EFFECT OF THE REPLACEMENT OF CRUDE PROTEIN WITH UREA IN SERUM FOR SUPPLY OF NITROGEN TO LAMBS

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Abstract

The metabolic challenge imposed by the intensification of animal production can cause an imbalance between the body's demand for nutrients on the one hand, and the ability to metabolize them and the level of production sought on the other hand. Urea is an option as a supplementary source of non-protein nitrogen (NPN) in sheep diets due to its low cost, plentiful availability and ease of use. The blood serum urea nitrogen (SUN) content has been measured to obtain additional information about the protein nutrition of ruminants, through the metabolic response to a given diet. Thus, the objective of this study was to evaluate the effects of the inclusion of increasing levels of urea in the diet of confined lambs to replace the crude protein in the concentrated feed. Thirty-two crossbred lambs were used, with average initial body weight of 29 kg and average initial age of 5 months. The experiment was carried out in a completely randomized design using a 2 x 4 factorial scheme: 2 sexes (male and female) and 4 levels of urea inclusion: 0%; 1.5%; 3.0% and 4.5% urea based on total diet. The analyses were carried out using the R statistical program, to perform multiple comparison of means using the Tukey test at 5% probability and linear regression. All feed samples were submitted to chemical analysis. From the 47th to the 52nd day of the experiment, to determine serum N-urea, blood samples were collected by jugular vein puncture, at 0h, 2h, 4h, 6h, 8h after feeding at 7:00 am. The blood samples were immediately centrifuged at 4250 rpm for 15 minutes and the resulting serum was frozen (-20 ^{o}C). Blood samples were collected at different times after feeding during the 5 days of the experiment, with a collection being performed on each day of the period. The concentration of N-urea in the blood serum was obtained through the product of the concentration of urea in the plasma and 0.466, corresponding to the N content in the urea. Interactions between sex and time of blood collection after feeding, as well as between level of urea inclusion and collection time were significant (P<0.05) for SUN values. Regarding the time after feeding, greater variability was observed between the collection times in male animals ($\hat{\sigma}$ = 4.11) than in female animals ($\hat{\sigma}$ = 3.26). Greater variability was observed among females ($\hat{\sigma}$ = 1.81) than among males ($\hat{\sigma}$ = 0.91). A quadratic effect was observed between SUN and collection times for both male and female animals. The peak SUN values after feeding occurred at 2:03 a.m. for females and at 2:50 a.m. for males. No effect (P>0.05) was observed for SUN considering the increasing levels of urea in the diet. Among the SUN levels at each collection time, the treatment with a level of 0.0% urea inclusion (0%RH) was associated with a higher concentration of SUN at the collection time 2 hours after feeding in relation to the concentration at the collection time 8 hours after feeding. In the supply of the 4.5%RH diet, a higher value of SUN was observed at the times 2h and 4h after feeding in relation to the times 0h and 8h. The treatments with urea levels of 3.0% and 4.5% had the highest concentration of SUN at the collection time 2h after feeding. In general, values of SUN at 0 and 8h were less than at 4 and 6h, and these were lower than at 2h. No increase in SUN concentrations was observed as the PDR level increased, as expected, which can be explained by the fact that the animals were able to use a good part of the N consumed. The inclusion of up to 4.5% urea/ammonium sulfate (9:1) in relation to the dry matter of the diets to replace the crude protein in the concentrate for confined lambs did not compromise the productive performance of the animals.

Keywords

Sheep farming, Metabolism, Protein nutrition, Consumption, Diet.