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Effect of the nature of the nitrogen source on the urea content of milk from the Sicilo–Sarde dairy ewes

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Abstract

Twenty (20) Sicilo-Sarde ewes were divided into two homogeneous batches according to age (5.3±1.25 years and 5.7±1.15 years), litter size (1.1±0.31), lactation number (4.3±1.25 and 4.6±0.96) and weight (33.83±5.63 and 33.95±5.58 kg). Ewes housed in two identical boxes with an area of 10.14 m2 each (1.01 m^2/brebis) received a ration of common base (oat hay) at 1.5 kg DM/ewe/day supplemented per 500g/ewe/day of a standard concentrate diet composed of corn, barley, wheat bran, soybean and vitamins and minerals supplement sheep (control group: CC), and a concentrated feed composed of local white sorghum, horse beans and a sheep vitamin and mineral supplement (experimental group: CS). A weekly milk recording took place to determine the concentration of urea in milk during the ten (10) weeks of the first phase of trafficking. The average grade of urea was 53.5±8.76 for the lot and 35CC, 5±3.4 mg/dl for the outcome of the sheep milk fed the CS with significant difference ($p < 0.05$).

Keywords: Milk, Nitrogen Source, Sicilo-Sarde Dairy Ewes, Urea,

Introduction

The non-protein nitrogen, urea and especially milk, is an increased interest from the dairy industry and research. It is now recognized by the cheese industry that low rate of non-protein nitrogen often improve cheese yield. If that were the same for milk urea, its control would provide new opportunities for the industry. Several factors related to the diet can influence the urea content of milk. In fact, a constant rate of blood urea (Rodriguez et al., 1997) and milk (Ortega et al., 2005) can be achieved when the animals received the same ration for a specified period. In addition, many people mention that the total amount of dry matter intake of the ration does not affect milk urea (Whitaker et al. 1995; Muwalla and Harb, 1999). In the same context, Bocquier and Caja (2001) reported that food intake of crude protein (CP) affects the rate of urea in milk. Many feel that the digestible crude protein also affects milk urea (Rosel et al., 1993; Berstrom and Carlsson, 1994). Sampelayo Sanz et al. (2007) reported that the crude protein is not the main factor influencing the change in the rate of urea in milk.

Moreover, the concentration of milk urea nitrogen, which depends on the protein content of the diet, is better connected (r2 = 0.82) with the amount of protein intake (r2 = 0.56), making it an effective indicator of nitrogen utilization (Faverdin and Truth, 1998) and urea content of milk ranged between 12 and 27mg/dl as the protein level of the diet: these values, lower than those measured in dairy cows, are consistent with those observed on Lacaunes. Where increased coverage needs PDIN average (120 to 160%) causes a significant increase in urea content of milk (38 to 52 mg/dl or 36%) which is connected (r2 = 0.90) imbalance (PDIN-PEIR)/UFL rations (Lagriffoul et al., 1999).

Materials and Methods

Twenty (20) Sicilian-Sardinian ewes were divided into two homogeneous batches according to age (5.3±1.25 years as against 5.7±1.15 years), the litter size (1.1±0,31), lactation number (4.3±1.25 vs. 4.6±0.96) and weight (33.83±5.63 vs. 33.95±5.58 kg) received a ration common base (oat hay) at 1.5 kg DM/ewe/day supplemented by a 500g/brebis/jour standard concentrate feed consisting of corn, barley, wheat bran, soybean and further mineral and vitamin sheep (control group), and a concentrated feed composed of local white sorghum, horse beans and a vitamin and mineral supplement sheep (experimental group). Ingredients (%) and chemical composition (% DM) of concentrates and roughage are presented in Table 1.

To determine the concentration of urea in milk, a 5ml of milk sample and 5ml of TCA were taken into a

beaker and the mixture was allowed to act to precipitate the proteins. This mixture is then filtered. 2ml of DMAB and the mixture stirred. Then, we adjust the spectrophotometer to zero through the reagent blank and read the absorbance at 420 nm.

Results and Discussion

The content of urea which is correlated with blood urea and considered an indicator of protein utilization (Cannas et al., 1998). The average values found are 53.5±8.76 for the lot and 35 CC, 5 ± 3.4 mg/dl for the outcome of the sheep milk fed the CS with significant difference ($P<0.05$). This result is consistent with that found by Lagriffoul et al. (1999) and farther from that report by Maamouri et al. (2009) who worked on diets rich in tannins.

Table 1: Ingredient proportions and chemical composition of aliments (% DM)

Concentrate Feed			Oat hay
	CC	CS	
Barley	10	-	-
Corn	43.3	-	-
white sorghum	-	66	-
Wheat bran	25	-	-
Triticale	-	-	-
horse bean meal	-	30	-
soybean meal	17.7	-	-
VMC sheep	4	4	-
Chemical composition			
DM (%)	94.7	94.7	92
Organic matter	91.0	88.3	92.1
Crude protein	16.3	14.65	4.9
Crude fiber	12.7	3.7	35.6

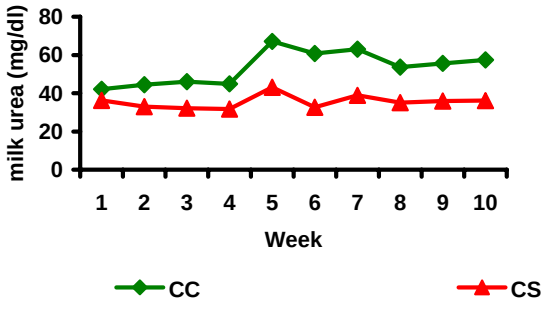

Fig. 1: Evolution of the content of urea based diet

Figure 1. shows that milk urea in the control group which is higher than the experimental milk throughout the trial period this may be the ratio of protein/energy in the diet appears to be the factor having the greatest nutritional impact on the rate of urea (Cannas, 2002). This trend could be attributed to grain quality rich in soy protein degradable in the rumen compared with fava beans that contains a large amount of starch but also influences negatively urea concentration. Indeed, the energy level affects the amount of protein and non protein nitrogen to be used by micro-organisms (Benazzouz et al., 2007). Thus, an increase in energy intake in the diet will cause a decrease of urea on the one hand and secondly the tannin content in the integument of fava beans may reduce protein degradation and therefore reduce the amount of urea.

Conclusion

The higher content of urea in the control group tells us about the waste of protein used in the diet and the coverage rate of nitrogen needs of the Sicilian sheep-Sarde. Indeed, the use of imported soybean prices important in the diet of ruminants can cause damage not only economically but also the quality of products and their processing and storage. For this, the search for alternatives has shown good results and provides a stimulating factor for significant production and income for farmers.

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