

SOME INDICATORS OF MILK QUALITY DEPENDING ON SANITARY AND HYGIENIC CONDITIONS OF ITS OBTAINING

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INTRODUCTION

Milk and dairy products, due to their exceptionally useful properties, are one of the popular foods of the population. To obtain high quality milk, it is necessary not only to properly feed the animals, but also to comply with sanitary and hygienic conditions, violation of which leads to high bacterial contamination of milk, which is a favorable environment for the development of microorganisms [1].

Today, Ukraine has set a clear course for its activities in the World Trade Organization (WTO). The food laws of the member countries of this organization set quite strict requirements for food producers, thus protecting the health of consumers. The legislation of the World Trade Organization promotes the production of guaranteed quality and safe food. Its characteristic feature is that control over food production must be constant throughout the production chain, ie "from farm to table". Each link in this chain must be strictly controlled by both the state and producers. Such international cooperation in the field of ensuring the proper quality and safety of milk, raw milk and dairy products is carried out through Ukraine's participation in the work of international organizations; concluding international agreements; optimization of normative documents, norms and rules with international documents, norms and rules that determine the requirements for the quality and safety of milk, raw milk and dairy products, as well as veterinary and sanitary requirements; exchange of information on measures taken to ensure the proper quality and safety of milk, raw milk and dairy products [5].

The quality of milk is determined by a significant number of factors, among which unsatisfactory sanitary and hygienic conditions for its production are prominent. At the same time, the use of antiseptics of chemical origin can harm both the health of the animal and the environment. The use of probiotics to clean the udder before milking has an interest in terms of improving the quality of milk and requires serious study.

GOAL Determination of the effect of probiotic means for cleaning the udder before milking with the disinfecting effect of prolonged action "PIP Cleaner Skin" on the quality indicators of milk in the conditions of "Druzhba" agricultural cooperative of Saratsky district of Odessa region.

MATERIAL AND METHODOLOGY

To conduct research on the study of milk quality indicators, depending on the sanitary and hygienic conditions of its production, 2 groups of cows with 15 heads in each were formed.

In group I (control) milk was obtained in compliance with sanitary and hygienic conditions adopted on the farm.

In group II (experimental), wash the udder of cows thoroughly with 0.05% PIP Skin Cleaner before milking.

Milk for research was taken from whole milk in the amount of 2 kg. 2 series of studies were conducted.

The acidity, mechanical and bacterial contamination of milk were determined in the studied samples. Based on the obtained data, a grade of milk was established in accordance with the current DSTU 3662: 2018 "Raw cow's milk. Technical conditions "[3].

RESULTS AND DISCUSSIONS

The degree of purity of milk according to the standard - is one of the main indicators that are taken into account by DSTU when purchasing milk.

Mechanical impurities that degrade the quality of milk usually include: dust, hair particles, skin flakes, food particles and litter. All these mechanical impurities are one of the main sources of contamination of milk by microorganisms. Therefore, it is necessary to clean the cows an hour before milking, wash the contaminated areas with warm water, refrain from distributing dry feed before milking, change the litter regularly. All these seemingly simple steps will help you get the highest quality milk.

Indicators of mechanical contamination of milk of the control and experimental groups are presented in table 1.

Table 1

Indicators of mechanical contamination of milk

Group	Research	Number of samples	Degree of purity according to the standard		
			I	II	III
I (control)	I	15	5	9	1
	II	15	7	8	-
	Total	30	12	17	1
II (experimental)	I	15	14	1	-
	II	15	15	-	-
	Total	30	29	1	-

Analysis of the data in Table 1 shows that the milk obtained from cows of the control group according to the standard of purity in the majority (53.33-60.00%) belongs to group II, and therefore can be attributed only to grade II according to GOST 3662: 2018. In addition, in the first series of studies, one sample in the control group had group III in purity, ie such milk belongs to the non-grade and can be used only for processing in accordance with industry recommendations approved in the prescribed manner. And only 33.33-46.67% of milk from the studied in the control group was classified as group I according to the standard of purity, and, depending on other indicators taken into account by GOST, may be higher or first grade.

In the group where sanitary and hygienic measures aimed at obtaining good quality milk were carried out, the general picture was somewhat different. Observance of sanitary and hygienic conditions allowed to receive milk only of the I and II groups according to the standard of purity: 93,33–100,00% of the investigated samples were carried to the I group, and therefore, such milk can be carried to the highest and I grades; and only 6.67% of samples - to group II.

Milk acidity is the most important biochemical indicator, which is taken into account when accepting milk on milk processing enterprises.

Since the acidity of milk is judged on its quality, it is advisable to list the main reasons that affect changes in the acidity of milk. These are, first of all,: individual and breed features of cows, character of feeding; type and level of feeding; ration and feed quality; lactation period; the state of health of cows, the system of keeping animals (care, exercise, litter, massage, udder care); cleanliness and processing of milking machines and dairy equipment; personal hygiene of service personnel, the degree of contamination of milk with mechanical impurities and bacteria; the nature

and compliance with the processes of primary processing of milk (cleaning, cooling, storage); period and storage temperature conditions.

In milk, which is in favorable conditions for the development of microorganisms, the acidity increases rapidly due to the fermentation of milk sugar and the formation of lactic acid. Technological properties of such milk decrease.

The acidity of the studied milk samples is introduced in table 2.

