

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Adaptation of the Recommendations of the International Committee for Animal Recording (ICAR) in Evaluating the Quality of Milk.

Vladimir Ivanovich Trukhachev*, Sergey Aleksandrovich Oleinik,
Nikolai Zakharovich Zlydnev, and Vitaly Yuryevich Morozov.

Stavropol State Agrarian University, Zootekhnicheskiy lane 12, Stavropol 355017, Russia.

ABSTRACT

An important step towards improving the quality of milk and dairy products is the harmonization of domestic and foreign methods of laboratory analysis, the introduction of the study of the quality of raw milk in the reference laboratories performing work based on the organizational principles of the International Committee for Animal Recording (ICAR, 2014). Established guidelines for the organization of the sampling and assessment of the quality of milk in the reference laboratory. The results of the analytical and laboratory work demonstrated the fundamental possibility of obtaining high-quality raw milk, which is on the basic parameters (fat, protein, somatic cells) corresponds to the highest gradations of Russian and European quality standards.
Keywords: Quality parameters of milk: fat, protein, somatic cells

*Corresponding author

INTRODUCTION

The results of market research international research center IFCN (Dairy Research Center), for the period of 1996-2012 years have shown that the yield per cow, the average for controlled agricultural companies increased by 29,3% and amounted to 7,5 thousand kg of milk per year. There is also a consolidation of farms, the average number of cows on farms increased by 54% to 51 cows, while the total number of farms producing milk decreased by 2,2 times. Increasing the productive qualities of the animals was the result of genetic progress, effective process management and ensure full feeding, resulting in increase of the conversion of nutrients diet and reducing the cost of feed to produce 1 liter of milk 1,5. The demand for high quality raw milk, which has the highest realizable price and has the greatest appeal of image in the international market[1, 2].

The introduction of the international system of quality assessment of milk will improve the culture of production and quality of milk production, improve the health of the animals, which in turn will lead to lower levels of somatic cells in milk[3, 6].

MATERIALS AND METHODS

Based on the study of foreign and domestic legal documents assessing the quality of the milk have been developed guidelines for the organization of sampling and research in the reference laboratory for the assessment of fat, protein and somatic cells. The milk samples are taken in the tribal agricultural enterprises of Stavropol Territory, studies were carried out in the reference laboratory evaluation of the quality of milk, which is certified in accordance with the requirements of the test laboratories of the Customs Union of Russia, Belarus and Kazakhstan. Set of laboratory equipment GOST ISO / IEC 17025-2009 for testing the quality of dairy products[4, 5].

RESULTS AND DISCUSSION

Evaluation of milk production of natural genetic resources of Stavropol Territory has shown a high potential to increase milk production in the region. The annual yield of Holstein cows (black and red-and-white), on average, amounted to 10300 and 8000 kg of milk, black and white breed - 8900 kg of milk, Ayrshire breed - 8800 kg of milk, Yaroslavl breed - 8600 kg of milk, red steppe - 6500 kg of milk (Table 1).

Table 1: Indicators of milk production and milk quality genetic resources breed Stavropol Territory (Russian reproduction)

Breed	The productivity of cows in 305 days of lactation							
	The highest productivity				The last completed lactation			
	Quantity lactations	Milk yield, thousand kg	Fat %	Protein %	Quantity lactations	Milk yield, thousand kg	Fat %	Protein %
Holstein black-and-white	2,3	10,3	3,78	3,13	3,5	9,2	3,78	3,17
Holstein red-and-white	2,0	8,0	3,70	3,17	1,8	7,7	3,68	3,15
Black-and-White	2,3	8,9	3,86	3,2	3,0	8,3	3,94	3,2
Ayrshire	2,9	8,8	3,85	3,10	3,5	8,5	3,85	3,03
Yaroslavl	3,2	8,6	3,81	3,17	3,7	8,3	3,80	3,16
Red steppe	2,2	6,5	3,77	3,17	3,0	6,8	3,85	3,11

Using in the process of modern milking systems: line the milk, milking parlor - can significantly improve the quality of milk. Compliance with the rules of preparation of cows for milking, preventive work on early detection and treatment of mastitis in cows helps to maintain the level of somatic cells in milk to 90-175 thousand cells in 1cm³.

Regional model of quality control of dairy products provides for sampling of milk during the milking control, which also takes into account the following indicators: the date of the control of milking, which is the date of preparation of the relevant act; nickname; identification number of the animal; one-time milk yield per milking; milk quality. In determining the rate of milk of the following factors: the date of determining the intensity of milk, which is the date of preparation of the relevant act; nickname, identification number of the animal; number of the current lactation; one-time milk yield per milking; time spent milking machine for milking, brand machine milking.

Accounting for productivity and quality of milk per lactation, or a certain period of lactation per cow, produced by summarizing the results of control milkings conducted according to existing requirements.

To determine the amount of milk produced using technical means - milk flow indicator, as well as electronic circuit devices. All technical facilities are monitored for accuracy of the organizations of the State Standard of the Russian Federation at least once a year. The amount of milk is determined with an accuracy of up to 0.1 kg. The yield for the control period is calculated with an accuracy of up to 1 kg. The amount of milk is determined with an accuracy of up to 0.1 kg. The yield for the control period is calculated with an accuracy of up to 1 kg.

