

## РЕЗЮМЕ

В статье рассказывается о пищевой ценности козьего молока и произведенного из него продукта курта. В организм всасывается 95-98% его составной части. Козье молоко содержит 13,4% сухого вещества, 4,4% жира, 3,6% белка, 4,9% лактозы. Козье молоко по химическому составу ближе к коровьему. Поэтому козье молоко и произведенные из него продукты благотворно влияют на здоровье людей с заболеваниями кожи и суставов и особенно полезны при лечении желчнокаменных заболеваний, фибромиомы и детской эпилепсии.

## RESUME

The article describes the nutritional value of goat's milk and the product kurta produced from it. 95-98% of its component part is absorbed into the body. Goat's milk contains 13.4% dry matter, 4.4% fat, 3.6% protein, 4.9% lactose. Goat's milk is chemically closer to cow's milk. Therefore, goat's milk and products made from it have a beneficial effect on the health of people with skin and joint diseases and are especially useful in the treatment of gallstones, fibromyoma and childhood epilepsy.

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## TECHNOLOGY OF YOGURT PRODUCTION IN «DOS BI» LPP

### Abstract

The article describes in detail the basic concepts and terms related to yogurt production technology. This proverb deals with the main stages of yogurt production by the reservoir and thermostat method, as well as the chemical and biological conditions for the successful implementation of processes. Based on the facts stated in the essay, a conclusion is drawn about the executed proverb.

**Keywords:** *technology, production, yogurt, dairy products, raw materials, reaction conditions.*

*Introduction.* The dairy industry is most popular in agro-industrial production. The dairy industry includes the production of baby food, milk powder, butter, cheese, cottage cheese, ice cream, condensed products and especially yogurt.

Yogurt is a fermented milk product of a homogeneous creamy consistency made from pasteurized milk with the addition of vitamins, fruits, Berry fillers, sugar, flavorings and stabilizers. The bacteria needed for yeast are lactic acid streptococci, heat-loving vessels, and Bulgarian Bacillus. A special role in the flavoring of yogurt is played by the fermentation product of milk sugar, in particular diacetyl, in the process of its formation by diacetylactus bacteria (streptococci, StrDiacetillactus). Milk for the production of yogurt must be of high quality and without antibiotics, otherwise antibiotics in milk can kill the useful substances contained in yogurt [1], [2], [4].

Many enterprises for the production of milk and dairy products are being opened in the Republic of Kazakhstan. The dairy industry ranks third among the food industry sectors. According to statistics, milk production in all types of farms in 2019 amounted to 6.1 million tons, in particular, yogurt products are produced. Large yogurt factories are located in Almaty, Karaganda, Kostanai, Pavlodar and Shymkent. In order to provide citizens with yogurt products in a timely manner, each city should have dairy plants.

At the same time, one of the largest yogurt factories in the country is «Foodmaster», «BorteMilka» and the newly built «Dos Bi» plant.

The importance of yogurt production in our country. Product quality is considered as the main feature of the company's competitiveness, an increase in the standard of living of the country, and a means of solving many social problems. Fermented dairy products are of great importance in human nutrition due to their healing and dietary properties, pleasant taste, and easy absorption. They are also an important component of the diet of people of all ages, especially children and adolescents [3].

*Research methodology.* The object of the study was a yogurt product from the dairy plant «Dos Bi». In the course of this thesis, generally accepted physico-chemical and organoleptic methods were used in the study of the quality of raw materials, finished yogurt products, as well as special methods in accordance with GOST. Control of yogurt produced at «Dos Bi»LLP is carried out in accordance with St RK 1065-2002

"yogurt. General technical conditions".in accordance with the regulatory document.In addition, GOST 9225-84 "milk and dairy products.Methods of microbiological analysis", GOST 26809-86 "milk and dairy products.Acceptance rules, sampling methods and preparation of samples for analysis", GOST 10444.11-89 "food products. Methods for determining lactic acid microorganisms" standards were applied. Mathematical processing of the results of the study was carried out using the biometric method of G.F. Lakin.

At the «Dos Bi»dairy plant, yoghurts are produced in compliance with the requirements of this standard and regulatory legal acts, in accordance with the requirements of the documents (technical documents of the manufacturer, standards of the organization) in which yoghurts of a specific name are prepared.

*Research results.* To determine the organoleptic properties of yogurt, a laboratory analysis of yogurt was carried out. The color, taste, appearance and consistency of yogurt are produced in compliance with the requirements of the standard. When studying yogurt, the organoleptic indicators of yogurt correspond to Table 1.

