RESEARCH ARTICLE

Hygienic Control of Raw Milk from Small Farms

XHILDA ROKO[1], FATMIRA SHEHU[2], RENIS MACI[3], BIZENA BIJO[2], FEJZO BEGA[4], GORI STEFI[4]

[1]National Food Authority Durrës ALBANIA

[2]Department of Veterinary Public Health, Faculty of Veterinary Medicine - Agricultural University of Tirana - Albania

[3]Department of Food Microbiology, Institute of Food Safety and Veterinary. "Bilal Golemi"(ISUV). Tiranë - Albania

[4]Centre of Livestock and Rural Development (BZHR) – Albania

Abstract

The production of raw high quality milk is a requirement not only to the consumer as a safe and healthy product but also to support a profitable dairy industry. The Albanian law "On rules of producing and selling milk and milk-based products" and the Regulation No. 853 / EC / 2004, defines the criteria of raw milk hygiene. This legal basis requires that the number of somatic cells per ml (cytological indicator) must not exceed 400,000 (SSC) and Total Bacterial Count (TBC) must not be more than 100.000 UFC / ml. This study was conducted by testing of 108 samples of milk collected in farms in Lushnja, Fier and Kavaja. This study was supported by the center of "Livestock and Rural Development". The results obtained showed that 54/108 milk samples had values over the limits for cytological indicator, while 68/108 showed values above the limits prescribed by law for the total bacterial load. In positive samples were verified changes in physical and chemical indicators, resulting in decrease of lactose content in 37 samples of milk and of protein percentage decline in 41 samples. Given the fact that the production of milk and its derivates of these areas provides most of milk production of Albania, this situation calls for effective measures to help farmers to produce milk that meets the standards for customer and for milk industry.

Keywords: milk, SCC, TBC, physical-chemical indicators.

1. Introduction

Milk production in Albania is an old tradition that plays an important role in agriculture and rural development. Expansion of the market, including the availability of a variety of imported dairy products, has made the customer more demanding about the quality and safety of products supplied. In recent years the dairy industry has undergone major transformations in effort to become more competitive in terms of quality and benefits to producers [3]. Regular testing of raw milk quality is an important instrument for the development of the dairy sector and the consumer's protection. The parameters for estimating the quality of milk are fat, protein, lactose, and of security and higiene matters are Total Bacteria Count (ufc / ml), number of somatic cells (cell / ml) and residues of antibiotics [7, 11, 12]. The control of total quaility of milk is an essential component of the dairy sector and should be performed for a few reasons. Firstly, it helps farmers, collectors, processors and others involved in the milk productive chain to determine the condition of the quality as well as the weak spots in their ongoing activities. Secondly, it helps agencies involved in monitoring the quality of milk to meet consumer expectations for a final product of high quality, with high security and biological values [2].

Milk, being a complex mixture of nutrients and a high content of water, with an approximately neutral pH, may suffer negative changes very quickly. It is a very favorable product for microbial growth, especially bacterial pathogens [1]. Depending on which manipulation milk undergoes, biological and physico-chemical properties of milk can slightly vary from the activity of microorganisms. Thus, the number of bacteria in milk directly influences the quality and safety of dairy products [4]. Food disease

outbreaks, associated with the consumption of milk, are often associated by the presence of infectious pathogens may cause infections breast, [1, 13].

Mastitis is the most prevalent and expensive disease to farms which produce milk. Knowledge of the prevalence and distribution of pathogens is important for preventing the disease and determining the number of somatic cells, as an important indicator which impacts public health. Given as noted above, milk should be given special attention in the production, processing, marketing and consumption. Several important factors, such as the health of the herd, the degree of cleanliness of equipment and utensils in which is milk collected, hygiene of the place, secretion from the glands mammary an infected animal, the quality of water used and cooling conditions after milking, may affect the microbiological quality of milk and its derivatives [11.6]. Therefore, the definition of microbiological quality of the milk is an important step to ensure the hygienic safety of milk and its derivatives, consistent with the Albanian Law; "The rules of milk production and sales, and dairy products", Instruction No. 5, dated 03.25.2011 of MBUMK "*On the specific hygiene requirements for plant production, collection and processing of milk and milk-based products*", and *Directive 92/46 of CE.*

The region of Lushnja, Fier and Kavaja is one of the largest producers of milk in Albania. However, despite the fact that milk production is increasing, many dairy producers still use unspecialised methods, resulting in poor quality milk.

2. Material and method

2.1 Sampling

The study was conducted on 13 small farms in the region of Lushnja, Fier and Kavaja during the period of March - September 2015. Sampling was conducted by applying Method SSH 707 ISO, 1999: "The method of sampling for milk and milk-based products". Milk samples taken in the evenings and in the mornings and, within 2 hours, were transported, in cooling condition, to the Laboratory of Control of animal products - Faculty of Veterinary Medicine and to the Institute of Food Safety and Veterinary.

2.2 Determination of the overall content of microflora at 30^0 C

The method used to to estimate this indicator was conducted by the *ISO 4833: 2003 method*

"Microbiology of food/ animal feed". Count of aerobic mesophile was conducted by using the pour-plate technique. Aliquots of 1 ml of each serial dilution was placed in sterile Petri dishes, followed by the addition of the Plate Count Agar (PCA). Later, the content in Petri dishes was mingled easily by rotating movements and was incubated at $30^0 \pm 1^0$ C for 72 hours. Dishes which had a growth of 25 to 250 colonies were taken into consideration to be counted. Results were stated in CFU / ml.

2.3 Determination of the Somatic Cells Count

Quantitative assessment of somatic cells in milk samples was determined by using the mass electronic counter DCC DeLaval database kit.

