Food Safety of Soft Cheese

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Abstract: The paper presents the results of studying the composition of the microflora of soft cheese, the dynamics of their change during storage, as well as the optimal shelf life of the finished product.

Key words: microflora, thermoacid coagulation, proteins, serum, viable cell.

1. INTRODUCTION.

Food safety is a valuable and integral benefit. Each of us consumes food on a daily basis and must be sure that these foods do not pose a health hazard. A high level of food safety can be ensured as a result of the creation of an improved system for minimizing risks. The peculiarity of the current stage of the safety policy is due to the fact that, in addition to the deterioration of the environmental situation, changes in the technology of food processing, international trade and an extensive logistics system are also significant factors in ensuring the safety of food products. The public is becoming more and more aware of the dangers associated with pathogens and chemicals in food consumed. The introduction of new technologies, including genetic engineering, in today's environment of increasing concerns about food safety, creates the need for solving special problems. In particular, the government of the Republic of Uzbekistan pays special attention to improving the regulatory framework for ensuring food safety. This is confirmed by the decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 474 "On approval of the general technical regulations on the safety of milk and dairy products" dated July 7, 2017, the Decree of the President of the Republic of Uzbekistan No. UP-5303 "On measures to further ensure the food security of the country" dated January 16 2018, San PiN RUz No. 0283-10 "Hygienic requirements for food safety" dated December 29, 2010. A feature of the modern period of food safety policy is that its development should take place in accordance with the principles of collective participation, transparency and the use of internationally agreed methods [1].

The various hazards associated with food can be grouped into several groups: microbial hazards; nutrient hazards; hazards associated with pollution from the external environment; natural hazards; the dangers of food additives and dyes. It is food products that can serve as transfer factors for many pathogenic and toxigenic agents of diseases. The severity of the effects caused by microorganisms varies from temporary discomfort and a fairly quick recovery to the acute toxic effect of botulism. Therefore, the establishment of food safety by microbiological indicators is very important.

The purpose of these studies was, using the example of a typical food product - soft cheese, to determine the composition of the microflora of the finished product and to study the dynamics of their change during storage, after which the optimal shelf life of the product was established. The investigated products were obtained using a new technology with thermoacid coagulation of heat-treated milk proteins at 75 - 85 ° C. To determine the influence of the adopted technological regimes on the composition of microflora, experimental and control variants of fat-free and mass fraction of fat (ppm) in dry matter of 20% soft cheeses were studied. Control versions of soft cheeses were obtained using the same

technology as the experimental ones, but with coagulation of milk proteins at the pasteurization temperature.

2. RESEARCH RESULTS:

Taking into account that the coagulation of milk proteins during the production of the studied cheeses occurs at temperatures above 65 ° C, it can be assumed that the level of contamination of finished products will correspond to the level of contamination of pasteurized milk and whey. This residual microflora can develop during storage of the studied cheeses. However, the growth of this residual microflora in cheeses depends on a number of factors: the level of active acidity, storage temperature and osmotic pressure [2].
Studies by a number of scientists have established that the quality of the Adyghe cheese at elevated storage temperatures (16-18 ° C) deteriorates significantly and its shelf life is reduced to 12 hours. They recommend a storage temperature of 0-8 ° C, at which the shelf life of the cheese is extended to 7 days.
With this in mind, microbiological studies of soft cheeses were carried out during their storage at 6-8 ° C.
Since the active acidity of the studied cheeses is 5.9-6.1, then at storage temperatures of 6-8 ° C in the cheeses, apparently, psychrotrophic microorganisms will develop, and the rest will not receive significant development. In addition, the cheese salting provided by the technology, reducing the activity of water, in turn, can also inhibit the growth of microorganisms.
During the heat treatment and coagulation of milk proteins, most of the microflora perishes, however, mesophilic aerobic and facultative anaerobic microorganisms (MAFAM), psychrotrophic and lactic acid bacteria were found in the finished product, studied after the end of the technological process. Escherichia coli bacteria, droshky and molds were not detected in 1 g of food. The results of studies of experimental and control options for fat-free and with m.d.zh. in dry matter, 20% of soft cheeses in the process of halodil storage at 6-8 ° C are presented in tables 1, 2, 3.

Table 1.

