

Investigation of Technological Features and Microbiological Composition of Bioyogurt Made from Mare's Milk

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Abstract

Prospects for the use of bio-yogurt technology in large-scale production in the southern regions, especially in Southern Kazakhstan, are high. This is due to the fact that livestock farms in the region are developing at a high level, and opportunities for obtaining the main product - milk in sufficient quantity and at favorable prices are becoming available.

The article examines the lactic acid microflora, conducted cultural, morphocytological, identification studies of local strains, according to the technology of preparation of bioyogurt from Kazakh mare's milk-a lactic acidic product that traditionally occupies a place in the lifestyle of Balkars, European countries.

Keywords: lactic acid microflora, local strains, mare's milk, bioyogurt, morphocytology

The relevance of the problem. One of the urgent problems of food biotechnology is the search for new and economically affordable, high-quality and high-nutritional dairy products.

Currently, the dairy industry is interested in the introduction of technologies that insure resources and do not harm the environment. Many scientists pay attention to the production of fermented dairy food bioyogurt as an effective direction of these issues.

In a number of European countries, the production of bio-yogurt is prepared by traditional technological processes and uses active industrial strains of lactic acid bacteria.

The biological value of this food is estimated by the content of vitamins, macro-microelements, carbohydrates and lipids. However, the decisive factor is the presence of a large amount of the main and nutritious component of yogurt – amino acid reserves.

The supply of amino acids is an essential component of the cells of the human body, since it performs important functions. Thus, by participating in structural processes, it participates in spare, portable, protective, bioenergetic, regulatory, catalyzing mechanisms /1/.

Taking into account the active participation of bio-yogurt in these processes, large enterprises have been financing research related to their microorganisms for many years.

Pure protosymbiotic cultures, often selected strains of lactic acid bacteria *Lactobacillus bulgaricus* (Bulgarian bacillus) and *Streptococcus thermophilus* (thermophilic streptococcus) have been used in the biotechnological process of bioyogurt for many years.

Ailai, the number of works with scientific data devoted to biotechnological features, biochemical value, microbiological character of local strains of yogurt made from mare's milk is limited.

Practical significance of scientific work. Bio-yogurt with preservation of nutritional value is important for maintaining the normal life processes of the human body, especially the newly formed organism of newborns, timely formation and renewal of flakes with new cells, synthesis of various forms of amino acids. It is especially important that this fermented milk food promotes the synthesis of essential amino acids - which is highly appreciated by scientists and doctors.

In this regard, microbiological laboratories of many dairy industries, including Kazakhstan, are actively engaged in the issues of enrichment with valuable biological substances, especially amino acids, stabilization storage by improving biotechnological processes of bio-yogurt.

When assessing the amino acid composition of bio-yogurt, its characteristics characterizing its biological, nutritional value are studied. The effective content of essential amino acids in bio-yogurt allows it to be fully attributed to biologically complete proteins, used in biotechnological industries.

Thus, according to the industrial and Agricultural International Organization working in one of the directions of the United Nations program, the amount of essential amino acids is accepted and recommended for use in the production of feed and feed protein.

Therefore, scientific laboratories dealing with issues in this area with all producers of fermented milk products in the world use the proposed standards as a reference when assessing the biological, nutritional value of fermented milk products.

The purpose of scientific work. Taking into account the specifics of the bio-yogurt, which is made from mare's milk as an object of research and based on the fact that this drink is one of the products in great demand on the world market, we intended to study the biotechnology and morphocytology of lactic acid bacteria strains of the local bio-yogurt.

The novelty of scientific work. For the first time in the course of the work, microbiological, cultural, organoleptic examinations of the bio-yogurt products from mare's milk were carried out by private workshops with small agricultural farms located in Southern Kazakhstan, local strains of lactic acid bacteria were isolated throughout the facility. At the same time, changes were made to the technological processes that the bio-yogurt creates, and the stages of enrichment with local vitamins were added.

Tasks of scientific work.

1) Determination of the microbiological quality of products manufactured in small livestock farms, workshops.