Table1 – Organoleptic corsets of yogurt at the « Dos Bi»dairy plant

Name of the indicator	Description
Appearance and consistency	With a homogeneous, reservoir production method, the clot is destroyed, with an undisturbed clot - by the thermostatic production method, with the addition of medium-viscous, thickeners or stabilizing additives-jelly-like or cream-like. The presence of insoluble particle compounds characteristic of the introduced components is allowed.
Taste and smell	Pure, sour milk, without foreign taste and smell, moderately sweet taste (when produced with sweetening components), with the corresponding taste and aroma of the added components.
Color	Milky-white or with the intersection of homogeneous or insoluble particles, depending on the color of the added components.

According to the table, it was found that the organoleptic indicators of the yogurt product at the «Dos Bi»dairy plant meet the requirements. There was no foreign taste or smell in any yogurt [10], [13].

Yoghurts are made in these areas:

- yogurt;
- enriched yogurt.

Yoghurts are divided according to the non-dairy components introduced:

- without components;
- with components.

According to the norm of components and direction of production of yogurt products at the «Dos Bi» dairy plant, the standard norm corresponds to Table 2.

Table 2 – Standard of yogurt products depending on the norm of components and the direction of production

Name of the indicator	Norm	
Mass fraction of fat, %	Less than 0.5 (less fat)	From 0.5 to 10.0 are included
Mass fraction of protein,%, not less: -for yoghurts without components - for yoghurts containing components	3,2 2,8*	
Mass fraction of dry skimmed milk residue (SOMO),%, not less - for yoghurts without components -for yoghurts containing components	9,5 8,5**	
Acidity, ° T	from 75 to 140 is included.	
Phosphatase or peroxidase	Absence	
Product temperature at release from the Enterprise, °C	4±2	

Yogurt made with probiotics can be produced under the name bioogurt.

The permissible level of content of potentially dangerous substances (toxic elements, mycotoxins, dioxins, melamine, antibiotics, pesticides, radionuclides) in yoghurts should not exceed the requirements [9], [12].

General requirements and recommendations for conducting microbiological studies according to regulatory documents in force on the territory of the states that adopted the standard, and microbiological indicators of yogurt are indicated in Table-3.

Table 3 – Microbiological indicators of yogurt quality at the « Dos Bi»dairy plant

Name of the indicator	Norm
At the end of the shelf life, the number of dairy microorganisms ( <i>Streptococcus thermophilus</i> and <i>Lactobacillus bulgaricus</i> ) in 1 g of the product is not less than	1·10 <sup>7</sup>
The number of <i>Bifidobacterium</i> ( <i>Bifidobactericum</i> ) in 1 g of the product by the end of the shelf life is not less than	1·10 <sup>7</sup>
The number of <i>Bifidobacterium</i> ( <i>Bifidobactericum</i> ) in 1 g of the product by the end of the shelf life is not less than	1·10 <sup>6</sup>

Microbiological indicators of yogurt with quality control of yogurt. By the end of the shelf life, the norm of milk microorganisms (*Streptococcus thermophilus* and *Lactobacillus bulgaricus*) in 1 g of the product is  $1 \times 10^7$ . At the end of the shelf life, the number of *Bifidobacterium* (*Bifidobactericum*) in 1g of the product is normally equal to  $1 * 10^7$ , and at the end of the shelf life, the number of *Bifidobacterium* (*Bifidobactericum*) in 1 g of the product is equal to  $1 * 10^6$ . That is, microbiological indicators of yogurt quality meet the standard.

The number of viable cells of yeast microflora in the finished product should exceed the normalized number at the end of the shelf life, since the number of viable cells decreases due to their destruction during the storage of the product. The rate of destruction depends on the type of fermentation microflora, product storage temperature, pH values and shelf life [10], [11], [12], [14].

*Technological processes.* Production of yogurt products at the « Dos Bi» dairy plant consists of the following technological processes.

The technological process of yogurt production consists of the following operations: acceptance and preparation of raw materials and materials, normalization by oil and dry matter, purification, homogenization of the mixture, pasteurization, cooling, fermentation, introduction of fillers and dyes, fermentation, mixing, cooling, filling, packaging, labeling and storage.

Milk selected by quality is normalized by the mass fraction of fat and solids. Milk by fat is normalized in the stream by using a separator – normalizer or by adding whole milk or cream to skimmed milk. For dry matter, milk is normalized by adding powdered milk, which is restored in accordance with the current regulatory documentation. In addition, the normalization of dry matter is when you evaporate pasteurized and homogenized milk at a temperature of 55-60 °C.

