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A COMPARATIVE STUDY ON MOUNTAIN AREA INFLUENCE OF MILK SAMPLES FROM COW AND SHEEP

Elena MARCU[1], Petru NICULITA[1], Ramona IANCU[2]

[1]Faculty of Biotechnologies, University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59, Marasti Bvd., 011464, Bucharest, Romania
[2]Faculty of Agricultural Sciences, Food Industry and Environmental Protection "Lucian Blaga" University, 5-7 Ion Ratiu Street, 550012, Sibiu, Romania

Corresponding author email: emarcu_asi@yahoo.com

Abstract

With the current rapid growth of world population and prolongation of human life, the raise of the living level and the targeting of food to a growing extent of agro-food products, with high nutritional and biological value, the need for food, especially of animal origin have increased ever more. This research was carried out to investigate and compare the physicochemical and microbiological parameters of milk samples of two different species like cow and sheep, including: pH, fat, protein, total solids, density, and somatic cells. Results showed that maximum fat and protein content were observed at sample 3 and sample 4, indicate that in mountain area sheep's are the most favorable animal breeding. The milk samples were collected nine month in the year 2011 from different farmers. The statistical analysis showed that the physicochemical and microbiological parameters of these milk samples were significantly different ($p<0.05$).

Keywords: *physicochemical parameters, microbiologic indices, cow milk, sheep milk.*

INTRODUCTION

The animals have an important role for small farmers. The growth of these animals is a sector of livestock production, effective from the biological and economic point of view, constituting an important goal for researchers.
Due the biological recovery of nutritional substances from feedstuffs in valuable products for human health, in the future, major investments in raising farms will be needed, but also in milk processing centers, to support and develop the supply of milk and milk products. [1, 2].
A market place for milk and milk products constitutes a fundamental strategic objective of farmers whose purpose is the systematic adjustment of the food sector, its fulfillment estimating the agriproduct potential conferred by natural resources. [4,11].
The significant increase in the competitiveness of Romanian agricultural producers is restricted by limited financial possibilities of maintenance through public resources of the government actions in the field of agro-food sector, as well as qualitative losses in what regards human resources, especially the attractiveness of careers in research.
The raw material for the production of drinking milk and milk products is, in our study, the milk of cows and sheep. It is considered the most complete product and easily assimilated by the body, constituting one of the basic foods in human nutrition. [3, 7].

MATERIALS AND METHODS

In the frame of selected farms for the determination of physic-chemical composition of Spotted breed's milk (called in Romania "Baltata") is predominate, but there are also a few specimens from the Holstein,the Romanian Spotted breed.
Sheep breeding is, through their social implications, a zoo-traditional representing for agricultural landowners source of food and raw material for their own needs, but also for their involvement in trade activities.
The prevalent breed in the farms taken into study, in Sibiu district is the breed Ţurcana. Milk samples were collected for 9 months in 2011 from different farmers.

A total of 210 samples of sheep's milk, 130 of cow's milk samples were analyzed from the physics-chemistry point of view, using the milk analyzer Ekomilk found in the equipment of the company ASI NATURE SRL Sibiu.
The microbiological analyses were made with MT-04. Sampling was done in sterile 50 ml vials, labeled and placed in a freezer at the device temperature 4°C up to the laboratory to be analyzed.

RESULTS AND DISCUSSIONS

The variability presents significant differences regarding the physicochemical parameters, but also microbiological. The chemical composition of the milk is subject breed, individuality, area, age, level and nature of nutrition, lactation, season calendar, during milking and health status [6.9].

The variability of the results of physicochemical and microbiological of cow's milk

The study shows that the majority of the samples of milk fall within normal values by 3.5% to 4.00% of the fat content. Samples that have experienced the greatest amount of fat are during the months of October and February, with a mean value of 3,99% 3,90% respectively.

High fat content recorded in winter is due to complete the different ration of warm season forage. Hay's introduction of good quality alfalfa and oat sharps increases the fat percentage with 1.08% as compared to the value recorded in the month of May (3.68%) fat.

Considering that the total proteins are relatively comparable in the two types of milk (3.43 g/100 ml for cow's milk and 2 g/100 ml goat's milk), it follows that of cows ' milk has a lower protein content and non-nitrogen. [8, 14, 15]

Determination of solids (SNF) for farms taken into study reveals that SNF is directly related to our values, values of protein, fat, lactose and water.

The integrity of the raw milk is the farmers'concern, but at the same time processors'one.