Cheese name	The number of MAFAM in 1 g of cheese, thousand cells during storage, days.				
	0	2	5	8	12
Low-fat cheese (experience)	40	38	67	48	26
Low-fat cheese (control)	78	87	84	20	19
Cheese smdzh. in dry matter 20% (experience)	40	35	90	21	23
Cheese with mdzh. in dry matter 20% (control)	100	120	300	62	62

During refrigerated storage at 6-8 ° C for 12 days, the amount of MAFAM did not change significantly (Table 1). In the first two days of storage, their number remained at the level of the initial seeding, and a slight increase in the amount of MAFAM was noted after 5 days of storage (by 1.8-3 times). In the next day of storage, there was a tendency to a decrease in MAFAM, and after 12 days of storage, their amount decreased in comparison with the initial one by 1.5-4 times. Judging by the amount of MAFAM during storage, it can be said that the quality of the examined cheeses practically did not change and they can be consumed within 12 days. Products containing more than 10 microorganisms in 1 g are considered spoiled and unsuitable for food.

Similar results were obtained for psychrotrophic microorganisms (Table 2).

Table 2.

Cheese name	The number of psychrotrophic microorganisms in 1 g of cheese, thousand cells during storage, days.				
	0	2	5	8	12
Low-fat cheese (experience)	5,5	6,6	14	37	36
Low-fat cheese (control)	13,0	16,0	55	53	51
Cheese smdzh. in dry matter 20% (experience)	12,0	22,4	106	110	120

Despite the fact that their number during storage increased 6.5 - 21 times, it did not reach the values leading to noticeable organoleptic changes in cheeses. In a broad sense, bacteria of the genus *Pseudomonas*, yeast, mold fungi, micrococci, spore-forming sticks, lactic acid sticks and other microorganisms that can multiply at temperatures below 7 ° C are classified as psychrotrophic. According to the conclusion of the researchers, the influence of psychortrophs on changing the taste of a product is determined not only by their number, but to a greater extent by the type of microorganisms. Bacteria of the genus *Pseudomonas* cause spoilage of the product when their number reaches 5.2-200 million cells per 1 g, yeast 2.5-14 million, *coli-form* 2.7 -150 million.

Yeast and mold fungi were not detected in freshly produced cheeses when sowing 0.1 g, and their number did not exceed more than 10 cells in 1 g. During storage at 6-8 ° C, the growth of these microorganisms was not observed in the studied cheeses.

Lactic acid microorganisms that were part of acidic milk whey, after holding the mixture of milk and whey at coagulation temperatures, mostly died, and the dynamics of changes in the remaining viable cells during storage are presented in Table 3.

Table 3.

Cheese name	The number of lactic acid microorganisms in 1 g of cheese, thousand cells during storage, days.				
	0	2	5	8	12
Low-fat cheese (experience)	2500	600	500	250	25
Low-fat cheese (control)	0,60	0,60	0,60	0,25	0,25
Cheese smdzh. in dry matter 20% (experience)	0,25	0,25	0,25	0,13	0,13
Cheese smdzh. in dry matter 20% (experience)	0,60	0,50	0,50	0,06	0,06

An analysis of the results obtained indicates that the number of lactic acid bacteria in the experimental skim cheese is much higher compared to other versions of cheeses throughout the entire considered range of storage duration. The higher amount of lactic acid microorganisms in the test cheese is explained by the use of a lower coagulation temperature (75 ° C) of milk proteins and the introduction of increased doses of acidic milk whey. During storage of cheeses at 6-8 ° C, there is a gradual decrease in the number of lactic acid microorganisms.

3. CONCLUSIONS.

Thus, in the finished product, studied after the end of the technological process, mesophilic aerobic and facultatively anaerobic microorganisms (MAFAM), psychrotrophic and lactic

acid bacteria were found. Despite the fact that their amount during storage underwent significant changes, it did not reach values leading to noticeable organoleptic changes in cheeses. It should be noted that yeast and mold fungi were not detected in freshly produced cheeses when sowing 0.1 g, their number also did not exceed 10 cells per 1 g, and during storage at 6-8 ° C, the growth of these microorganisms was not observed in the studied cheeses. ... The analysis of the conducted microbiological studies indicates that at a storage temperature of 6-8 ° C, observance of technological regimes and sanitary and hygienic conditions of production, the shelf life of cheeses with their high quality is 10-12 days.

4. REFERENCES:

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