At the «Dos Bi»dairy plant, yogurt is heated with normalized milk to 43±2°C, sugar is added, previously dissolved in a portion of normalized milk at the same temperature in a ratio of 1:4. The mixture is cleaned in milk purification separators, homogenized at a pressure of 15±2.5 MPA and at a temperature of 45-85°C. The prepared stabilizer is introduced into the mixture. The purified and homogenized mixture is pasteurized for 2-8 minutes at a temperature of 92±2°C or for 10-15 minutes at a temperature of 87±2°C and cooled to a fermentation temperature of 40±2°C. The mixture is fermented immediately after cooling with selected yeast (for example, in pure cultures of heat-loving *Streptococcus*, Bulgarian *Bacillus* and KD type, prepared in a ratio of 7:1:7, and then clarifies this ratio in micro-copying of the drug). The amount of sourdough administered is 3-5% of the volume of the fermented mixture, and sourdough prepared in sterilized milk is 1-3%. If symbiotic yeast is used, it is added in the amount of 1-3%, and bacterial concentrate is added according to the instructions for use of dry bacterial concentrate. Yeast is introduced into the tank for fermented dairy products when you turn on the milk mixer.

The end of fermentation is determined by the formation of a strong clot with an acidity of 95-100° T, the clot is cooled for 10-30 minutes and replaced to obtain a uniform consistency of the milk clot and prevent the release of whey. Cools down to 16-20°C are directed to filling, packaging, labeling and cooling in cold storage rooms to a temperature of 4±2°C. [33], [34], [20].

There are two technologies for making yogurt: a tank and a thermostat. The reservoir method of production is shown in diagram -1, which consists of the following stages:

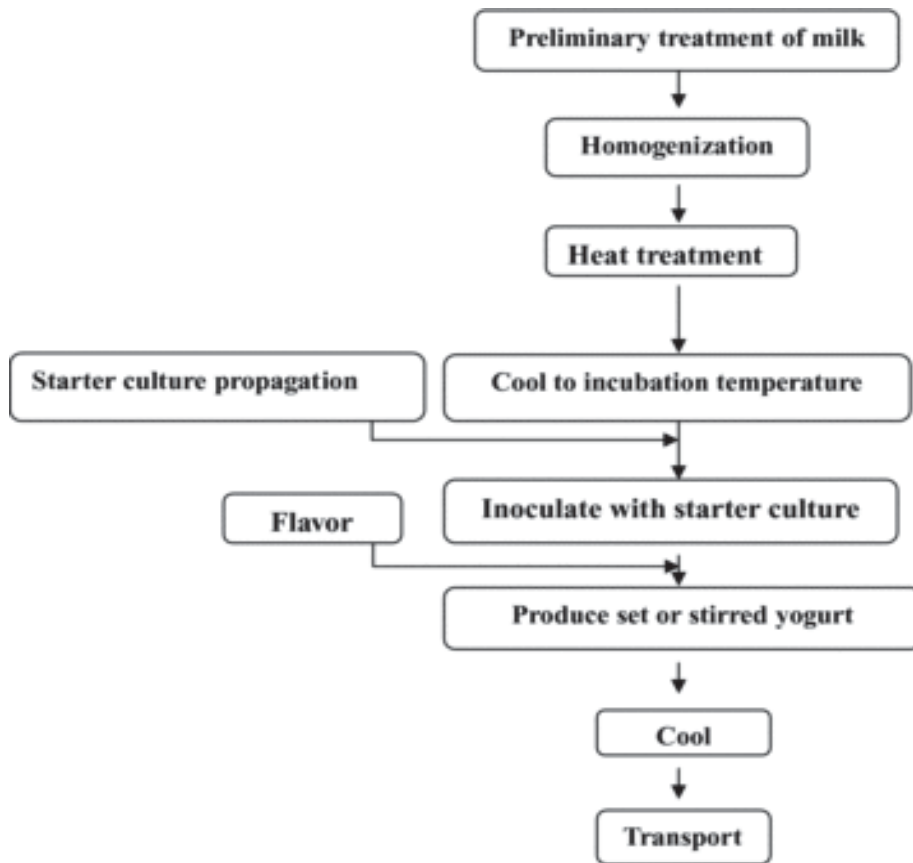


Figure 1– Technological stages of yogurt production

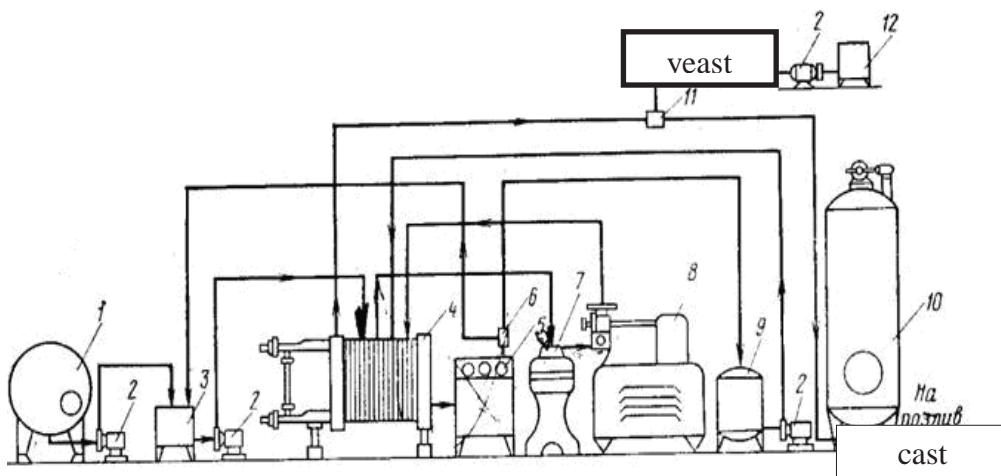


Figure 2 – Reservoir technology of yogurt production

Preparation of raw materials. Selected quality milk should be normalized by the mass fraction of fat and solids. This is done by adding cream or whole milk to skimmed milk or using a separator. Normalization of dry matter is carried out by evaporation of raw materials at a temperature of 50-55°C [15], [16], [22].

Making a milk mixture. Sweet yogurt is added dissolved sugar when heated, normalized at 40-43°C in a ratio of 1:4. Vitamin C is added to vitamin yogurt in the proportion of 180 g per 1000 kg and Sodium Ascorbate in the proportion of 210 g per 1000 kg. dyes, fruit additives and flavor fillers are also added to the normalized mixture.

Cleaning. The cleaning process takes place in separators-mixers (milk purifiers). The purified milk mixture is disinfected and sent for homogenization.

Homogenization. The milk mixture is homogenized at a temperature of 45°C and a pressure of 12 MPA. The temperature is favorable, where pasteurization takes place (65-69 degrees) [17], [18], [20].

Pasteurization. The stabilizer is introduced into the mixture and pasteurization is stirred for 10-15 minutes at a temperature of 65-95 degrees. The milk mixture is cooled and prepared for fermentation.

Fermentation. Yeast is made from microorganisms such as thermophilic substances, Bulgarian sticks, thermophilic streptococci, etc. Yeast is added to the milk mixture, making up only 3-5% of the milk product, while yeast and symbiotic yeast prepared in sterilized milk make up 1-3%. After adding, the mixture is mixed in a special bowl with a mixer for 15-20 minutes.

Transportation and storage.

1 Yoghurts are transported by specialized vehicles in accordance with the rules of transportation of perishable goods used in a certain type of transport.

2 Transportation and storage of yoghurts shipped to the far northern regions and lands equated to them - according to GOST 15846.

3 Yoghurts are stored at a temperature of  $(4\pm 2)^{\circ}\text{C}$ .

The shelf life of products is determined by the manufacturer, taking into account the requirements of regulatory legal acts in the field of food safety.

*Conclusion:*

1. Laboratory analysis of yogurt was carried out to determine the organoleptic properties of yogurt. The color, taste, appearance and consistency of yogurt are produced in compliance with the requirements of the standard. The organoleptic parameters of yogurt met the correct requirements.

2. Based on the norm of components and the direction of production of the yogurt product, studying the standard norm, the protein, milk, sugar and dyes contained in it are developed with the preservation of a certain mass.

3. General requirements and recommendations for conducting microbiological research - according to regulatory documents in force in the territory of the states that adopted the standard.

4. Production of yogurt products at the dos bi dairy plant consists of the following technological processes.

The technological process of yogurt production consists of the following operations: acceptance and preparation of raw materials and materials, normalization by oil and dry matter, purification, homogenization of the mixture, pasteurization, cooling, fermentation, introduction of fillers and dyes, fermentation, mixing, cooling, filling, packaging, labeling and storage.

5. The thermostat method involves the same stages of yogurt production, but the difference lies in the complexity of the equipment used in this method.

6. Transportation and storage yoghurts are transported by specialized vehicles in accordance with the rules of transportation of perishable goods used in certain types of transport and are carried out according to GOST 15846.

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### **ТҮЙІН**

Мақалада йогурт өндіру технологиясымен байланысты негізгі ұғымдар мен терминдер егжей-тегжейлі баяндалған. Бұл мақалда резервуар мен термостаттық әдісімен йогурт өндірісінің негізгі кезеңдері, сондай-ақ процестерді сәтті жүзеге асырудың химиялық және биологиялық шарттары қарастырылған. Очеркте айтылған фактілерге сүйене отырып, орындалған мақалда туралы қорытынды жасалады.

### **РЕЗЮМЕ**

В статье подробно раскрывает ключевые понятия и термины, связанные с технологией производства йогурта. В данной статье рассмотрены основные этапы изготовления йогурта резервуарным способом, а также химические и биологические условия для успешной реализации процессов. Сделан вывод о выполненной работе, на основе фактов, упомянутых в статье.