The paper reports the newly developed technology of sour-milk desserts that uses the consortia of lactobacilli – Acidophilus, S. Thermophilus, and bifidobacteria – B. Bifidum, B. Longum, B. Adolescens, resist to the effects of inhibitors – gastric juice, bile, phenol, sodium chloride, antibiotics, and lactic acid.

To better develop the bifidobacteria, bio-stimulants were applied. The number of viable cells of bifidobacteria during 6 hours of fermentation in the presence of fructose increases from 1·10³ CFU/cm³ up to 8.8·10⁸ CFU/cm³, of lactulose – to 9.9·10⁸ CFU/cm³.

To obtain a structure resistant to delamination, with a glossy surface, the modified starch was used. The dynamic viscosity of the experimental samples is 25·10³ PAs, the number of viable cells of bifidobacteria is 2.5·10⁰ CFU/cm³.

Pasteurization at a temperature of (90±2) °C at a 2-minute aging warrants the safety of a milk mixture.

The formulation and technology for dessert fermented products with a fruit-berry dressing have been developed. The obtained product clots are dense, their consistency is homogeneous, gentle, gel-like, moderately thick. The taste is pure, pleasant, with a color, flavor, and smell of the fruit-berry filler.

After 10 days of storage, the number of viable cells of bifidobacteria is 1.5·10¹⁰ CFU/cm³, after 15 days – 9.5·10⁹ CFU/cm³, which significantly exceeds the standard required level of bifidobacteria in fermented milk products. The optimal shelf life of dessert products at a temperature of (3±1) °C without a change in the rheological properties is 15 days.

The use of lactic acid bacteria with bifidogenic properties extends the range of products capable to normalize the imbalance of intestinal microflora in humans and to stimulate own intestinal microflora.

Keywords: prebiotics, probiotics, bifidobacteria, lactobacilli, fruit-berry dressing, thickeners, fermented sour-milk desserts.
The daily increasing demand for meat products with original taste properties causes the need to improve processing of meat raw material. This applies not only to the technology of preparation of raw material, for example its preliminary keeping in various marinades and spices. It is the equipment for manufacturing crust-free meat products that is of great importance.

The proposed innovative solution for the development of the plant for low-temperature treatment of meat products by infrared radiation has some design and technological features. Mobility and portability are ensured thanks to easy movement in space. The use of a flexible film resistive electric heater of the radiative type ensures an even distribution of the heat flow and makes it possible to repeat the internal geometry of the operating chamber of the plant. The designed equipment is capable to operate in a sparing low-temperature treatment mode (63...85 °C) with simplified automation of the technological process. The feature of the plant is the ability to use secondary heat coming from the working space of the plant, by absorbing it by the absorbing screen. Its further transformation by conductive heat exchange between the absorbing screen and Peltier elements provides two structural advantages at the same time. Firstly, there occurs low-voltage of supply, which is used for the operation of exhaust fans. It was established that this voltage is provided when the temperature of a meat product reaches the range of 30...35 °C. Secondly, the internal technical space cools down because the temperature of the outer surface of Peltier elements is 10...15 °C. Thus, there is no need for thermal insulation of the plant.

It was found that for tender pork, the treatment temperature is 53...80 °C with the duration of 5.0...8.0 hours; 55...80 °C with the duration of 4.5...6.0 hours for poultry; 55...80 °C with the duration of 5.0...8.0 hours for tender tough; respectively, 58...83 °C with the duration of 5.0...10.0 hours for tough beef. Degustation results prove the original functional and organoleptic properties and the effectiveness of using the plant.

**Keywords:** meat semi-finished products, low temperature, IR-radiation, mobility, portability.

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The paper reports a comprehensive study into the impact of feeding rations and breed of cows on the technological properties of milk and quality characteristics of the Dutch type of cheese. Despite the abundance of information on the relationship between domestic animal feeding and technological parameters for the production of cheeses, a possible relationship between particular properties of animal breeds, changes in feed, and a positive influence on the quality of products requires in-depth research. That explains the relevance of studying the influence of an animal breed and the optimization of animal feed on a set of technological parameters and quality indicators for the Dutch type of cheeses. We manufactured the Dutch-type cheese in a series of experiments using milk from cows of different breeds, obtained at different rations of feeding. We compared the chemical composition of milk from three groups of cows – the Ukrainian brown dairy breed, Lebedinskaya breed, and Simmental breed, at different feed. The results obtained demonstrate that the use of alfalfa haylage contributes to an increase in the mass share of a dry fat-free milk residue in milk, improves its suitability for cheese, as compared with milk obtained over a silage-hay period.

