

ABSTRACT

**of dissertation work
of Botagoz Ongdasynkyzy Kulzhanova on the topic "The scientific
bases of the technologies of national food from sheep milk", submitted for the
degree of Doctor of Philosophy (PhD) on specialty 6D080200 "Production
technology of livestock products".**

Relevance of the research topic: Sheep breeding is considered one of the leading branches of animal husbandry in Kazakhstan, and its products provide the national economy with raw materials (wool, karakul lambskin, sheepskin, leather), and the population with food products (meat, fat tail oil, milk, etc.).

In Kazakhstan, 16 breeds of sheep of different productivity are raised. These are fine-wool (fine-fleece) (Kazakh fine-wool, South Kazakh merino, North Kazakh merino, meat merino, Kazakh arkharomerino), semi-fine-wool (Kazakh crossbred semi-fine-wool, Kazakh meat semi-fine-wool, Akzhaik meat-wool), semi-coarse-wool (Kazakh fat-tailed semi-coarse-wool, Degeres fat-tailed meat semi-coarse-wool), meat-fat coarse-wool (Edilbay, Kazakh fat-tailed semi-coarse-wool, Saryarka, Ordabasy), karakul (Karakol, Kazakh kalakul meat-fat) breeds of sheep.

Of course, all the mentioned breeds of sheep can satisfy domestic and foreign needs for the production of sheep milk. Sheep milk is a valuable food product, easily digestible by the human body and containing all the necessary substances. It contains 18 amino acids, which are very useful for the human body.

Since ancient times, the Kazakh people knew that sheep milk is very useful for the human body, and often consumed it in everyday life.

Sheep milk has a higher fat content compared to the milk of other animal species. For example, the fat content of mare's milk is 1.0%, cow's milk - 3.2%, sheep's milk - 6.7%. The composition and properties of sheep milk depend on various factors: sheep breed, age, lactation period, season, feeding level, care and health of the ewe.

According to A.M. Ombaev (2003), the highest milk yield (41.0-43.5%) in the Karakol breed of sheep is observed in the first month of milking. During this period, the average daily milk production was 450-500 grams, the maximum milk yield occurred at the age of 3-5 years, and the average milk yield of adult individuals during the lactation period was 62-65 kg. The milk content of those who gave birth to twins was 0.2-0.3% higher than that of those who gave birth to one lamb, and the fat content was 7.7-8.0%. In general, when the lambs are 3 months old, milking the ewes does not cause any harm to the condition and development of the lambs. The chemical composition of sheep and cow milk is completely different. Sheep milk contains 1.4 times more dry matter, 1.8 times more fat and 1.7 times more protein than cow's milk. Freshly milked sheep milk has a characteristic smell. This is due to the high content of saturated fatty acids in sheep milk.

Another characteristic of sheep milk is its resistance to low temperatures. Up to 99.1% of the protein in sheep milk is absorbed by the human body. That is, sheep milk is more complete than the milk of other animal species. Due to the high content of casein and dry matter in sheep milk, their required amount for the production of 1 kg of cheese is 1.5-2.0 times less than cow's milk.

Bringing raw sheep milk to the level of industrial production and the production of export dairy products, including domestic dairy products, leads to getting rid of dependence on imports.

To develop the market of cheeses and fermented milk products from sheep milk:

- improving the range of dairy products, including the introduction of new types of products in special and functional areas (for children's and dietary nutrition); mastering the technology of producing sheep's milk products of famous European brands;

- providing consumers with information about the beneficial properties of other products made from sheep's milk, fermented milk products;

That is why the development of technology for the production of fermented milk products and cheeses from sheep's milk obtained from Kazakh breeds of sheep, which have hypoallergenic and valuable biological properties, is an urgent task and is of great scientific and practical interest.

The objective of the study is to create technologies for the production of complete and valuable products (fermented milk products, cheeses) from sheep's milk, aimed at preserving and strengthening public health, solving social and economic problems through the use of a new raw material base.

Research objectives

- study of milk productivity of Kazakh sheep breeds of various productive directions;

- study of physicochemical, microbiological, biochemical and technological properties of Kazakh crossbreed sheep's milk, study of the effect of thermal and alternative processing modes on the microbiological properties of sheep's milk;

- study of effective compositions of bacterial starters and biotechnological processes of fermentation and milk coagulation;

- assessment of technologies and new products from the technical, economic and environmental point of view.

