PRODUCTION AND PROCESSING OF CHEESE

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Annotation:
This article discusses the stages of cheese production technology, types of raw materials used, as well as the microbiological and biochemical processes involved. It highlights modern industrial methods, equipment, starter cultures, and differences in preparation techniques depending on cheese types. The article also analyzes advanced approaches to improving product quality, extending shelf life, and preserving nutritional value. It is of practical interest to food industry professionals, technologists, and dairy processing specialists.

Keywords: cheese, technology, dairy products, fermentation, starter cultures, milk processing, microbiology, cheese types, industrial equipment, food technology.

Introduction

Cheese - Among food products, cheese occupies one of the first places in terms of nutritional and energy value. The nutritional value of cheese is determined by the abundance of protein, milk fat, as well as mineral salts and vitamins in a well-balanced ratio and easily digestible. 100 g of cheese contains: 20-30 g of protein, 32-33 g of fat, about 1 g of calcium, 0.8 g of phosphorus.

Cheese contains a large amount of free amino acids. Cheese contains 18% to 25% protein, and most of it is in soluble form, so it is well absorbed by the body.

Main part. Rennet coagulation of milk occurs as a result of the addition of milk-curdling enzymes obtained from animals (rennet, pepsin, and enzyme preparations based on them).

Fermentation enzyme solutions are prepared by keeping the enzyme in boiled drinking water heated to a temperature of 30-320C for 20-30 minutes.

The storage time of aqueous solutions of the enzyme does not exceed 1 hour, since its activity gradually decreases. To increase the activity of the rennet enzyme, its solutions can be prepared not in water, but in whey (acidity 45-600T), pasteurized at a temperature of 850C and cooled to 400C.

In this case, the solution is prepared 3-4 hours before use. The amount of enzyme preparation required for coagulation is determined using a special device - a cup indicator.

The curd mass formed by rennet coagulation is cut, crushed, and the resulting cheese grains are mixed. The purpose of these processes is to partially dehydrate the curd mass. A second heating is also performed for the purpose of dehydration.

The amount of water in the rind determines the development of microbiological and biochemical processes during cheese ripening. Usually, the rate of development of microorganisms in cheese grains and separated whey is not the same.

A large number of microorganisms migrate to the cheese grains, and a small number to the whey (this ratio is approximately 1:6-1:8).

This difference in the number of microorganisms is further enhanced by their rapid development in cheese grains compared to whey. The more whey is separated from the cheese mass, the less milk sugar and other substances remain, which are a nutrient medium for microorganisms, and the less lactic acid is formed. Lactic acid is the main factor determining the rate of protein syneresis, that is, its dehydration during the processing of cheese grains.

Initially, when the assembly is ready, the surface of the assembly is increased by cutting it to accelerate the separation of whey. The assembly cutting elements are cut lengthwise and widthwise using a vertically positioned cutting device, and then the cutting elements are cut using a horizontally positioned cutting device. As a result, cubic-shaped assembly pieces with sides of 8-12 mm are obtained. Cutting the assembly takes 10-15 min.

A very thin mixture should be cut slowly to prevent the protein and fat from passing into the whey, and a dense mixture should be cut quickly to prevent it from thickening prematurely.

In the cheese-making bath, the temperature of the surface of the curd is much lower than the temperature of the lower layers of the curd, and also, when making soft, fatty cheeses, the upper layer of the curd may become thin and oily due to prolonged coagulation of the milk. In order to obtain cheese grains of the same size and prevent fat loss into the whey, a 4-5 cm thick surface layer of the curd is turned over 2-3 minutes before cutting.

The cut curd is gradually stirred to break up the curd cubes, equalize their temperature by volume, and obtain cheese grains of uniform size. This process is called cheese grain preparation. Cheese grain preparation results in cheese grains of a specific size for each cheese group.

For example, this process produces cheese grains with a size of 2-3 mm for Swiss cheese and 5-6 mm for Dutch cheese. In order to obtain cheese grains of the same size, the nature of the aggregate must be taken into account. In this case, the fine aggregate is first crushed slowly, then at high speed until the grains are compacted and no longer crumble.

Pishloq donalarini tayyorlash jarayoni 5 min davom etgach, mayda pishloq olish vannalarida aralashtirish jarayoni to‘xtatiladi va 30% zardob maxsus elak-zardob olgich yordamida chiqarilib yuboriladi.

Conclusion:

After the cheese making process is complete, the cheese grains are further mixed to further dehydrate them. During mixing, the grains shrink in size and become spherical. At the end of mixing, the grains lose their stickiness and become elastic. The mixing time depends on the acidity of the grains; as the acidity increases, their dehydration accelerates and the mixing time is shortened.

Under the same conditions, small grains dehydrate faster than large grains. In addition, the mixing time is sharply reduced by increasing the temperature of the cheese mass. The mixing time before the second heating is 20-30 minutes. The dehydration of cheese grains is further accelerated by increasing its temperature. As a result of this process, the compaction of the aggregate and the separation of whey are accelerated.

References

1. Gudkov A.V. Pishloq tayyorlash: texnologik, biologik va fizik-kimyoviy jihatlar
2. Gorbatova K.K. Sut va sut mahsulotlari biokimyosi. - M.: Yengil va oziq-ovqat sanoati
3. Mamatrizayev, N. A., Xikmatov, X. I., & Tuxtayev, O. B. (2020). Pervonachalnыye rezultatы ispolzovaniya baranov-proizvoditeley afganskoy populyasii.
4. S.O. Kazakova, NP Roziboev (2022)Characteristics milk production of cows with different body composition World Bulletin of Management and Law.
5. Antipov S.T. va boshqalar oziq-ovqat ishlab chiqarish uchun mashinalar va apparatlar.