INFLUENCE OF SEASON ON PRODUCTIVE PERFORMANCES AT BROWN BREED EXPLOITED IN NORTH PART OF ROMANIA

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Abstract

The main objective of dairy cattle's exploitation is the one to find an efficient economical path for increasing of milk production and quality. The results presented in the current study were obtained after an ample research which aimed to complete the information regarding quality of milk gathered from Brown breed cattle exploited in the N-E area of Romania.

To achieve the proposed targets, research was carried out in according with an experimental design based on considerations regarding milk production and determination of milk quality by specific physical-chemical analysis during four seasons, aiming the following parameters: fat, protein, casein and lactose.

For fat percentage, the lowest mean value was 3.24% (recorded in spring season) and the highest one 3.98%, (recorded in winter season). There are very significant differences ($p<0.001$) for fat percentage between seasons: autumn-winter; summer-winter; autumn-spring; summer-spring and insignificant differences ($p>0.05$) for seasons: spring-winter; autumn-summer.

For protein percentage were calculated mean values between 3.46% and 3.61%, during spring months, respectively autumn months. The mean values calculated in the current study are in according with the limits from literature.

Regarding casein percentage, in our own research were calculated mean values between 2.71% (summer) and 2.83% (winter).

Key words: Parameters; Casein; Lactose

INTRODUCTION

Milk has over 200 components, some in large quantities (water, fat, carbohydrates, and proteins) and some of them in small quantities. Milk composition differs mainly by breed but differences also appear in the same breed, thing influenced by a series of factors such as: breed, nutrition, age, lactation stage etc (Pătraşcu et al., 1985; Sutton and Morant, 1989; Bendixenet al., 2011).

From genetic factors, breed and individuality play an important role, because milk quantity and quality have large variations from one breed to another, from one individual to another.

The main aim for dairy cows exploitation is the one to find an economical and efficient way for increasing milk production and its quality. The results presented in the current study were obtained after a laborious research aimed to complete the information regarding quantity and quality of milk obtained from Brown breed cattle's exploited in the N-E area of Romania.

For fulfilling the proposed targets, research were carried out in according with an experimental design based on grounds regarding milk production and determination of milk quality through specific physical-chemical analysis during four seasons, observing the following parameters: fat, protein and casein.

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The manuscript was received: 28.09.2018
Accepted for publication: 13.02.2019

MATERIAL AND METHODS

Cattle populations belonging to Brown breed from N-E area of Romania were selected based on several reasons. The most important ones were: existence of some individual data regarding milk production and lactation ranking, existence of passports, respectively pedigree.

Samples were individually gathered from a total number of 121 cows from four different locations. Milk samples were gathered in 50 mL tubes, from each animal taking the mean sample. For determination of milk quality, samples were seasonally gathered, one sample set in each season. Milk samples were stored and transported to laboratory at a temperature of 4ºC, into a 24 hours time interval. As preservative was used potassium dichromate, substance which not affects nor modifies milk composition.

Samples were analysed using a Foss automatic system namely MilkoScan FT 6000fordetermination of physical-chemical parameters. System includes more analysers (LactoScope and SomaScoper MKII), as well as an automatic preparing unit for samples and a date base type software which integrates the results of the analysed samples.

The device needs an adequate calibration, and for this thing was utilised PLS method, described and recently compared by Sakari Salonen et al., (2012).

The utilised LactoScopefor determination of fat, protein and lactose percent uses "Mid Infra-Red" (MIR) technique described by Bijgaart (2006). The technique utilised by the device respect the calibration standard IDF 141B:1996 *(IDF standard 141B, 1996).*

For analysing of milk quality parameters were used the following reference methods: fat was determined by Röse Gottlieb method in according with standard AOAC 989.05 ISO 8381/IDF 124-1:2005 and reference AOAC Official method 989.05 with LactoScope analyzer; protein was determined by Kjeldhal method in according with standard ISO 1/20-1:2001; IDF 20-1/2:2001and reference Codex Stan 234-1999 with LactoScope analyzer; case in was determined by Kjeldhal method in according with standard ISO 17997-1:2004; IDF 29-1:2004 and reference ISO 17997-1:2004 (IDF 29-1: 2004) with MilkoScan FT 6000analyzer.

RESULTS AND DISCUSSION

The lowest mean value for fat percent was 3.71% (recorded in summer) and the highest one was 4.08%, (recorded in winter), at is shown in Table 1.

