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PHYSICO-CHEMICAL AND MICROBIOLOGICAL ANALYZES WITH A ROLE IN ASSESSING THE QUALITY OF SHEEP'S MILK

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• Introduction

✓ Milk and milk products from sheep are included in the human diet, due to the complex chemical composition determined by the macro and micronutrients they contain. Knowing the physico-chemical properties and the microbial load of sheep's milk are essential considering that it represents the source of obtaining dairy products.

✓ The quality of sheep's milk is affected by several factors: breed and genotype, animal health, age, stage of lactation, season, feed system, rearing system, milking techniques, etc.

• Material and method

✓ The study presents the results of the physico-chemical and microbiological analysis of milk samples from Turcana sheep from 2 experimental groups, sheep that benefited from a different feeding system: Group A - 100 sheep that grazed freely on the pasture area for about 10 hours, Group B - 100 sheep that grazed freely on the pasture area for about 10 hours, but which received additional feed.

✓ The milk collected from sheep by milking manually was quantitative analyzed, were determined: physical-chemical parameters (pH, freezing point, chemical composition: lactose (L), the content of fats (F), total proteins (TP), non-fat solids (Snf)), respectively the microbiological parameters: the total number of aerobic mesophilic germs (NTG), the number of coliform bacteria (CT), the number of Staphylococcus aureus and the number of somatic cells (SCC).

• Results and discussions

Table 1. Physical characteristics and chemical composition of Turcana sheep milk

Parameters	Month	Group A	Total	Months	Group B	Total
pH	May	6.72 ± 0.035		May	6.87 ± 0.090	
	June	6.81 ± 0.023	6.74 ± 0.027	June	6.81 ± 0.091	
	July	6.69 ± 0.031		July	6.76 ± 0.100	6.81 ± 0.093
Freezing point (C)	May	0.56 ± 0.003		May	0.56 ± 0.003	
			0.57 ± 0.002			
	June	0.57 ± 0.002		June	0.57 ± 0.013	0.56 ± 0.007
	July	0.56 ± 0.003		July	0.56 ± 0.005	
Lactose	May	4.03 ± 0.182		May	4.29 ± 0.051	
	June	4.60 ± 0.036	4.28 ± 0.167	June	4.81 ± 0.125	
	July	4.23 ± 0.291		July	4.70 ± 0.221	4.60 ± 0.132*
Fat	May	7.86 ± 0.025		May	8.7 ± 0.286	
	June	7.75 ± 0.030	7.98 ± 0.030	June	8.12 ± 0.170	
	July	8.32 ± 0.036		July	8.65 ± 0.287	8.49 ± 0.246*
Casein	May	4.68 ± 0.036		May	5.2 ± 0.381	
	June	4.79 ± 0.070		June	5.30 ± 0.264	
	July	4.84 ± 0.036	4.77 ± 0.047	July	5.74 ± 0.201	5.41 ± 0.282*
Solids-non-fat (Snf)	May	11.67 ± 0.041		May	11.58 ± 0.040	
	June	11.45 ± 0.036	11.52 ± 0.040	June	11.53 ± 0.046	11.53 ± 0.041
	July	11.45 ± 0.045		July	11.49 ± 0.038	

Table 2. Trace elements and heavy metals concentration in Turcana sheep milk

Parameters	Month	Group A	Months	Group B
Zn	May	14.19 ± 0.477	May	15.14 ± 0.429
	June	14.97 ± 0.567	June	15.37 ± 0.463
	July	15.07 ± 0.900	July	15.87 ± 0.087
Fe	May	2.66 ± 1.163	May	3.76 ± 0.107
	June	3.33 ± 0.193	June	3.80 ± 0.156
	July	3.54 ± 0.187	July	4.06 ± 0.082
Cu	May	<LOD	May	<LOD
	June	0.17 ± 0.029	June	0.19 ± 0.010
	July	0.20 ± 0.007	July	0.19 ± 0.021
Pb	May	<LOD	May	<LOD
	June	0.06 ± 0.005	June	0.06 ± 0.005
	July	0.066 ± 0.005	July	0.073 ± 0.005
Cd	May	<LOD	May	<LOD
	June	<LOD	June	<LOD
	July	<LOD	July	<LOD
Mn	May	0.20 ± 0.011	May	0.21 ± 0.020
	June	0.21 ± 0.009	June	0.25 ± 0.039
	July	0.22 ± 0.036	July	0.26 ± 0.017

Table 3. Somatic Cell Count (SCC) and microbial counts in Turcana sheep milk

Parameters (lg_{10} cells/mL)	Month	Group A	Total	Months	Group B	Total
Somatic Cells Count (SCC)	May	4.62 ± 0.313	4.71 ± 0.154	May	4.69 ± 0.185	4.76 ± 0.152
	June	4.70 ± 0.113		June	4.84 ± 0.149	
	July	4.8 ± 0.036		July	4.75 ± 0.127	
Total mesophilic bacteria (TMB)	May	2.8 ± 0.400	2.86 ± 0.328	May	2.43 ± 0.351	2.74 ± 0.270
	June	2.86 ± 0.208		June	2.73 ± 0.305	
	July	2.93 ± 0.378		July	3.06 ± 0.152	
Total coliforms bacteria (TCB)	May	1.90 ± 0.529	1.98 ± 0.362	May	1.80 ± 0.360	2.00 ± 0.220
	June	1.96 ± 0.351		June	2.00 ± 0.201	
	July	2.10 ± 0.210		July	2.20 ± 0.100	
S. aureus	May	1.33 ± 0.503	1.27 ± 0.427	May	1.36 ± 0.665	1.45 ± 0.528
	June	1.03 ± 0.472		June	1.33 ± 0.503	
	July	1.46 ± 0.305		July	1.66 ± 0.416	

Conclusions

The microbiological parameters analyzed at the level of all milk samples indicate a generally good state of health of the sheep, especially of the mammary gland, so the absence of microbiological contamination of the milk, a high degree of hygiene in the farm and in the milking process. the high content of fats and proteins, Zn, Fe and Mn, respectively the optimal values of pH and SCC are optimal conditions for obtaining good quality sheep's milk products. Based on the values recorded for the concentrations of heavy metals, we can conclude that there are no sources of pollution in the area where the microfarm is located.