We have worked out technological modes for producing the hard Dutch-type cheese from milk of three cow breeds at different feeding rations. It is shown that when applying alfalfa haylage to feed animals the duration of basic technological operations shortens. That helps reduce the share of dry substances (including fat) in whey, and increases the output of finished product. The samples of hard Dutch-type cheese, made from milk of all three groups of animals over a haylage-hay period are characterized by a high content of essential amino acids, as well as free amino acids, and soluble non-protein nitrogen. That predetermined their higher degree of ripeness, and the larger point-based assessment, in terms of organoleptic characteristics (by 7–15 points), compared to the samples of cheese produced from milk received over a silage-hay period. The highest point-based estimate for organoleptic characteristics (99 points) was given to samples of the Dutch-type cheese made from milk of the Ukrainian brown dairy cow, milked over a haylage-hay period.

It was established that an animal breed has a significant impact on the suitability of milk for cheese and yield of the finished product. The most significant influence of the optimized feeding was exerted on the organoleptic and sensorial indicators for a Dutch-type cheese. The proof are the indicators for proteolytic activity. There was an increase in the growth of nitrogen within soluble fractions, an accelerated maturation process, as evidenced by the accumulation of low-molecular nitrogenous fractions. The largest total amount of free amino acids was demonstrated by cheese made from milk of the cows that were fed the improved ration using alfalfa haylage.

The developed feeding rations, as well as the improved technological parameters for making a Dutch-type cheese, could be recommended as the cost and product quality management methods for producing mass-market and craft cheese.

**Keywords:** Dutch-type cheese, amino acid composition, suitability of milk for making cheese, alfalfa haylage, optimization of feed.

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difficult to distinguish taste and texture of parsnips with a growing season from 120 to 180 days. Therefore, the influence of the degree of ripening on the preservation quality of parsnip root crops is of great practical interest.

We substantiated theoretically and confirmed experimentally the smallest mass loss (5.0–6.7 %) and the highest preservation quality (93.3–90.3 %) in parsnips with a growing season of 150 days. Within the growing season of 140–175 days, growing season duration affects preservation of parsnip root crops by 21.0 % more, characteristics of a variety – only by 1.1 %, the interaction of the studied factors – by 68 %, other factors (weather conditions, growing technology) – by 9.9 %.

We found that diseases affected unwashed root crops stored in open boxes by 0.7 % more than washed ones. Storing of washed root crops in plastic bags increased their pronoeness to diseases by almost 3.5 times than unwashed ones. Dry substances accumulated from 24.1 % in root crops of parsnip (in the Petrik variety) to 27.7 % (in the Student variety). We noticed the high content of dry substances in the Boris variety – 25.8 %. The Petrik variety contained 1.2 % of monosaccharides, 3.7 % of sucrose, and 5.0 % of total sugars. The total sugar content in the Boris variety of 5.4 % was at the level of control. The largest total amount of sugars was contained in the roots for the Student variety – 5.7 %. We established that the lowest content of vitamin C in root crops was in the Petrik variety – 9.9 mg/100 g, the content of vitamin C was 10.1 and 10.2 mg/100 g in the Boris and Student varieties, respectively. The nitrate content in parsnip roots was low for the Student variety – 60 mg/kg, and it was the highest for the Boris variety – 100 mg/kg.

We established that the mass loss of parsnip root crops depends on storage conditions by 33 %, peculiarities of a variety affects only 1 %, an influence of the interaction of factors (storage conditions, peculiarities of a variety) – by 64 %, other factors – 2 %. The use of a polyethylene film for packaging reduces the mass loss of root crops of the Petrik variety parsnip by 2.1–4.7 times, the Student variety by 1.9–3.7 times, the Boris variety by 2.3–3.1 times comparing to the storage of root crops in open boxes.

Keywords: parsnip root crops, ripening degree, duration of growing season, storage methods, preservation.

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The comprehensive approach to the technology of bread for people suffering from celiac disease by applying amylolytic enzymes, lecithin, and dry egg albumen was scientifically substantiated. The effect of amylolytic enzymes on sugars accumulation during the hydrolysis of rice flour starch was established. It was proved that the use of enzymes contributes to the formation of mono- and disaccharides in quantity of 3.5–6 %, which are essential for the intensification of microbiological processes in dough. The improvement of gas production in dough during the application of the enzymatic modification of flour starch during fermentation was detected.

With the aim of improving the quality of the dough semi-finished and finished products, the expedience of using surfactants was substantiated. The regularities of the influence of sunflower defatted lecithin on properties of dough and quality characteristics of bread with enzymes were determined. It was established that the introduction of phospholipid into dough using the enzymatic modification of starch flour contributes to the improvement of gas formation in it and causes an increase in specific volume and porosity of finished products.

To ensure the porous structure of the crumb, the additional use of dry egg albumen in the technology of rice bread was proposed. It was established that the preliminary recovery of albumen when making dough with enzymes and lecithin contributes to its better leavening, which provides high quality indicators of the finished products.

