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Dairy Processing Technology

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Abstract
This article provides scientific information about the technology of processing dairy products, as well as the biologically active components of dairy products, their nutritional value, and the correct use of pasteurized and sterilized milk in the food industry.

Keywords: Milk, chemical composition, protein, fat, solids, pasteurized milk, sterilized milk.

Introduction

Pasteurized milk is prepared by heating raw milk to a temperature of 74-76 ℃ for 15-20 seconds. Raw milk is pasteurized in special equipment (designed to kill bacteria that have entered the milk). Pasteurized milk is cooled and placed in disinfected clean containers (bottles, bottles, paper bags with polymer coating). Dairy plants sell pasteurized and sterilized milk.

The Main Part

Pasteurized milk can be consumed without boiling. Milk from pasteurized milk without cream (fat) is also called normalized milk, that is, milk with a certain amount of fat. It contains 3.2% milk fat. Skimmed milk is prepared by adding cream. Its fat content is up to 6%. Protein milk has less fat (1-2.5%) than skim milk, but more protein (up to 5.5%), milk sugar and other components. Protein milk, which is a mixture of skimmed milk and skimmed milk, is a dietary product, mainly prescribed for patients with protein deficiency. Skimmed milk is obtained by passing skimmed milk through a separator (separating the cream). Fat in such milk does not exceed 0.05%. Vitamin C is added to non-vitaminized milk (1 kg prepared by adding 100 mg) to milk. Heated milk is prepared by boiling pasteurized milk in closed containers at 95-99 ℃ for 3-4 hours. Skimmed milk is also fat-enriched milk.

Sterilized milk is made by heating raw milk under special conditions that not only kill the bacteria that got into the raw milk but also kill their spores. Milk is sterilized at high pressure and temperature of 125-145 ℃ for 2-10 seconds. Before sterilization, the milk is homogenized, that is, the fat particles in the milk are crushed, so that it does not retain creaminess and is well digestible. After sterilization, the milk is cooled and then packed in paper bags lined with polymer film and aluminium foil under sterilized conditions. If the milk is poured into bottles after cooling, its sterility is destroyed. Therefore, the mouth of milk poured into bottles is closed and re-sterilized at a temperature of 115-120 ℃ for several minutes (such milk is called "mojaiskoe").

Sterilized milk can be stored in a hermetically sealed container for a long time at any ambient temperature. Unsterilized milk is among perishable products; it is necessary to store it at a temperature of up to 6 ℃. It is not recommended to store milk at room (room) temperature for more than one day.

In addition to pasteurized and sterilized milk, dairy enterprises produce canned milk: milk condensed with added sugar, and dry milk (skimmed and skimmed). In conditions where the

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original properties of the product can be restored from dry milk, so-called reconstituted milk is prepared in dairies. Such milk does not differ from natural milk in terms of its main chemical parameters and nutritional value. The reconstituted milk is used for drinking and the preparation of various dairy products, such as kefir, cottage cheese and smoothies.

Milk purchased from the market must be boiled, because it may contain pathogens of tuberculosis, brucellosis, anthrax, typhoid, poliomyelitis, dysentery and other diseases. It is recommended to boil the milk in a sealed container so that the milk does not burn (does not stick to the bottom), it is necessary to rinse the container in which the milk is cooked in cold water. It is not good to store milk in an aluminium container for a long time, because its taste is nauseating.

In cooking, milk is used to prepare liquid, thick ("shirkhorda") dishes, sweet dishes, "shirchoy", dough, etc. Shirkhorda, shirkhor, jelly, ice cream, sweet sauces, creams, and shirkhor are very necessary foods for diet food and baby food in terms of easy digestion. For some diseases, it is recommended to consume skimmed milk. All other dairy foods, especially dairy desserts, are usually made from skimmed milk.

Milk- products - yoghurt, kefir, "kimiz", cream, sour cream, cottage cheese, cheese, and dried milk are widely used as food products. In particular, cheese (cheese) is one of the most nutritious food products from which milk can be recycled. Due to the microbiological, enzymatic and other biological processes that take place in the preparation and ripening of the cheese, the quality of taste and nutrition is completely different from that of milk. It is a highly nutritious product due to the presence of a large amount of protein (up to 25%), milk, and fat (up to 30%). It also contains irreplaceable amino acids, vitamins A and B, PP group vitamins, pantothenic acid, calcium and phosphorus salts. Cheese is a healthy food for people of all ages, especially children. Almost all of its nutrients (98-99%) are absorbed by the human body. Depending on the content of fat and protein, the caloric content ranges from 2500 to 4500 kcal. The cheese is made from cow, sheep and goat milk. It has many varieties.