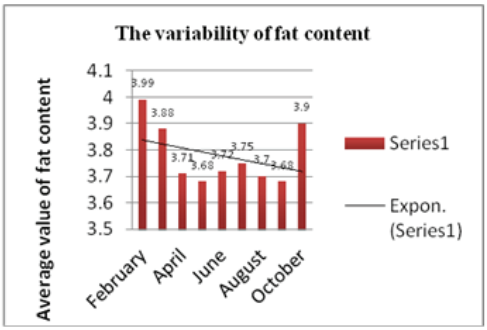

Figure 1. The variability of fat content

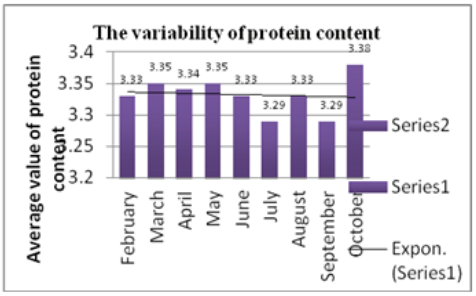

Figure 2. The variability of the protein content

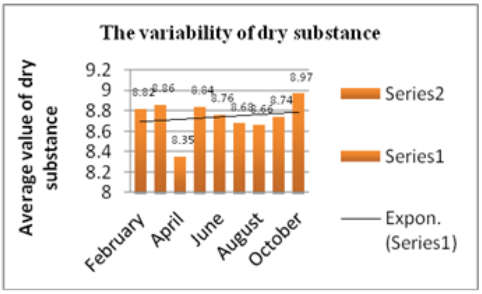

Figure 3. The variability of SNF content

The average value of the dry portion of the cows' light milk substance in 9 months is: 8,82% in February, 8,86% in March, April, 8,35% 8,84% in May, in June, the 8,68 8,76% in July, in August, 8,66% 8,74%, in September, 8,97% in October.

Cow's milk has a Newtonian behavior that depends on pH, in the sense that an increase or decrease in the pH of the milk causes an increase in the volume of casein micelles. [11].

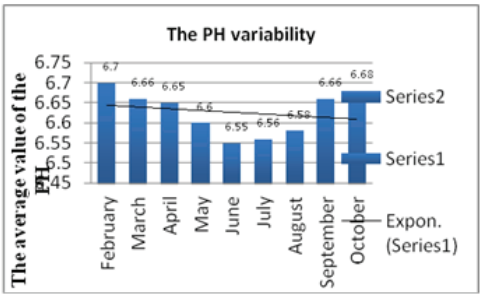

Figure 4. The variability of PH

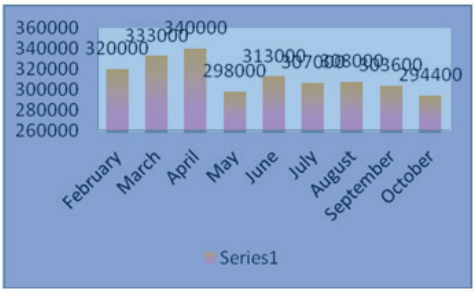

Figure 6. The variability of somatic cells number

The average value of pH of cow's milk caused by GARANIYA and associations in 2012, states that the pH value varies according to lactation, but remains around 6,62, the same values that it has been obtained in the present study.

The variability of the density of cow's milk according to lactation remains at around 21,904 g/cm³. The density (mass/volume) is dependent on the temperature at the time of determination, material composition, particularly in fat content, air inclusions.

The density varies between limits of l431-1,033 g/cm3.

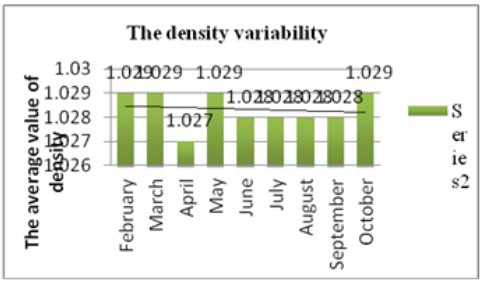

Figure 5. The density variability

As a result of the study on the quality of raw milk in the researched holdings regarding the evaluation of somatic cell counts (NCS), it is found that the samples analyzed milk fall in the standard of quality set by European Regulations 853/2004, 854/2004 and 2076/2005 and 479/2007.

The highest value registered was 340,000 M/m in April, and the lowest value was 294.400/ml NORTON in October.

On this basis, the correlation between the number of somatic cells equal to or greater than 400,000 cells/ml of milk and the presence of infection in cow's milk, has been determined using the test, Fisher associations (p = 0,2), under different production systems.

On this basis, the correlation between the numbers of somatic cells equal to or greater than 400,000 cells/ml of milk and somatic cell count was accepted as quantitative index in the case of mastitis in cows or to indicate the level of irritation of the mammary glands. [12, 13]

Among the diseases that can be transmitted through human milk consumption, include enterocolitis caused by salmonella, brucellosis, Q fever, listeriosis, toxoplasmosis, streptococe and stafilococe infections caused by Campylobacter. [8, 9]

Most dispersed agents, which causes mastitis, are: *Streptococcus agalactiae, Streptococcus pyogenes, Streptococcus dysgalactiae, Streptococcus zooepidemicus, Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus pyogenes, Yersinia pseudo-tuberculosis, Enterobacter cloacae, Pseudomonas aeruginosa, Clostridium perfringens,* tipul C*, Corynebacterium ovis, Bacillus cereus, Klebsiella pneumoniae* şi *Mycopasma putrifaciens*. [16, 17]

The variability of the results of physicchemical and microbiological milk sheep indices

The type of diet can influence both the quantity of milk and milk quality indices. The milk fat may be influenced in terms of quantity and consistency. Reducing the fat content of the milk may also be caused by the lack of an adequate level in the diet, composed of cellulose by the presence of large amounts of food rich in unsaturated fatty acids and ruddy acidosis.