It was proved that the use of sunflower defatted lecithin and whipped egg albumens during dough kneading with previously conducted hydrolysis of starch flour by α-amylase and glucoamylase leads to a significant increase in its gas-retaining abilities and contributes to increasing its running. Given the reduction in viscosity of the dough with the addition of selected raw materials, it is recommended to manufacture pan bread.

The influence of application of the enzymatic modification of rice flour starch, lecithin, and egg albumen on the process of gelatinization of water-flour suspensions was studied. The identified regularities make it possible to predict an increase in the shelf life of the finished bread.

Keywords: gluten-free bread, rice flour, α-amylase, glucoamylase, lecithin, egg albumen.

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EFFECT OF THE CRYOPOWDER “BEET” ON QUALITY INDICATORS OF NEW CURD DESSERTS (p. 52-59)

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Natural plant bio-additives deserve special attention, because due to their natural properties they provide dairy products with functional properties. The use of such additives makes it possible to fill the shortage of essential nutrients, increase non-specific resistance of an organism to the effect of unfavorable environmental factors. A skillful combination of cryopowders and the dairy base are very promising both in technological and social terms.

The technology of curd desserts with varying fat mass fraction using the cryopowder “Beet” was developed. The expedience of using the cryopowder “Beet” in the technology of new sweet curd mass was substantiated. The optimal dose of the cryopowder “Beet” was proposed. The possibility of using the cryopowder “Beet” as a component of health promoting curd desserts was studied. The amount of the specified cryo-additive varies depending on the fat mass fraction of the dairy base. The organoleptic, physical, chemical and microbiological characteristics were studied in the experimental samples. An analysis of organoleptic characteristics of curd masses with the cryopowder “Beet” shows that they did not have any substantial changes and fully comply with regulatory requirements. Thus, the color of the sweet curd mass was light-beet, raspberry with separate white inclusions of crushed powder-like cryogenic bio-additive. The curd masses retained the smell of fresh sour milk. When introducing the cryopowder “Beet” into the curd mass, the energy value grew.

The revealed changes in the amino acid composition of curd masses indicate that the use of cryopowder “Beet” makes it possible to enhance nutritional and biological value of the protein component. In particular, we established an increase in the total amount of amino acids by 1.73 %; by 1.16 % in the composition of essential amino acids, and by 2.17 % in the composition of non-essential amino acids.

The proposed product expands the domestic range of dairy products for functional purposes.

Keywords: curd mass, cryopowder, amino acids, organoleptic indicators, titrated acidity, health promoting products.

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DEVELOPMENT OF FORMULATIONS FOR SPONGE CAKES MADE FROM ORGANIC RAW MATERIALS USING THE PRINCIPLES OF A FOOD PRODUCTS SAFETY MANAGEMENT SYSTEM (p. 60–70)

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To control the safety of sponge cakes made from organic raw materials in line with the HACCP principles, we have developed two sample sponge cakes “Winter delight” and “Exotic”. To make the semi-finished sponge cake “Winter delight”, we used organic buckwheat flour, organic powdered ginger, organic maple sugar, organic eggs, organic peppermint essence. To make the semi-finished sponge cake “Exotic”, we used organic spelt flour, organic hemp flour, organic powdered rosehip, organic coconut sugar, organic eggs, organic lemon-based essence. It was established that the products developed have high organoleptic properties. Among the physical-chemical indicators, we identified moisture content in both products, which was 25±2 % for the semi-finished sponge cake “Winter delight” and 24±2 % for the semi-finished sponge cake “Exotic”. The nutrient and caloric value of products was determined. The amount of proteins for the sponge cake “Winter delight” was 14.4 g/100 g, for “Exotic” – 15 g/100 g, the amount of fat – 3.80 and 4.40 g/100 g, the amount of carbohydrates – 50.41 and 55.40 g/100 g, caloric value – 298.84 and 315.80 kcal/100 g, respectively.

The HACCP-based plan for the production of sponge cakes makes it possible to manufacture a safe product: we analyzed dangerous factors at each stage of the production process, it was found that the highest degree of risk is inherent to biological factors that might affect the safety of the finished product. We established 4 critical control points, as well as critical boundaries, and designed a HACCP-based plan. We defined the microbiological and toxicological safety indicators for finished products; they do not exceed permissible limits.

These results indicate that the use of alternative formulations for semi-finished sponge cakes based on organic raw materials taking into consideration the HACCP approaches makes it possible to create safe products with elevated nutritional value. The results obtained could be applied at enterprises in confectionery industry in order to extend the range of organic products. In addition, given the requirement to implement the HACCP system by all operators in the market of foods, the results of developing the HACCP plan could also be utilized by manufacturers.

**Keywords:** safety management system, organoleptic indicators, physical-chemical, nutritional value, caloric value.

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