Depending on the quality of milk, its processing mode and cheese-making technology, various kinds of cheese are obtained that differ in taste, hardness or softness, and appearance. According to these signs, it has hard, soft, saltier, soft and lactic acid varieties. Cheeses are produced with 20-60% fat in dry matter (the amount of fat in the cheese can vary depending on the amount of water in it, so the fat content of the cheese is taken in relation to the weight of dry matter). In order to show the amount of fat in the hard glaze, a casein plate is placed on the rind or a stamp (stamp) is printed on the rind. A square stamp is printed on cheese with a fat content of not less than 50%, and an octagonal stamp on those with a fat content of not less than 45%. In addition to the amount of oil, the number of the factory that produced it, and the name of the district where the factory is located are also written on the stamp. The amount of fat in soft, soft and lactic acid cheeses is written on their packaging. Hard cheeses include Swiss, Dutch, Latvian and rindless cheeses. The group of soft cheeses includes such things as dorogobuj, white dessert and Roquefort. Examples of lactic acid cheeses are green, Lithuanian, Klinkovy, as well as "lyubitelsky sirok". white dessert and Roquefort. Examples of lactic acid cheeses are green, Lithuanian, Klinkovy, as well as "lyubitelsky sirok". white dessert and Roquefort. Examples of lactic acid cheeses are green, Lithuanian, Klinkovy, as well as "lyubitelsky sirok".

To make plain yoghurt, milk is pasteurized at 85–87 ℃ and cooled to 35–38 ℃, then 5% yeast is added to it and mixed well. Then it is placed in a thermostat with a temperature of 8-10 ℃ for 8-12 hours or it is well wrapped with warm materials to prevent cold from entering. After storing the finished yoghurt for another 10–12 hours at 8–10 ℃, its flavour increases, it thickens, and its quality and freshness for consumption improves.

It has a good density, as required and whey-free properties. Acidity is around 85–150 °T. The fat content of yoghurt should not be lower than 3.2 per cent. Otherwise, its quality will be negatively affected.

Skimmed or skimmed milk is used to make kefir. Pasteurized milk is added to kefir yeast. It is also recommended to use dry milk (milk flour) when preparing kefir. In general, kefir is a mixed fermentation product. To make kefir, milk is pasteurized at around 85–95 ℃ and cooled to 16– 24 ℃, then 3–5% kefir yeast (yeast) is added. It can be stored at a certain temperature (35-45 ℃) for 16-20 hours before. Even if the temperature is +5 ℃ and kefir is stored for five days, its quality will not be affected.

The acidity of kefir can be up to 90°-120°T according to its production technology. Its colour is white, yellowish, its smell is reminiscent of pure, liquid cream. Kefir can contain from 0.2% to 0.6% depending on its category. Quality kefir is digested quickly.

Preparation of “kimiz”. Qimiz is made from colostrum whose acidity is not higher than 6°T. For this purpose, milk fermenting rods and yeast are used as yeast. Kimiz is mainly divided into three different categories: weak (it matures in one day), medium (it matures in two days), and strong (it matures in three days) Kimiz.

The technology of preparing “kimiz” is as follows: - “kimiz” with an acidity lower than 45°T is added to milked bee milk and thoroughly mixed for 10-15 minutes, then it is kept at a temperature of 20-24 ℃ for 3-5 hours. As soon as the acidity level reaches 90–95 °C, it is necessary to accelerate its curing process. For this, the dough is put on it. The product is mixed for almost an hour. It has a pleasant fragrance. Then it is stored in a room with a temperature of 8-10 ℃ for good ripening in 1-3 days.

The colour of high-quality whey is milky white, and the foaming ability is well expressed. According to the category of Qimiz, it contains from 1% to 2.5% alcohol. Fat may be around 0.8%. The degree of acidity also varies. That is, it is determined to be 106–120 °T in strong winter, 81–105 °T on average, and 60–80 °T in weak winter.

We can also prepare q from cow's milk. For this purpose, milk with 20% fat, 5% water and a certain amount of sugar is added to the milk to bring it close to the content of colostrum and the technology described above is used. When the “kimiz” is ready, its taste, smell and characteristics of foaming are checked. If the prepared “kimiz” resembles “kimiz”, then it is considered to be made of good quality and it is suitable for consumption.

To make cottage cheese, milk is pasteurized at 65–90 ℃. Then it is cooled to 30–34 ℃ and 5–8% is added drop by drop and mix well. It is kept at this temperature for 6-8 hours. When the acidity is 80oT, the product is considered ready, and it is placed in a container equipped with a water heater at a temperature of 55-60 ℃. Then the product thickens and it is cut vertically with wooden knives. Then the product is heated to 40-45 ℃, and a special wooden type is placed on it, a load - a heavy object is placed on it, and a measure is taken to expel the water contained in it.

This is for each kilogram of product 5 kg. It is required to place a load with weight. When the curd is ready, it is put in containers, packed and sent to the sales enterprises.

