ABSTRACT

of the dissertation work by Iztileuov Maxat on the topic “ Developing standards for cow and mare milk combination products ” submitted for the degree of Doctor of Philosophy (PhD) under the specialty 6D073200– “Standardization and certification (by industry)”

Relevance of the research topic. The address of the head of state K. K. Tokayev to the people of Kazakhstan with the address" strategy Kazakhstan-2050: a new political course of the established state" defined the strategic goal of joining the top 30 most developed countries of the world, as well as increasing the life expectancy of Kazakhstanis to 84 years.

Currently, according to WHO estimates, Kazakhstan has not taken the necessary measures at the state level to reduce the consumption of sugar and trans fats.

Kazakhstan recent years are characterized by the rapid development of the functional products market, the wellness effect of which is associated with the high content of functional food ingredients and its constant use.

Dairy raw materials are the most suitable basis for creating a line of functional products. The use of beneficial properties of dairy and plant products in combinations allows us to obtain harmonious composites in composition and properties.

The combination of the nutritional value of yogurt with the unique dietary properties and easy digestibility of mare's milk in one product can dramatically increase the consumer properties of this product and expand consumer demand, including children and the elderly.

Studying the basic principles of the formation of composite products based on cow’s and mare’s milk with the addition of plant fillers, as well as the process of producing dairy products with high nutritional value and great functional effect, will not only impact the sustainable development of food production, but will also provide customers with a new range of products with improved characteristics.

Determining the quality criteria of such an innovative product and developing an organization standard reveals the relevance of the dissertation topic. Therefore, the development of yoghurt technology using mare's milk is an urgent problem with significant socio-economic consequences.

A review of the literature in publications based on the results of research work obtained by adding additives of various origins to dairy products shows the relevance and purposefulness of the production of composite products. The high quality of vegetables grown in Kazakhstan, in terms of the content of vitamins and minerals, influences the dynamic and intensive development of production in this direction.

The hypothesis of the work is based on the assumption that the study of the optimal combination of plant and dairy components, as well as rational methods of their processing, will make it possible to obtain a product of high biological value

that will partially compensate for the lack of protein and polyunsaturated fatty acids in the population's diet.

The purpose of the dissertation research. The purpose of the study is to develop a new type of yogurt made from combined raw materials based on Mare's and cow's milk with the addition of pumpkin pulp in order to expand the range of dairy products and improve quality indicators, study the quality indicators of finished products and fix the parameters of the processing process.

Objectives of the study:

1. Study of regulatory documents on the topic of the dissertation (international standards: ISO, Codex Alimennarius and technical regulations of the countries of the customs union);
2. Study of the influence of pumpkin tissues on the structural properties of yogurt, the process of clotting;
3. Study of compounded milk pumpkin-the fatty acid content and nutritional value of milk yogurt
4. Determination of consumer preferences of yogurt made from combined milk with pumpkin by hierarchical analysis
5. Determination of the shelf life of a new lactic acid product
6. Determination of economic indicators of yogurt made from a combined milk-pumpkin mixture and development of a draft standard of the organization.

Justification of the novelty and practical value of the results obtained.

Scientific novelty: based on a comprehensive study of the chemical composition, physicochemical and qualimetric indicators of dairy-vegetable yogurt based on pumpkin, mare's milk and cow's milk, the quality parameters of the new product were approved. It was found that no syneresis was observed in yogurt obtained from thermal processing by keeping mare's milk at 70^0C for 10 minutes, cow's milk at 90^0C for 10 minutes, pumpkin soft at 95°C for 5 minutes. For the first time, the technological parameters of obtaining a lactic acid product with a high weight share of dry matter were substantiated by choosing the optimal combinations of Mare's milk, cow's milk and pumpkin soft. The scientific novelty of the study is confirmed by a utility model patent of the Republic of Kazakhstan.

Practical value. At the research level, a utility model Patent No. 6735 "Method of making yogurt with pumpkin" and the organization standard "Pumpkin yogurt with milk" were developed and approved for the method of making yogurt with pumpkin.

The yogurt sample with pumpkin (mare's milk - 25%, cow's milk - 75%) had a high protein content, the mass fraction of leek by mass fraction of fat, as well as the control sample No. 6, developed with the addition of pumpkin to pure cow's milk, were at the highest level, which is due to the high mass fraction of fat in cow's milk. There were no significant differences in the mass fraction of carbohydrates and ash content in all samples.

The pectin and sugar contained in the pumpkin pulp mix with the yogurt, increasing its consistency and viscosity, resulting in a pleasant mouthfeel. Pectin is reabsorbed by casein and increases spatial repulsion, which reduces aggregation.