2) systematization of technological processes for making yogurt from mare's milk.

3) study of organoleptic signs of microorganisms along the Bio-path.

4) study of morphological, cultural characteristics of microorganisms according to bio-yogurt obtained from mare's milk.

5) study of the morphology of microorganisms using various micro-preparations, photography.

Methods

Bio-yogurt products made from mare's milk were obtained as an object of research in small livestock farms, workshops in Southern Kazakhstan. The Bio-yogurt product refers to lactic acid products necessary for the normal functioning of the human body.

The following microbiological approaches were used as research methods along with the methods of biotechnology for obtaining bio-yogurt products, organoleptic control, and photofixation of micro-preparations: isolation and cultivation of colonies from the natural environment; examination of cultural characteristics; method of preparation of morphocytological micro-preparations "Gram", "Romanovsky-Gimze" /2/.

The peculiarities of the growth of the studied colonies of microorganisms are due to the presence of an important systemic feature, they were cultivated in a dense agar-agar nutrient medium, obtaining productive seedlings.

The cultural characteristics of microorganisms growing in a dense nutrient medium were studied with the following parameters: colony shape; colony face; colony edge; size; surface; optical properties; color; colony structure; consistency.

Morphocytological signs with cultural signs of germinated microorganisms were revealed, microphotographs of micropreparations were obtained.

Analysis with the results of the study.

As an object of research, mare's milk of private farms of the districts of South Kazakhstan region was used as a raw substance.

The technological works of the bio-yogurt, which is made from mare's milk, are determined and brought into the following system.

Technological line of bio-yogurt from mare's milk:

- 1) conducting a control examination of the raw substance
- 2) Pasteurization period
- 3) introduction of starter culture
- 4) Basic fermentation
- 5) bringing the acidity to 4.5-4.6 pH
- 6) continue fermentation for 4-6 hours
- 7) season the finished mass, mix with jam, more
- 8) packing process
- 9) marking process.

Further, the bio-yogurt from mare's milk was subjected to an organoleptic examination and evaluated by smell, color, taste, consistency, and the occurrence of side impurities. Five representative products of the local bio-yogurt were seized, the following conclusions were made based on the results of the organoleptic examination.

During the analysis of the conclusion of the general organoleptic examination, compared with the traditional cow's milk bio-yogurt, mare's milk bio-yogurt showed a number of differences.

For example, its density compared to yogurt made from cow's milk, fluidity and fluidity in consistency were different.

But the taste was appreciated by the smell, without any side substances. Organoleptic expert data during the analysis were evaluated on a point scale and relatively included in the table (Table No. 1).

Table 1. Organoleptic examination of bioyogurt

Sample	General view	Consistency	Taste	Smell	Color	General assessment
1	2	3	4	5	6	7
<i>№1</i>	4,7	4,3	4,7	4,6	4,5	4,4
<i>№2</i>	4,7	4,2	4,9	4,7	4,9	4,7
<i>№3</i>	4,7	4,1	4,8	4,8	4,6	4,3
<i>№4</i>	4,7	4,3	4,7	4,9	4,8	4,6
<i>№5</i>	4,7	4,2	4,7	4,8	4,7	4,3

Prospects for the use of bio-yogurt technology in large-scale production in the southern regions, especially in Southern Kazakhstan, are high. This is due to the fact that livestock farms in the region are developing at a high level, and opportunities for obtaining the main product - milk in sufficient quantity and at favorable prices are becoming available.

At the same time, the bio-yogurt contains a large amount of proteins, a wide range of vitamins, a high content of micro - and macroelements in a biologically effective form. Yogurt has a great preventive effect on the cardiovascular system, nervous system and other organs.

Biogogurt accelerates metabolism, activating normal physiological and biochemical processes in the body, preventing protein, mineral and vitamin deficiency.

In recent years, in the regions of Southern Kazakhstan, a number of livestock farms, along with cow's milk, have started producing yogurt from mare's milk.