Table 2

The results of determining the acidity of milk

Group	Research	Number of samples	Acidity, °T		
			16–17	18–19	20 and more
I (control)	I	15	6	8	1
	II	15	7	8	-
	Total	30	13	16	1
II (experimental)	I	15	13	2	-
	II	15	15	-	-
	Total	30	28	2	-

The data in Table 2 show that most samples of milk of the control group I have an acidity of 18–19 °T, which is 53.33%. Therefore, such milk cannot be referred to the highest grade. In addition, 6.67% of the studied samples of the control group had an acidity of 20 or more °T, so according to the requirements of GOST 3662: 2018 can be attributed only to grade II.

At the same time, in the second experimental group, where the planned sanitary and hygienic measures were carried out, the indicators of milk acidity were somewhat different. Thus, in the II experimental group 86.67–100.00% of milk samples had an acidity of 16–17 °T, ie this milk can be referred to the highest grade, and 13.33% of the studied samples with an acidity of 18–19 °T - to the first grade . In addition, none of the samples of the experimental group had milk with an acidity of 20 or more °T.

Thus, the implementation of a set of sanitary and hygienic measures has significantly improved the quality of milk in terms of acidity.

According to GOST, milk supplied to milk processing enterprises is evaluated for microbial contamination by reductase testing.

The reductase test is an indirect indicator of bacterial contamination of unpasteurized milk and is based on the fact that bacteria that got into the milk secrete various metabolic products, namely enzymes, including reductase. Reductase by its biochemical properties, redox enzyme, is able to decoloration methylene blue. If a solution of this dye is added to milk, it discolors under the action of reductase. Decoloration of methylene blue occurs in proportion to the content of reductase. The faster the decoloration, the more microorganisms in the milk and, as a consequence, the higher the bacterial contamination.

The results of the reductase test in the studied milk samples are shown in table 3.

Table 3

Indicators of bacterial contamination of milk					
Group	Research	Number of samples	Total bacterial contamination, thousand CFU / cm ³		
			≤ 300	≤ 500	≤ 3000
I (control)	I	15	2	8	5
	II	15	3	5	7
	Total	30	5	13	12
II (experimental)	I	15	13	2	-
	II	15	14	1	-
	Total	30	27	3	-

As can be seen from table 3, for milk I control group, characterized by high bacterial contamination of milk. Thus, the total bacterial contamination of milk ≤ 3000 thousand CFU / cm³ had 33.33-46.67% of milk samples; 33.33–53.33% of samples had a total bacterial contamination of milk ≤ 500 thousand CFU / cm³ and only 13.33–20.00% of the studied milk samples of the control group with a total bacterial contamination of milk ≤ 300 thousand CFU / cm³.

In the studied samples of milk of the II experimental group we observe the direct opposite: 86.67–93.33% of the studied samples had a total bacterial contamination of milk ≤ 300 thousand CFU / cm³, only 6.67–13.33% - a total bacterial contamination of milk ≤ 500 thousand CFU / cm³ and none of the studied samples had a total bacterial contamination of milk ≤ 3000 thousand CFU / cm³.

Thus, the test for reductase showed significant bacterial contamination of milk of the I (control) group, obtained on the farm SVC "Druzhba". This is due to contamination of milk with manure, particles of feed, litter, hair residues, etc., which was possible as a result of violation of zoohygienic conditions for milk production. By implementing the proposed sanitary and hygienic measures in production, it is possible to significantly improve the quality of milk in terms of sanitary and hygienic indicators.

Based on the requirements of DSTU 3662: 2018 "Raw cow's milk. Technical conditions" and the results of studies of mechanical contamination, acidity and reductase test were determined by the grades of milk, which are shown in table 4.

Table 4

Grade distribution of milk						
Group	Research	Number of samples	Grades			
			Highest	I	II	Non- grade
I (control)	I	15	2	3	9	1
	II	15	3	4	8	-
	Total	30	5	7	17	1
II (experimental)	I	15	13	1	1	-
	II	15	14	1	-	-
	Total	30	27	2	1	-

The data in Table 4 show that the main amount of milk obtained in the first control group was grade II (53.33-60.00%); milk of the highest grade for the studied period was 13.33–20.00%, I grade - 20.00–26.67%, and the share of non-grade milk among all the studied samples of the control group was 6.67%.

When using the set of proposed sanitary and hygienic measures, the quality of milk has significantly improved. Thus, the milk of the highest grade in the II experimental group for the study period was 86.67-93.33% of all studied samples; Grade I - 6.67% and only one sample in the first series of studies was classified as Grade II. There was no non-grade milk in the samples of this group at all.

CONCLUSIONS

1. The use of probiotic means for cleaning the udder before milking "PIP Skin Cleaner" measures can improve the quality of milk in terms of mechanical contamination: the amount of milk in I group of purity in the control group is 40.00%, against 96.67% in the experimental group.

2. The milk's acidity of the II experimental group was lower (16–17 ° T - 93.33%; 18–19 ° T - 6.67%), compared with the control group I (16–17 ° T - 43.33%; 18–19 ° T - 53.33%; 20 ° T and more - 3.33%).

3. Milk of the control group had worse indicators of bacterial contamination compared to the experimental group: the number of samples with total bacterial contamination ≤ 300 thousand CFU / cm³ in group I reached 16.67% against 90.00% in group II.

4. Carrying out a set of sanitary and hygienic measures on the use of "PIP Skin Cleaner" significantly improves the quality of milk according to the requirements of the current standard of Ukraine: of all milk milked during the study period, 90.00% was of the highest grade, 6.67% - grade I and only 3.33% - grade II; in the control group, the values were 16.67%, 23.33%, 56.67% and 3.33% of milk, respectively.

LITERATURE:

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