The content of fat, protein, somatic cells, and if necessary, other components in the milk of cows is determined by examination of selected samples of milk according to current standards and techniques in the laboratory.

Sampling of milk used measuring cups and cups for transporting milk samples with numbers.

Sampling of milk and its conservation is carried out in the following order:

- Before milking control in the measuring cup add preservative substances permitted for use, tightly capped and placed in a special holder, which is marked by the code of the subject of livestock breeding and the code of the transport crate;
- After milking, milk yield is measured by a one-off, some part of milk thoroughly mixed and poured into a special container;
- The sample is selected in proportion to each nadoyu for milking control using the above techniques.

For the preservation of milk used preservatives: potassium dichromate, aqueous formaldehyde solution or specialized broad spectrum preservatives MicrotabsII. Devices milk analyzers must be calibrated taking into account the effect of the preservative used.

Assessment of the quality of milk from animals is carried out under the control of members of the reference laboratory in accordance with the relevant regulations of the Russian Federation and with the advice of ICAR (Table 2).

Table 2: Methods of determining the quality of milk

Indicator	Regulatory document of Russia	Reference methods ICAR (2014)
Fat	GOST R ISO 2446-2011 - Milk. Method for determination of the fat content (Gerber)	Gravimetric method, Röse-Gottlieb ISO 1211 Butyrometric method, Gerber ISO 2446
Protein	GOST 23327-98 Milk and milk products (Kjeldahl)	Titrimetric method, Kjeldahl ISO 8968 Dye-binding, Amido Black ISO 5542
Somatic cells	GOST R 54077-2010 - Milk. Methods for determining the number of somatic cells according to the change in viscosity GOST R ISO 13366-1-2010 «Milk. Counting somatic cells. Part 1: Method using a microscope (Reference method)»	Microscope Reference method ISO 13366-1 Electronic particle counter ISO 13366 Fluoro-opto-electronic method (Rotating disk) ISO 13366-3

Data analysis Table 2 shows that for determining quality indicators milk protein, fat and somatic cells of domestic and foreign reference methods substantially coincide. At the same time, when determining RF somatic cells has allowed the use of indirect methods using viscometry.

Modern analytical laboratory during mass analysis can be completed with equipment for the instrumental determination of quality of milk:

- Determination of fat:MilkoTester (FossElectric, DK);
- Determination of fat and protein: MTA-PMA (FossElectric, DK), Milkoscan (FossElectric, DK), Multispec (Multispec, UK), Bentley (Bentley, USA), Lactoscope (DeltaInstruments), Aegys (AnadisInstruments, F);
- Determination of somatic cells: Coultronic (UK), Foss Electric (DK), Anadis (F), Bentley (USA), Chemunex (D), Delta Instruments (NL), Foss Electric (DK).

CONCLUSION

Establish a regional management model of quality dairy products with the advice of the International Committee for Animal Recording (ICAR) is adapted to the regulatory requirements of the Russian Federation and can be implemented in its other regions. Improving the quality of dairy products will increase the profitability and attractiveness of dairy cattle branding. The system of milk production and herd management in tribal agribusiness Stavropol Territory allows you to receive high-quality raw milk that meets the highest gradations of domestic and foreign standards of quality milk.

REFERENCES

- [1] Dairy Research Center / <http://www.globalfarm.de/media/downloads/EXTRACT-Dairy-Report-2013.pdf>
- [2] <http://www.icar.org/>
- [3] Oliynyk S.O. What Ukraine loses livestock in the absence of ideology introduced ICAR // Oliynyk SO, SklovskaSL .// Livestock Ukraine. - 2013. - №9 (49). S. 2-5.
- [4] Order of the Ministry of Agriculture of Russia №25 dated February 1, 2011. "Rules of accounting in breeding cattle dairy and dairy-beef productivity" / <http://www.rg.ru/2011/02/03/uchet-skotovod-site-dok.html>
- [5] Federal law of 3 August 1995 N 123-FZ "On livestock breeding" (as amended) / <http://base.garant.ru/10107888/>
- [6] Vladimir VsevolodovichSadovoy, Sergei Nikolayevich Shlykov, Ruslan Saferbegovich Omarov, and Tatiana Viktorovna Shchedrina. Res J Pharm Biol Chem Sci 2014;5(5):1530-1537.
- [7] Vladimir IvanovichTrukhachev, Vladimir VsevolodovichSadovoy, Sergei Nikolayevich Shlykov, and Ruslan Saferbegovich Omarov. Res J Pharm Biol Chem Sci 2015;6(2):1347-1352.
- [8] Shaliko Zhorayevich Gabriyelyan, Igor Nikolaevich Vorotnikov, Maxim Alekseevich Mastepanenko, Ruslan Saferbegovich Omarov, and Sergei Nikolayevich Shlykov. Res J Pharm Biol Chem Sci;6(3):1345-1350.