Table 1 Brown Breed milk fat content

	Batch	$\bar{X}\pm s_{\bar{X}}$	V%	Limits	Signification of differences T-Test (2 tailed)				
Fat (%)	Li	4.08±0.03	12.92	3.14÷4.96	-	Li	Lp	Lv	Lt
	Lp	3.73±0.01	2.12	3.51÷4.02	Lt	n.s.	***	***	-
	Lv	3.71±0.03	3.91	3.21÷3.87	Lv	***	n.s.	-	-
	Lt	4.01±0.02	2.23	3.74÷4.34	Lp	***	-	-	-

Li= milk samples gathered in winter; ***Lp*** = milk samples gathered in spring; ***Lv*** = milk samples gathered in summer; ***Lt*** = milk samples gathered in autumn; $^{n.s.}$p>0.05 = insignificant differences; *p<0.05 = significant differences; **p<0.01 = distinct significant differences; ***p<0.001 = very significant differences

There are very significant differences (*p<0.001*) for fat percent between seasons: summer-winter; autumn-spring; autumn-summer and spring-winter.

For protein percent were obtained mean values between 3.23% and 3.47%, in summer months, respectively in winter. Variation coefficient for this index shows a very homogenous population for this character.

Very significant differences (*p<0.001*) for protein percent were obtained between seasons autumn-summer, summer-winter, summer-spring, spring-winter (Table 2).

Regarding casein percent (Table 3), in the frame of own research was calculated mean values between 2.63% (for milk gathered in spring) and 2.75% (for milk gathered in winter).

Significant differences ($p<0.05$) for this character were recorded between season summer-winter, while between seasons autumn-spring, summer-spring and spring-winter existed very significant differences ($p<0.001$).

Distinct significant differences ($p<0.01$) for this character exist between seasons autumn-winter, while between seasons summer-winter were obtained very significant differences ($p<0.001$).

Table 2 Brown Breed milk protein content

	Batch	$\bar{X}\pm s_{\bar{X}}$	V%	Limits	Signification of differences T-Test (2 tailed)				
Protein (%)	Li	3.47±0.03	4.91	2.97÷4.62	-	Li	Lp	Lv	Lt
	Lp	3.36±0.01	2.09	3.15÷3.62	Lt	n.s.	n.s.	***	-
	Lv	3.23±0.00	1.24	3.43÷3.38	Lv	***	***	-	-
	Lt	3.43±0.01	2.62	3.14÷3.71	Lp	***	-	-	-

Li= milk samples gathered in winter; ***Lp*** = milk samples gathered in spring; ***Lv*** = milk samples gathered in summer; ***Lt*** = milk samples gathered in autumn; $^{n.s.}$p>0.05 = insignificant differences; *p<0.05 = significant differences; **p<0.01 = distinct significant differences; ***p<0.001 = very significant differences

Table 3 Brown Breed milk casein content

	Batch	$\bar{X}\pm s_{\bar{X}}$	V%	Limits	Signification of differences T-Test (2 tailed)				
Casein (%)	Li	2.75±0.02	4.31	2.05÷3.71	-	Li	Lp	Lv	Lt
	Lp	2.63±0.01	2.92	2.45÷2.78	Lt	n.s.	***	n.s.	-
	Lv	2.69±0.01	1.49	2.56÷2.81	Lv	*	***	-	-
	Lt	2.72±0.02	2.22	2.52÷2.93	Lp	***	-	-	-

Li= milk samples gathered in winter; ***Lp*** = milk samples gathered in spring; ***Lv*** = milk samples gathered in summer; ***Lt*** = milk samples gathered in autumn; $^{n.s.}$p>0.05 = insignificant differences; *p<0.05 = significant differences; **p<0.01 = distinct significant differences; ***p<0.001 = very significant differences.

CONCLUSIONS

In case of determination of milk quality by specific physical-chemical analysis during four seasons, were recorded very significant statistical differences for parameters fat, protein and casein between the cold seasons and the hot ones.

The research realised for milk production and determination of milk quality of Brown breed from North-East of Romania, could serve, in the way in which the decisional factors involved in cattle's breeding will consider that it is useful, as an knowing element of actual stage of breeding and utilization in future technical actions.

REFERENCES

[1] Bendixen E., Danielsen Marianne, Hollung K., Gianazza Elisabetta, Miller Ingrid, 2011 – *Farm animal proteomics – A review*. Journal of Proteomics, Vol. 74, p. 282-293.

[2] Pătrașcu C., Pătrașcu Al., 1985 – *Laptele aliment și materie primă.* Ed. Tehnică, București

[3] Sutton J.D., Morant S.V., 1989 - *A review of the potential of nutrition to modify milk fat and protein*. Livest. Prod. Sci. Vol. 23, p. 219–237.