

## QUALITY OF RAW MILK OBTAINED FROM BROWN BREED EXPLOITED IN VRANCEA COUNTY

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### Abstract

Having in view that, Brown breed have an important rate in cattle breed structure from Vrancea County, we consider that it is opportune to carry out a study concerning the seasonal variation of qualitative features of raw milk obtained from this breed, due to specific technologies and technological factors management applied in the area.

The results of this research aim to complete the information regarding quality of raw milk gathered from Brown breed cattle which are registered in Vrancea County Official Control of productive performances. Research was carried out to determine the raw milk quality by specific physical-chemical and microbiological analysis, for parameters such as: somatic cell count, dry matter, fat, protein, lactose and casein content, urea, density and pH.

The mean values and variability estimators for somatic cell count ranged between 242600 (winter) and 573200 (summer), dry matter oscillated between 11.84% and 13.42%, the fat percentage varied between 3.28% (spring) and 4.34% (winter), protein percentage recorded mean values between 3.21% and 3.96% in autumn, respectively in winter; lactose content was between 3.78% and 4.87%, casein content ranged between 27.46 g/l and 29.29 g/l.

**Key words:** raw milk, Brown breed, quality features

### INTRODUCTION

Milk is universally recognized as complete food [20] with a complex chemical composition [7, 19], being rich in essential components for human nutrition such as proteins, fats, carbohydrates (lactose), mineral salts, vitamins [14, 15, 21-23, 27].

Milk's composition is influenced by several factors such as: breed, season, physiological condition, animal individuality, lactation stage, feeding and forage quality, body condition score, sanitary conditions of the mammary gland, interval between lactations, number of daily milking and the moment of milking[2, 4, 9, 10, 12, 13, 16].

Due to its nature, it provides a good environment for the growth and development of micro organisms [3, 5, 21], being known that fresh raw milk contains bacteria and somatic cells, which are milk's biological constituents [24].

The quality of raw material of bovine origin has become an increasing issue for the consumers [1], and sanitary conditions must be strictly respected in order to have safe products [11].

The aim of this paper is to determine the quality of raw milk gathered from Brown breed cattle which are registered in Vrancea County Official Control of productive performances.

### MATERIAL AND METHOD

The samples were gathered from 1520 Brown dairy cattle from 15 exploitations' from Vrancea County. At each monthly control of productive performances, samples were collected in sterilized plastic bottles of 50 ml. Before reaching the analysis laboratory, each sample was previously preserved with bronopol 0.2 %, labelled with a unique code and was also mentioned the animals' identification number and kept at refrigerating conditions. Samples analysis took place in a maximum of a week from the moment, in which they were brought to the laboratory.

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The manuscript was received: 07.10.2019

Accepted for publication: 23.04.2020

Microbiologically speaking, was analysed the somatic cell count (SCC) performed with a SomaScope device, the obtained results being multiplied by 1000. Before the analysis begins samples were heated into a water bath till reaching a temperature of 38°C.

Raw milk physico-chemical composition analyses included pH, fat, protein, lactose, casein, urea, dry matter, and density were realized using the Fourier Transformed Infrared technique (FTIR), performed with LactoScope (Delta Instruments).

Primary data from monitoring each farm were statistically processed (average, standard deviation, the coefficient of variation) and summarized for each analysed parameter. The software used for statistical analysis was SPSS.

## RESULTS AND DISCUSSIONS

A number of 72960 of raw milk samples were analyzed in total, data from the analysis were summarized in total (Table 1 and 2) and after separated by season (Table 3).

Regarding the SCC present in the milk (Table 1 and 3) results found in the literature are controversial. Some studies shows that there is no effect of year seasonality on the milk SCC [6, 25],but, other authors observed a decrease in the SCC of milk in the coldest periods of the year [10-14, 17], data which are in accordance with the results of this study.

Table 1 Somatic cell count of raw milk samples

Specification	Somatic cell count (SCC/ml)
$\bar{X}$	380.20*
$s_x$	643.30
V (%)	128.24

\*Results have to be multiplied by 1000

Table 2 Proximate composition of raw milk samples

Specification	Fats (%)	Proteins (%)	Lactose (%)	Dry matter (%)	Urea (mg/100 g)	Casein (g/l)	Density (g/l)	pH
$\bar{X}$	3.91	3.50	4.02	12.80	27.40	28.12	1029.50	6.64
$s_x$	1.01	0.54	0.54	0.95	7.54	2.93	0.78	0.06
V (%)	22.59	10.65	5.52	11.10	29.57	13.90	0.30	0.95

Having in view that the animals are of the same breed and with a similar productive potential, the main factors associated with differences of milk composition are: year, season of the year, dry matter intake and its quality, fibre digestibility and energy/protein diet ratio, lactation stage [6, 8, 13, 14].

