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Can condensed tannins added to elephant grass silage improve microbial protein synthesis in dairy steers?

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Few studies in the literature have evaluated the effectiveness of condensed tannin addition during the ensiling process and its response in production animals. Therefore, the aim of present work was to evaluate microbial protein synthesis in dairy steers fed with condensed tannins added to elephant grass (*Pennisetum purpureum Schum.*) during ensiling to test the hypothesis that condensed tannins can be added to elephant grass during ensiling to improve microbial protein synthesis in dairy steers. The experiment was conducted in the Academic Unit of Serra Talhada of the Federal Rural University of Pernambuco. Five intact Holstein-zebu dairy steers with a body weight of 151 kg were used. In the pre-experimental period, all animals were treated against ecto and endoparasites. Animals were kept in individual stalls. Each stall had a feeder. The experimental design was a 5×5 Latin square. The experimental period lasted 65 days, divided into five periods of 13 days, being seven days for adaptation of animals to experimental conditions and six for data collection. Experimental diets were isoproteic (119.2 g/kg dry matter) and composed of elephant grass silage or fresh elephant grass, ground corn grain, soybean meal, urea, and mineral salt. Feeding was done twice a day at 08:00 and 16:00 h to allow for ad libitum intake and adjusted next feed upward by 10% leftover every day. Treatments consisted of grass without tannin; grass with tannin; grass with tannin diluted in water; silage with tannin; and silage without tannin. A single urine sample from each animal, named “spot” was collected on the last day of each collection period approximately 4h after the first feeding during spontaneous urination. A 10-mL urine sample was immediately diluted into 40 mL of sulfuric acid at 0.072N. Microbial protein synthesis was determined by the technique of purine derivatives (PD). PD excretion in the urine was calculated by multiplying daily urine volume by the sum of allantoin and uric acid concentration in the daily urine samples. All variables were subjected to the analysis of variance followed by the Tukey test, using the GLM procedure of Statistical Analysis Systems. The differences were significant at 5% of error probability. Condensed tannins added to elephant grass during ensiling significantly affect the microbial protein synthesis in dairy steers ($P < 0.05$), where the silage with tannin treatment obtained the highest microbial protein production (251.22a g/day), followed by grass with tannins diluted in water (207.21ab g/day), grass with tannin (175.54ab g/day), silage without tannin (152.23b g/day), and grass without tannin (111.83b g/day). These results can be explained by the ability of condensed tannins to reduce proteolytic activity during ensiling and in the rumen, resulting in optimization of nutrient release synchronization in the rumen, thus maximizing microbial protein synthesis. It is recommended to include condensed tannins as an additive in elephant grass silage to improve microbial protein synthesis in dairy steers.

Keywords: amino acids; cattle; phytochemical additive; secondary metabolites

Animal Experimentation Ethics Committee: approval no. 6736060922/UFRPE.

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