Milk Quality Of Holstein Cattle Under North African Conditions

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Introduction

The quality of the milk became a concept for which the producers and the industrialists should grant a particular attention. This is imposed by the taste of the consumer and the competitiveness on the national and international markets. In order to produce milk of quality, it is first recommended to look for the factors affecting the composition. These are the objectives of this study which consists in establishing the inventory of fixtures of the physical and chemical characteristics of milk and its variation according to the cattle-breeding area.

Material and methods

Data of 86 000 monthly tests for 31 000 cows enrolled in the national milk recording system were provided by the Office d'Elevage et des Paturâges. Herds belong to four production sectors (OTD, OEP, SMVDA, and Privatized) and located in north, central and south of Tunisia.

The data were edited to remove abnormal records, only values included between averages +/- two standard deviations were retained. All cows were required to have 30 to 450 days in milk. Stage of lactation was divided into 14 periods and production into four levels.

The data were analyzed by least squares technique using the GLM procedure of SAS, the following model was used:

$$Y_{ijklmno} = \mu + Sect_i + fasv_j(Sect_i) + M_k + NL_l + SL_m + NP_n + e_{ijklmno}$$

Where $Y_{ijklmno}$, $Sect_i$, $fasv_j(Sect_i)$, M_k, NL_l, SL_m, NP_n are respectively fat and protein percentage, production sectors, cofactor farm-year - season of calving intra the production sectors, month(k=1..12), number of lactation (l=1..6), stage of lactation (m=1..14) and levels of production (n=1..4)

Results and discussion

The means and standard deviation for each trait estimated by region are given in table 1; fat and protein percentage were higher than this cited by Agabriel, G., Coulon, J, B., Marty, G., and Cheneau, N. (1990).

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The preliminary analyses identified important sources of variations in protein and fat percentage (table2). It allowed a significant effect of the month. The number of lactation is a factor of change in the composition of milk in the north regions. However, the stage of lactation didn't affect the fat composition in the northeast and the center. Moreover, the level of production has no effect on fat and protein in the northeast.

The most important factor which affects the milk composition is the season. The rates of fat and protein are lower in summer; this can be explained by the effect of photoperiod: a long duration of day can act negatively on the milk trait (Agabriel et al. (1990)).

The percentage of fat and proteins varies between regions and according to the seasons (figure 1). Northern regions showed higher fat percentage and the highest protein percentage are shown in the southern region

Table 1: Means and standard deviations of fat and protein percentage

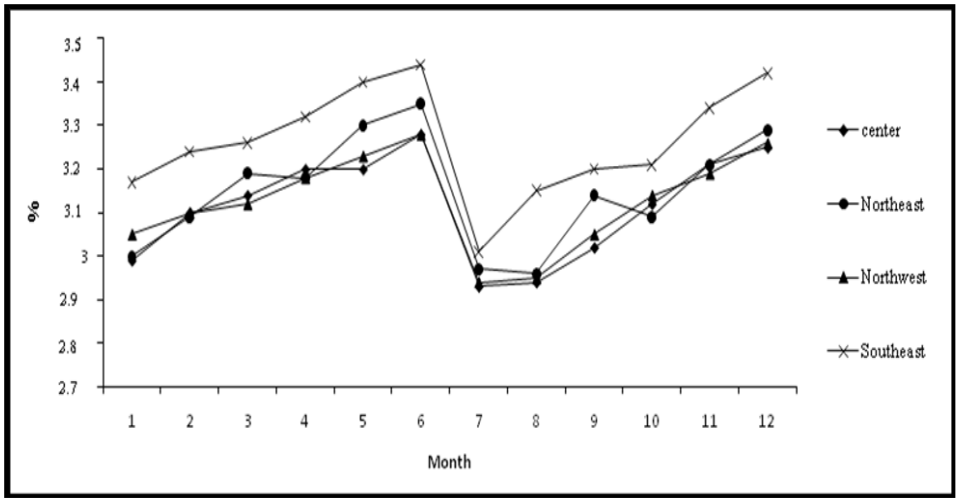
Region	Fat (%)	Protein (%)
Center	3.50±0.59	3.14±0.33
Northeast	3.5±0.61	3.19±0.34
Northwest	3.43±0.55	3.12±0.32
Southeast	3.41±0.59	3.1±0.35

Table 2: *F* Tests for significance of factors affecting fat and protein percentage

		Center		Northeast		Northwest		Southeast	
Source of variation	df	MF	MP	MF	MP	MF	MP	MF	MP
production sectors	2	**	***	ns	***	***	***	ns	***
fasv(production sectors)	886	***	***	***	***	***	***	***	***
Month	11	***	***	***	***	***	***	***	***
Lactation number	5	ns	ns	*	*	***	***	ns	ns
Stage of lactation	13	ns	***	ns	***	***	***	**	***
Level of production	3	**	***	ns	ns	***	***	***	***
R^2 %		22.70	38.70	25	40.60	19	29.40	26	42

MF : milk fat percentage, MP: milk Protein percentage, *** P<0,0001 ,** P<0,001 , P< 0,05.

a- Variation of milk protein



b- Variation of milk fat

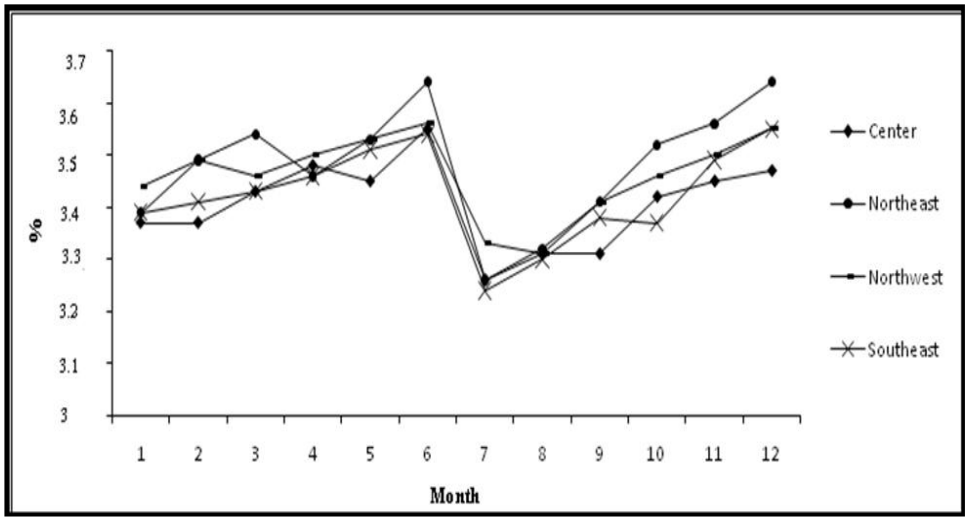


Figure 1: Seasonal variation of milk traits by region

Conclusion

This study allowed us to identify the various factors affecting milk traits (fat and protein); the main effects are the region and the season. The found results can serve as a dashboard of the quality of the cow's milk in Tunisia.

References

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