The colour of the prepared cottage cheese is white and pale yellow, and the smell and taste are pleasant, clean, and delicate, reminiscent of the smell of milk yoghurt. The curd should not be scattered and massaged.

When the chemical composition of cottage cheese is checked in dairy laboratories, it contains 14-19 per cent protein, 9-18 per cent fat, 3 g/kg calcium, 2-4 g/kg phosphorus, 6 mg/kg iron, 1.52 g/kg was determined to be chlorine.

Curd is mainly prepared by two different technological methods, i.e. acid and rennet acid methods.

Curd is made mainly from skimmed milk using the acid method. In this, the milk is first pasteurized at 85–90 ℃ and cooled to 80–85 ℃ and a 5 per cent drop is added to it. It is kept at this temperature for 5-8 hours and is stirred from time to time. When the product is ready, its acidity is around 65–75 °C. Then the product is horizontally cut into 3-5 cm pieces with a wooden knife and left for 15 minutes. Then it is heated at 38-45 ℃ for about 20-30 minutes, and then it is put in a container (bag) made of grey to release its serum. Ready curd is stored in a refrigerator at 0 ℃.

Curd preparation using the rennet acid method is mainly made from skimmed milk. Such curd is sometimes used to make cheese or other dairy products. The technology for making such cottage cheese is as follows. That is, the milk is pasteurized at 80–85 ℃ and cooled to 30–32 ℃ and thawed with 3–5% lactic acid streptococci. After 1–2 hours, its acidity reaches an average of 32–35°C. Then a 40 per cent solution of calcium chloride salt to it1000 l to milk500 gis placed. And its anhydrous powder1000 l0.8–1.0 g of milk is enough. The product is thoroughly mixed and kept for 6–8 hours, sometimes around 10 hours, to set. If the product is required to be dark and dense, then every 100 l is recommended to add 10-20 g of calcium chloride salt to milk.

When making cottage cheese using the acid rennet method, less curd is formed than in the acid method. Because the thickening of the product occurs mainly under the influence of lactic acid and rennet enzymes.

The product is processed and stored until its acidity is 65–80°C, and its whey content is extracted. Grey fabrics can be used for this. Sometimes the product is cut into cubes of 2-4 cm in size, which also accelerates the release of whey.

It is necessary to keep the cottage cheese at room temperature until its acidity reaches 60-62 °C. Then the acidity is brought to 70-75 °C, it is taken out of the milk tank and put into grey bags, and the whey is removed. In this case, the product is pressed for 1-1.5 hours, cooled to 4-5 ℃ and pressed again. After the curd is ready, it is forbidden to store it for a long time. Will be shipped to retail locations as soon as possible. Sometimes it is packaged and sent to sales organizations ready.

Preparation of sour cream. Sour cream made from cream in dairy should contain 30 per cent fat. Sourness can be around 65–90°T in high-grade sour cream, and 65–110°T in case of the first grade. According to the fat content, sour cream can be adjusted up to 31.6%. The product pasteurized at 85–95 ℃ is cooled to 22 ℃. It is recommended to cool down to 18 ℃ on hot days of the year. Then 5 per cent of the solution is added, mixed and stored in a thermostat at

16-18 ℃ for 14-16 hours. The finished product is cooled at 5-8 ℃ for 6-8 hours with an acidity of 65-85 °C.

Sour cream is a lactic acid diet product with a high content of milk fat, pasteurized and cooled cream is sweetened by adding cultured lactic acid streptococcus, sometimes a flavouring bacterium. Creams with 20%, 25%, 30%, and 36% fat content are sold; The fat content of condensed cream is 40%. Sour cream is a nutritious food product with high calories. In addition to milk fat, it contains protein, milk sugar, organic acids, and mineral salts, as well as vitamins A, E, B1, B2, C and PP. The calorie content of sour cream depends on the amount of milk fat in it. Since sour cream contains a lot of fat and vitamins, it is used as a diet food. It is added to salads, sauces, liquid and thick foods; it is added to some sweet dishes, and dough, as well as eaten as a separate meal at breakfast. Sour cream is stored in glass or enamelled containers, it does not spoil for three days in a dark place with a temperature of 0-8 ℃.

At home, sour cream is made from cream, and to thicken it, sour cream is added to the cream as a drop (in the amount of 5-10% compared to the cream).

The cream is a dietary product made from cow's milk separated from a separator. Fresh cream contains 10-60% fat. Condensed and dried cream is also sold. Due to the high content of fat, it is a very nutritious product. In addition to fat, it contains protein, carbohydrates, mineral salts, vitamins A, E, B1, B2, C, PP, etc. Calories of 10% fat cream - 1173, 20% cream - 2131, and 35% cream - 3345. The cream is used in the preparation of various culinary products. Buttercream is often used in the preparation of sweet dishes and confectionery products, as it foams quickly and easily. The cream is eaten as a diet food.

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