When analyzing the fatty acid composition in yogurt obtained by adding mare's milk to the milk formula, the amount of polyunsaturated fatty acids increased, and the amount of saturated fatty acids decreased. In particular, the linolenic acid content in yogurt with a high proportion of cow's milk was 0.77%, and in yogurt with a high proportion of mare's milk - 2.83%. Overall, yogurt contains 60.39% saturated fatty carboxylic acids and 39.46% saturated fatty acids. The ratio of unsaturated fatty acids to saturated fatty acids is 0.64. We paid attention to the composition of palmitoleic acid, which is not found in cow's milk yogurt. Thus, the results obtained confirm the valuable nutritional properties of yoghurt based on mare's milk.

The chemical properties of the resulting product have improved, including the amount of protein, fat content, raw leeks, and available carbohydrates. By adding pumpkin pulp to mixed milk, the pH value decreased and the acidity of the finished yogurt increased ($P \leq 0.05$). The content of β-carotene and water-soluble vitamins was significantly higher in mixed milk-pumpkin yogurt compared to the control sample.

According to consumer preferences, studied by hierarchical analysis, the importance of the taste index formed by adding pumpkin to mare's and cow's milk prevailed. The results of the expert assessment and analysis of the assessment result by the hierarchical method showed that preference was given to choosing a sample of yogurt with the addition of 10% pumpkin pulp to a mixture of mare and cow milk in a ratio of 25/75, respectively.

The shelf life of fresh milk-pumpkin yogurt is 21 days if stored at a temperature of 0-60c.

The technology for the production of yogurt, developed with the addition of pumpkin pulp to a mixture of Mare's milk and cow's milk, was aromatized and put into production at the «LF Company».

Due to the unique biological value of mare's milk, due to the enrichment with a plant mixture, it was possible to obtain a new product with increased beneficial properties and improved consumer properties.

Due to the development of technology for the production of dairy products based on cow's and mare's milk with natural fillers for dietary nutrition, the range of domestic dairy products on the market has changed.

During the research, the recipe and production technology of a new lactic acid product with the addition of pumpkin pulp to a mixture of mare and cow milk was optimized. As the viscosity of the milk mixture increases in the process of acidifying the milk during kneading, during the time it reaches the gelation point, when the food system remains in a state of long-term rest during kneading, part of the pumpkin pulp sinks to the bottom. It has been established that to reduce the degree of

sedimentation of fine particles of pumpkin pulp, a tank method for producing yogurt should be used.

Regulatory documents prepared based on the results of the work are introduced into domestic milk processing plants and used in the educational process in the process of training students under the educational program "standardization and certification".

Personal contribution of the author. Implementation of the theoretical and experimental part of the work, analysis of literary data, justification of the use of Mare's milk and pumpkin crops in the production of lactic acid products, Planning and conducting experiments, statistical processing of the results obtained and their publication, industrial testing of the proposed yogurt product made from cow's and Mare's milk with pumpkin; participation in the development of regulatory and technical documentation.

Compliance with state programs and areas of science development: resolution of the Government of the Republic of Kazakhstan dated November 24, 2022 No. 945 on approval of the concept of health development of the Republic of Kazakhstan until 2026.

Scientific principles proposed for protection:

- justification of the use of a mixture of Mare's milk, cow's milk and pumpkin puree in the production of yogurt;
- technology of yogurt made from a combined milk-pumpkin mixture;
-fatty acid composition, nutritional, biological and energy value of yogurt made from a combined milk-pumpkin mixture.
- hierarchical analysis of consumer preferences of yogurt made from combined milk with pumpkin;
- determination of the shelf life of a new lactic acid product
-standardization of quality parameters and production processes of yogurt made from a combined milk-pumpkin mixture.

Approbation of the work. The research results were tested in laboratory and production conditions. Both conventional and modern methods of statistical data processing were used to confirm the results of the work. The research results were published in scientific journals with an impact factor above zero, and presented at international scientific and practical conferences. All results and conclusions presented in the dissertation work were obtained and formulated with the direct participation of the applicant in accordance with the doctoral student's individual research plans. The doctoral student mastered modern research methods, took an active part in the discussion and publication of the results obtained, preparation and design of a scientific article for publication in domestic and foreign scientific journals.

Publications. 9 scientific papers have been published on the topic of the dissertation, of which 1 article was published in the journal "Food Production, Processing and Nutrition" (impact factor 6.9, Q1, Agricultural and Biological

Sciences/Food Science percentile 81), included in the Scopus database, 2 in international scientific and practical conferences and 6 in those recommended by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan.

The structure and scope of the dissertation. The dissertation consists of an introduction and four sections, a conclusion, a list of references and applications. The main part of the work is presented on 137 pages, there are 24 drawings and 44 tables. The list of used literature consists of 206 titles.