2.4 Determination of physical-chemical indicators

The values of temperature, protein, lactose, fat, cryoscopic point and dry matter were determined using milk analyzer (LACTOSCAN S_L).

3. Results and Discution

The results showed that 54/108 milk samples were above the permitted value levels of cytological index (400,000 cells / ml), and 68/108 milk samples were value above the allowed limits for Total Bacterial Count (over 100,000 UFC/ ml). Changes of physical and chemical indicators were found in positive samples demonstrating decrease of lactose content in 37 samples and also decrease of protein percentage in 41 samples. High level of bacterial load that corresponds more often to the evening milking.

That identifies potential problems related to the quality of milk in the presence of infectious inflammation of the breast, especially those producing toxins. This situation is obviously related to the lack of adoption of quality improvement programs, aimed at reducing costs in the production process associated with increased quality, product differentiation in the market, as well as the fulfillment of requirements of the consumer. Given the importance that the dairy sector is in the economic sector national, as well as having the increased demands of the National and Europian legislation [8], the results of the study presented for evaluation of quality microbiological raw milk, suggests using the Good Manufacturing. Practices (GMP). Only in this way we can fulfill the criteria stipulated in the legal basis cited above.

Table 1. TBC and SCC results

PERIOD	R E G I O N S								
	LUSHNJA			FIER			KAVAJA		
	Samples	SCC	TBC	Samples	SCC	TBC	Samples	SCC	TBC
March	12	9	5	12	4	8	12	7	6
June	12	7	9	12	4	10	12	5	11
September	12	8	7	12	5	6	13	5	8
All	**36**	**24**	**21**	**36**	**13**	**24**	**36**	**17**	**25**
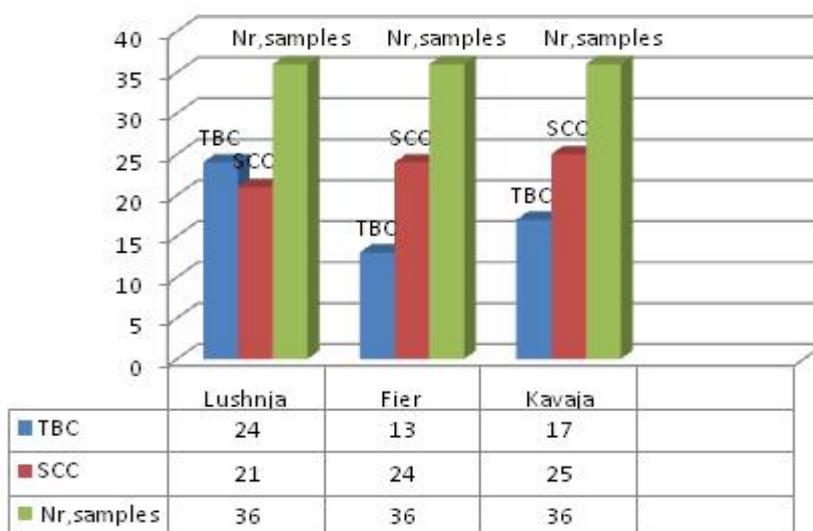
Figure 1. Graphical presentation of TBC and SCC.
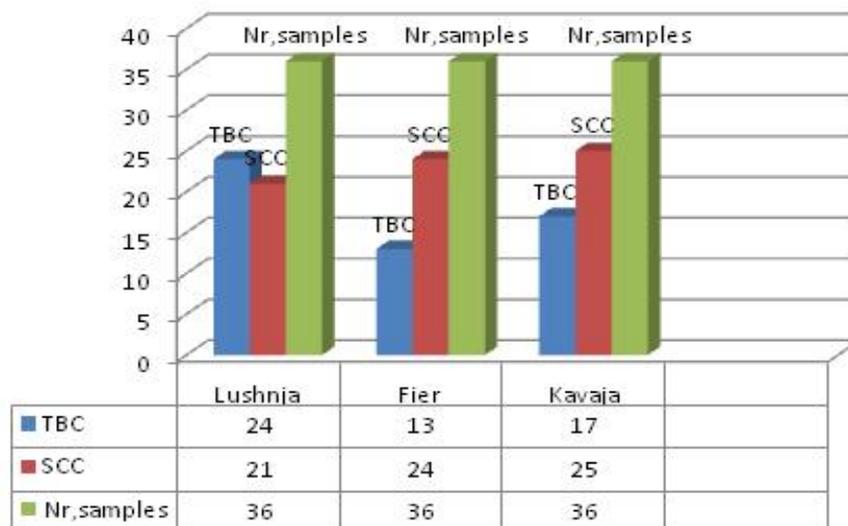
Figure 2. Graphical presentation of TBC and SCC.

4. Conclusions

The present study showed that the quality of milk produced in the study area was poor. This situation is an evidence of non- compliance with sanitary measures necessary in milk productive chain. These measures include proper handling of the cows, personnel hygiene, use of hygienic milking and processing equipments, improving milk handling environment among others. The poor bacteriological quality observed in the present study requires further investigation of the status of the animals' health, especially mastitis and the significance of the effect of

containers to ascertain their contribution on microbial quality The Good Production Practice (GMP), are effective practices in improving the microbiological quality of raw milk. Implementation of these practices, without doubt gives immediate results in reducing the level of pollution in the first step of the production chain of milk [5].

Also, in addition to the adoption of new procedures for the control and prevention of mastitis, determination of SCC (Somatic Cells Count), can help to avoid contamination of milk with agents cause infection, particularly those toxins producer, which constitute a real risk to public health [9,10].

5. Acknowledgements

6. References

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