Regarding the data presented in table 2, we can observe that the average values for all the determined parameters are within the limits mentioned in the specialty literature [6-8, 10, 13, 14, 20-22, 26].

Certain differences were found for proximate composition of raw milk samples (Table 3).

Table 3 Variation of microbiological and proximate composition of raw milk samples in 2018 seasons

Specification	Somatic cell count (SCC/ml)	Fats (%)	Proteins (%)	Lactose (%)	Dry matter (%)	Urea (mg/100 g)	Casein (g/l)	Density (g/l)	pH
Spring									
$\bar{X}$	409.40*	3.28	3.51	3.78	11.84	28.13	28.34	1029.17	6.60
$s_x$	569.46	1.20	0.40	0.91	0.79	6.68	4.21	0.94	0.07
V(%)	125.33	24.90	11.60	4.10	10.45	33.51	11.24	0.48	1.01
Summer									
$\bar{X}$	573.20*	3.78	3.23	3.72	12.44	34.46	27.46	1029.31	6.62
$s_x$	894.24	0.81	0.32	0.40	0.98	5.14	4.64	0.77	0.06
V(%)	149.65	20.95	9.87	6.41	12.52	20.91	12.51	0.28	0.91
Autumn									
$\bar{X}$	348.26*	4.26	3.21	3.67	13.11	26.48	27.54	1029.64	6.65
$s_x$	464.07	0.86	0.40	0.52	1.11	9.94	3.18	0.85	0.05
V(%)	186.93	20.30	11.26	7.25	10.78	21.51	11.54	0.60	0.92
Winter									
$\bar{X}$	242.60*	4.34	3.96	4.87	13.42	22.65	29.29	1030.89	6.69
$s_x$	858.75	1.12	0.85	0.45	0.78	8.18	6.51	0.94	0.08
V(%)	151.54	26.51	9.88	4.34	8.54	42.35	10.61	0.18	0.90

\*Results have to be multiplied by 1000

Thus, for the total lipids content, the average values ranged between  $3.28 \pm 1.20\%$  in spring season and  $4.34 \pm 1.12\%$  in the winter season, the obtained values being in accordance with the quality standard, which impose that milk fat content, should not be less than 3.2%.

Regarding the protein content, this one oscillated between  $3.21 \pm 11.60$  in autumn season and  $3.96 \pm 9.86\%$  in the winter season.

For the lactose content, the average of milk samples was  $3.67 \pm 0.52\%$  in autumn season and  $4.87 \pm 0.45\%$  for the samples from winter season.

In the case of dry matter content was obtained a mean value of  $11.84 \pm 0.79\%$  in spring season and  $13.42 \pm 0.78\%$  in winter season, difference till 100% being represented by water content.

Analysis of samples in the case of urea content highlighted a higher content during the summer season, which can be explained by the fact that cows are at pasture and lower values in winter season when cows are during the indoor period.

The casein content (g/l) presented more constant values, with a slight increase during the cold months of the year, the maximum value being recorded in winter season (29.29 g/l), while the minimal one in summer season (27.46 g/l).

For density, we obtained a mean value of  $1.02917 \pm 0.48 \text{ g/cm}^3$  for milk samples in spring season and  $1.030 \pm 0.094 \text{ g/cm}^3$  for milk samples in winter season.

The pH values indicate a healthy milk, without contaminants or altered compounds, average values ranking between 6.60 and 6.69.

From the data presented in table 3, we observe that the analysed samples had a very good homogeneity regarding the following characters: lactose, density and pH, a medium homogeneity was recorded for dry matter, protein and casein content, and inhomogeneous for fat and urea content.

## CONCLUSIONS

In this study preliminary investigations were carried out to determine the quality of raw milk gathered from Brown breed cattle from Vrancea County.

Milk samples had a poor microbiological quality in spring and summer seasons with values of SCC above the threshold of actual sanitary regulations.

Concerning the physico-chemical quality features all the raw milk samples collected fully complied with the en-force regulations of the European Union.

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