Scientific novelty: creating conditions for the production of sheep milk and the production of export-oriented national dairy products, which will eliminate import dependence in the dairy segment of the country, expand and develop the range of dairy products, including traditional dairy products using sheep milk. In Kazakhstan, the sphere of dairy sheep farming is not fully developed, sheep milk products are not produced on an industrial basis, their chemical and technological properties have not been fully studied. Based on this scientific work, studies of sheep milk were conducted and processing practices in Bulgaria, Greece, Italy, France, Turkey and Spain were considered.

The object of the research: sheep of the meat-fat coarse-wool Ordabassin breed (Turkestan region, Ordabassin district, «Seraly» farm), South Kazakh

merino, meat merino and Kazakh fine-wool breeds (Almaty region, Zhambyl district, Mynbayev village, farm of the Kazakh Research Institute of Sheep Breeding named after K.Medeubekov).

Methodology and research methods: The research of the dissertation was based on the achievements of sheep breeders. At different stages of the dissertation work, along with generally accepted methods (analogue, control, comparison and others), standard physiological, biochemical and zootechnical research methods were used using modern equipment and devices. The obtained results and data of the zootechnical and biochemical report (P.F. Rokitsky, 1961, N.A. Plokhinsky, 1970, E.A. Merkuryeva, 1977, O.Yu. Rebrova, 2002) were processed by the method of biometric analysis using the software capabilities of Microsoft Excel, 2010 and others. The ggplot2 (Wickham, 2016) and ggcorrplot (Kassambara, 2022) packages were used to create correlations and correlograms.

Applied significance of the research results: According to the results of the research work, for the first time in Kazakhstan, the results of the production of national products from sheep's milk will be in great demand not only among producers and processors of dairy products, but also among sheep farmers.

Products from sheep's milk, which have medicinal and preventive properties, will be in great demand in places of preschool education, health care and recreation.

The breadth of market liquidity is due to the presence of state-owned shopping malls, health care and recreation facilities, restaurants and cafes.

The main principles proposed for the dissertation defense :

- milk productivity of sheep breeds of different productivity directions;
- technological properties of sheep milk, indicators of fatty acid, amino acid, vitamin composition, suitability of cheese;
- optimal composition of bacterial starters, ensuring high quality and safety of cheese, fermented milk products;
- the result of changing the technological properties and composition of sheep milk depending on the types of processing;
- effective modes of processing sheep milk to improve the quality of raw materials in the production of cheeses and fermented milk products;
- the first optimal technological parameters of yogurt (curdled milk): (the amount of bacterial starter, rennet, the coagulation time of sheep milk protein).

Compliance of the dissertation with state programs:

The work was carried out on projects for grant financing of scientific research of young scientists "Zhas Galym" for 2023-2025 under the IRN AR19175496 project "Study of the quality of sheep milk of fine-wool, semi-fine-wool and coarse-wool productivity directions" and under the project for grant financing of scientific and (or) technical projects with a implementation period of 27 months for 2020-2022 IRN AR0885575 "Development of live yogurt technology based on milk of small cattle with encapsulated fruit and berry concentrate".

Approbation and publication of works: based on the results of dissertation research, 9 scientific publications were published, including 2 articles

in publications included in the international Scopus database, 3 articles in publications recommended by the Committee for Quality Assurance in the field of Science and Higher Education of the Ministry of Education and Science of the Republic of Kazakhstan, 4 articles were published in collections of international conferences and foreign journals.

Personal contribution of the candidate for a degree to the work: The candidate took direct part in all events during the research work, performed data obtained from sheep in each product, filled in special journals and relevant documents according to the methodological instructions. Completely statistically processed the obtained data, and disclosed the results in the sections of the dissertation. The candidate took direct part in the preparation and design of scientific publications, both in domestic and foreign editions.

Structure and volume of the dissertation: The dissertation takes up 180 pages of computer text and consists of an introduction, literature review, research materials and methods, results of own research, conclusion, proposal for production, list of used literature and appendix. The text of the dissertation contains 46 tables, 12 figures and 36 appendices. The bibliography consists of 130 sources, including 94 sources in foreign languages.