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Synthesis and efficiency of microbial protein in sheep fed with the replacement of soybean meal by urea plus ground corn in diets rich in cactus

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Due to its high biological value protein, soybean meal (SM) is widely used in animal feed. However, the use is susceptible to price variations during harvest and off-season periods, as well as being influenced by international market demands, given its extensive use in animal production. Therefore, including this ingredient in the feed can lead to an increase in diet costs. In this context, the partial or total substitution of true protein sources by non-protein nitrogen (NPN) has been the subject of several studies, aiming at economic and performance indices. Urea, a source of NPN, can effectively replace large quantities of rumen-degradable protein due to its high protein equivalent. In the rumen, it stimulates microbial growth, which is then converted into valuable protein. Moreover, urea is easily accessible and convenient to use, readily available in the market. In the rumen environment, the main source of nitrogen (N) for cellulolytic bacteria is NH_3, while for fermenting bacteria of non-fibrous carbohydrates, it is NH_3, peptides, and amino acids. Thus, diets that allow for NPN in the rumen can improve the nutrition of different groups of microorganisms, maximizing microbial protein synthesis. For microbial protein synthesis and the utilization of absorbed N, there needs to be energy availability synchronized with protein degradation in the rumen. Therefore, the use of energy sources associated with urea is necessary. The hypothesis was that including high levels of urea, exceeding literature recommendations, in forage palm-based diets does not change ruminal parameters. The study aimed to assess the impact of replacing SM with urea + ground corn in diets high in cactus (*Opuntia stricta* [Haw.] Haw) on various parameters including dry matter (DM) and Crude protein intake, plasma urea nitrogen (PUN), urinary urea nitrogen (UUN), microbial protein synthesis and efficiency. Five non-castrated crossbreed sheep, with rumen fistulas and an average body weight of 47.2 ± 9.7 kg, were assigned to a 5 × 5 Latin square design. The means were submitted to regression analysis with the PROC REG command of the SAS software (version 9.2) with a critical level of 5% probability being adopted for type I error. The substitution did not alter DM intake (1596 g/day), microbial protein efficiency, PUN (16,60 g/day), and UUN (10,29 g/day) ($P>0.05$). The microbial protein synthesis exhibited quadratic behavior ($P = 0.031$), with a minimum concentration of 5.92 (g/day) at 585 g/kg DM replacement. The inclusion of up to 2.7% DM of urea in isoprotein diets and with a high proportion of cactus do not affect DM intake, justifying the use of urea as a factor to reduce the cost of the diet.
Keywords: Cactaceae. Concentrated. Semiarid. Non-protein nitrogen.

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