures, functional properties.

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**THE SPEED OF COOLING SWEET PEPPER FRUIT OF TECHNICAL STAGES OF MATURITY**

V. Koltunov, K. Kalaida

The pepper fruits are different in size, weight, diameter, length, wall thickness, and also have a different chemical composition, energy value, which widely varies: technically ripe fruits contain the dry matter in the range of 8.1–15.1%, the amount of sugar is 1.7–6.9%, and the biological ripe fruit, respectively, of 8.9–15.0% and 2.5–7.0%.

Quality control of fruits is carried out according to DSTU 2659-94, in the EU countries using the UNECE standard FFV-28, in Ukraine there is an analogue of DSTU UNECE FFV-28:2007. All standards define the quality of the fruit, which are typical of this cultivar, but does not define the requirements for the chemical composition of fruits, their thermal and physical characteristics, which have a crucial role not only for food, but also as storage object.
The research objective is to define the speed of cooling of pepper fruits different in size and weight, and therefore their thermal capacity.

The thermal capacity of fruit depends on dry matter content. If the dry matter content is 8.1%, follow the formula V.Z. Zhadan thermal capacity of pepper fruit gonna be 3.96 kJ/kg·K, and if the content of 15.1% of dry matter – 3.77 kJ/kg·K, at temperature +25°C the pepper fruit will contain a 99.0 kJ/kg of heat, in the second pattern – 94.25 kJ/kg. In the first pattern, 1 t of pepper fruit will contain 99000 kJ of heat, in the second – 94250 kJ, or on 4750 kJ less, so their cooling in the fridge require less energy.

Heavy and large in diameter fruits (200 g, 75 mm) reduce temperature to 0°C within 130 min. Difference in weight by 28 g between the first and second fruit, the first and third fruit – 106 g, respectively, the duration of cooling was on 10 min longer.

Warming-up of fruit became faster. For warming 1 and 2 fruits need 120 min, 3 fruit – 60 min, so, warming-up of small sweet pepper fruits pass twice as fast, just as was observed sweating fruit, with intense formation on the surface "infectious droplets".

**Keywords:** sweet pepper, speed of cooling, warming-up, thermal and physical characteristics of sweet pepper, storageability, temperature, thermal capacity.

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**SEMI-FINISHED BISCUIT OF HIGH NUTRITIONAL VALUE WITH THE ADDITION OF FLEXSEED MEAL**

O. Gumieniuk, O. Gorodyska, M. Kseniuk

The article substantiates the need to enrich flour confectionery products with additives of plant raw materials containing dietary fibers, minerals and vitamins. As a possible component for improving the nutritional value of biscuit products, a linseed meal has been chosen. Flaxseed meal (fat-free flaxseed meal) is one of non-traditional source of nutrients that can be used in baking to improve the nutritional value of products. Flaxseed meal contains a large amount of nutrients and minerals, vegetable protein, B vitamins, macro- and microelements (potassium, magnesium, zinc, manganese, iron, molybdenum, copper, selenium, etc.), dietary fiber, antioxidants (lignans). Based on the literature sources, the analysis of the chemical composition of flax seeds has been made, with the identification of a specific biological effect and the functional properties of its constituents. Fibre of flaxseed meal, the component which gives volume and form to the majority of foodstuffs, is not hydrolyzed in the digestive tract; during the digestion process, fibre retains water and impedes cholesterol absorption. The researches on influence of the additive of flax flour on quality indicators of a biscuit semi-finished product have been carried out. The supplementation of flaxseed flour up to 4% showed no deleterious effect on the sensory attributes of biscuits. It has been established that
the addition of flaxseed meal in an amount of 2% increases humidity of the finished products, but does not impair their structural and organoleptic properties, so it can be considered optimal.

**Keywords:** biscuit semi-finished product, flaxseed meal, biological and nutritional value, organoleptic quality indices, humidity of biscuit products.

**INVESTIGATION OF QUALITY OF DRY EXTRACT ROOT OF GINGER**

**K. Rubanka, V. Terletskaya, A. Abramova**

The article presents the advantages of vegetable extracts over fresh plant products and the advisability of using them in the food industry as a food fortifier of food, natural coloring and flavoring. These prospects use the root extract of ginger, as part of the food recipe to create a functional product. The quality of dry ginger extract obtained by fractional maceration using water as an extract was analyzed. Changes in the chemical composition of the dry extract in the process of its production are described, namely, 10% reduction in carbohydrates, 24% organic acids, 42% simple phenols, 45% ascorbic acid and complete loss of proteins, whereas flavonoids, tannins, vitamins P and B$_2$, on the contrary, increases by 7 – 40% in proportion to the source material used (dry ginger root). Analyzed changes in vitamins and minerals. A large increase in mineral substances is due to their resistance to high temperatures. The results of calculations of the nutritional value are given: for K – 154%, Na – 45%, Ca – 46%, Mg – 187%, Fe – 240%, Cu – 136%, Zn – 130% and maximum for Mn – 613%. For vitamins such as ascorbic acid, vitamin P and B$_2$, the nutritional value of dry ginger extract was 105%, 202% and 98%, respectively. The safety of the raw materials and the dry extract extracted from it in terms of the content of heavy metals and arsenic was established, and the results of studies of their changes in the production of dry extract of ginger root were presented.

**Keywords:** ginger, dry extract, food value.