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## SEASON INFLUENCE ON MILK PHYSICO-CHEMICAL CHARACTERISTICS

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**Abstract:** The influence of seasonal variations on milk composition might be contingent upon many variables, including geographical location, climatic conditions, cow breed, and farm management strategies. The objective of this research is to examine the correlation between the season, quality, and safety of bovine milk via the assessment of physical-chemical parameters and the somatic cell count. The milk samples were collected on a weekly basis from the cooling tanks of a farm located in the northeastern region of Romania. The parameters were assessed via the use of rapid analytical procedures that require minimal reagent usage and accessible analysis expenses. Based on the findings of the study, it was determined that seasonality exerted a notable influence on the milk's quality. Specifically, the cold season displayed higher levels of fat, protein, casein, and lactose compared to the warm season. Additionally, in the cold season a lower quantity of somatic cells (SCC) in comparison to the warm season was observed.

### Introduction

- ✓ The quantity and quality of milk are influenced by a number of factors, including nutrition, animal genetics, and management techniques. Furthermore, the yield and content of milk can be greatly influenced by the time of year it is produced (Bara S., et al, 2023).
- ✓ Milk's composition and physical-chemical properties can differ depending on several factors, including diet, animal health, lactation stage, and genetics. Seasonal changes also play an important role (Bernabucci et al., 2015; Larsen et al., 2010).
- ✓ High temperatures and humidity in the environment, as well as milking practices, have been linked to elevated SCC levels (Nasr & El-Tarabany, 2017; Reyes et al., 2017). Reduced yield, changes in the organoleptic properties of milk and milk products, and a shorter shelf life are all linked to high SCC (Andrade et al., 2007; Barbano, Ma, & Santos, 2006).

### Material and method

#### Physical-chemical evaluation and SCC (Somatic Cell Count) in milk cooling tanks from milking systems

- ✓ The automated analyzer - FTIR CombiScope 600/300 was used to determine parameters physical-chemical (density, total dry matter, fat, protein, lactose, casein) and SCC from samples collected from cooling tanks. The solutions used for the analysis were: 0.1% Triton solution, 20% solution staining and 20% Decon solution.



Automated Analyzer - FTIR CombiScope

### Results and discussions

- The aim of the work is to highlight the seasonal variability of the parameters related to the physico-chemical and hygienic quality of milk, compared in the cold season and in the warm season.

**Table 1.** The average values of the milk quality parameters depending on the harvest season (warm or cold)

Milk quality parameters	Average value of samples from the warm season	Average value of samples from the cold season
Density (g/cm <sup>3</sup> )	1.030	1.031
Total dry matter (%)	12.78	12.96
Fat (%)	3.84	3.95
Protein (%)	3.37	3.42
Lactose (%)	4.78	4.94
Casein (%)	2.75	2.82
Somatic cell count (cells/ml)	315 x10 <sup>3</sup>	285 x10 <sup>3</sup>

- The physico-chemical parameters analyzed showed higher values in the cold season compared to the warm season, the parameter with the greatest variation being lactose, followed by fat content, dry matter, casein and protein.
- The number of somatic cells in the warm season is higher compared to that in the cold season, both average values being below the maximum limit, allowed for this parameter of hygiene and safety of raw milk.

### Conclusions

- Thermal stress influences the quality of milk in the hot season, leading to an increase in the number of somatic cells and a decrease in the percentage of fat, lactose, protein and casein.
- It is recommended to continuously monitor the physico-chemical parameters of milk and make correct managerial decisions to maintain an optimal level of the values of the physico-chemical and hygiene parameters.