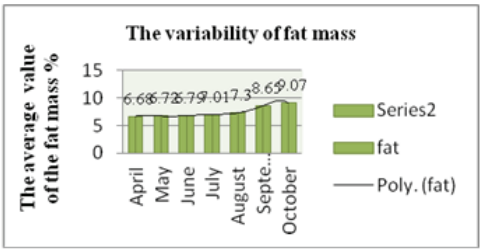

Figure 7. The variability of fat mass

Nutritional status, endocrine and physiological affects milk production and composition for shorter or longer periods.

Total protein from sheep's milk is higher in autumn than in the summer, in addition, the total content of protein depends on breed, researches conducted by the specialists' reveale that the highest concentration of the milk proteins has the milk of Turcana's breed.

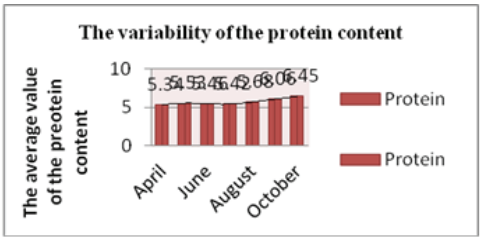

Figure 8. The protein content variability

Due to the introduction of good quality hay and fodder beet forage ration in dementrial of green mass, the non-fat solids record a maximum in winter (12%), the difference compared to the value recorded in summer being 10,81%.

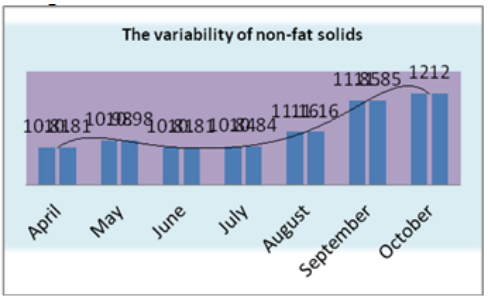

Figure 9. The variability of SNF

Density of milk is used for the conversion of mass to volume and vice versa, for estimating dry matter content, for calculating other properties, such as the kinematic viscosity.

The minimum density of sheep milk is determined by 1,032 + 0, 009 mg in the months of June and July.

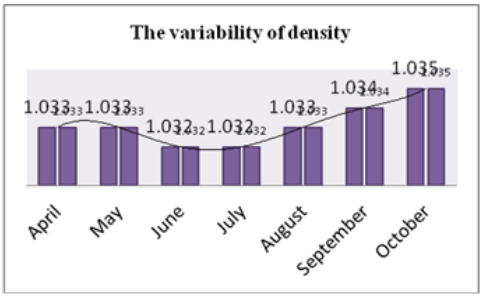

Figure 10. The density variability

As a result of researches carried out on the herd of sheep a minimum value of pH was registred for 6,58 milk in May, and in October of 6,70.

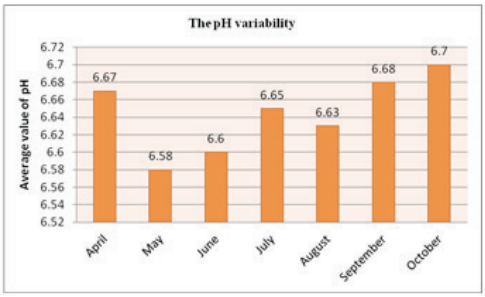

Figure 11. The PH variability

Some of them consider that the appeareance of intramamare infections with nonhemolitic staphylococci is random; others argue that these infections may become chronic and lead to irritation of the udder, increasing the number of somatic cells and decreased milk production. [5, 6].

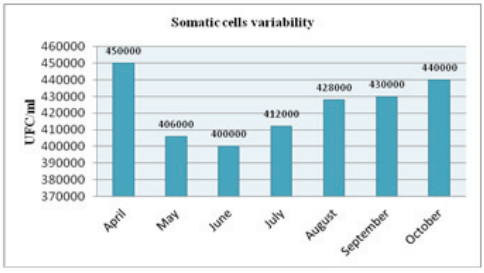

Figure 12. The variability of somatic cells number

CONCLUSIONS

The results obtained in this study show us that the breed most suitable to be developed and exploited for milk production livestock in the mountain area is sheep breed.

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