The reason for choosing mare's milk is due to the fact that it is quickly absorbed by the human body and is used as a preventive measure for diseases of the gastrointestinal tract and liver, thanks to its antiviral and antibacterial effect, it protects against infectious diseases and increases immunity.

The discovery of a bromine element in mare's milk opens the door for use in diseases of the nervous system, such as depression.

In this regard, one of the topical biotechnological issues is the issue of biotechnological features, isolation of local, local strains of yogurt from mare's milk, microflora of Kazakh sourdough.

Therefore, we decided to choose a research paper on this topic and obtained the following results:

- 1) the technology of bio-yogurt from mare's milk has been mastered;
- 2) local strains of lactic acid microflora in the composition of bio-yogurt were cultivated and cultivated in laboratory conditions;
- 3) cultural characteristics of populations of cultural strains are given;

4) micro-preparations of cells contained in the colony were made, prenatal identification was accompanied; photographs of local strains were obtained;

5) the results achieved in the course of scientific practice are analyzed, and the presented scientific data are confirmed by an illustration obtained using microtubules.

At the first stage of the experiment, the biotechnology of bio-yogurt from mare's milk was studied and systematized.

In two queues, organoleptic expert work was carried out on the finished products of bio-yogurt, five different samples were obtained. The results were evaluated on an average approximate point scale.

In the third stage, local strains of lactic acid bacteria in the bio-yogurt were cultured in a microbiological laboratory and signs of populations were detected. So, after two days, a cultural examination was carried out on nine signs of local strains of lactic acid bacteria on a bio-yogurt product made from mare's milk, and differences in populations were analyzed for five different samples.

During the examination, the size, shape, optical properties, color, colony surface, face, edge, structure, consistency associated with uniformity were determined.

In four queues, the object of the study underwent microbiological studies. In this practice, micro-preparations have been developed, which are manufactured in three different ways: the drug "live-vital", the drug "Romanovsky-Gimze", the method of "Gram staining".

It was found that in the "living-vital" preparation, cells are arranged separately and in groups of five or six cells, forming chains. All the cells became motionless.

Large adult cells of the same size were observed in the field of view of the microscope. The forms of bacteria in micropreparations are rod-shaped, the predominant number is formed by spore-bearing compacted areas along the edges of the cell. Cells with compacted colonies were found in a bacillary morphological form.

Based on the results of the vivo-vital preparation and the data of the cultural signs of bacteria during the identification of lactic acid bacteria in the bio-yogurt sample No. 1 prepared from mare's milk, it was found that representatives of the local strain of the genus *Lactobacillus*.

Based on the results of studies of the drug Romanovsky-Gimze and the data of the cultural characteristics of bacteria, it was found that lactic acid bacteria along the bio-yogurt of sample No. 2, made from mare's milk, form a mixed population consisting of representatives of two different morphological groups.

The first group of described cells was assigned to local strains of the genus *Streptococcus* by identification by cultural and morphocytological signs.

Based on the fact that the second morphological group occurred during sporulation and consisted of bacillary rod-shaped cells, in addition, these cells were identified as local strains of the genus *Lactobacillus* based on cultural characteristics of acquired colonies.

The bacterial micro-preparation of bio-yogurt sample No. 2, made by the Romanovsky-Gimze method, was microphotographed using an Axiolab electric microscope.

During the Gram study, the thickness of the peptidoglycan cell wall was determined.

Microscopy revealed that the local strains of bacillary *Lactobacillus* and coccal relative *Streptococcus* are colored purple and belong to the gram-positive group in both. The thickness of the cell wall was about 40-80 nm in two relatives.

Conclusion

The lactic acid microflora was studied, cultural, morphocytological, identification studies of local strains of bio-yogurt were carried out using the technology of preparation from Kazakh mare's milk-a fermented milk product that traditionally occupies a place in the lifestyle of the Balkarian, European countries.

The technological features of the bio-yogurt made from mare's milk are identified and systematized. In addition, local strains of lactic acid bacteria were grown along the drink, as well as morphocytological and cultural signs were revealed.

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