CONCENTRATIONS AND MOLAR RATIOS OF SHORT CHAIN FATTY ACIDS FROM BOVINE RUMINAL FLUID SUPPLEMENTED WITH CHITOSAN LEVELS

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Chitosan is a natural biopolymer derived from the deacetylation of chitin, the main component of the exoskeleton of crustaceans, algae, insects and the cell wall of some fungi and bacteria. It has a structure similar to cellulose and can act as a functional food. This study was carried out to determine the influence of increasing doses of chitosan on ruminal fermentation, of grazing beef steers. Five rumen cannulated crossbred steers [3.6 mo and 300 ± 25 kg live weight (LW), mean ± SD] were used in a 5 × 5 Latin square experiment design with 21-d periods, in which the last 7 days were used for data collection. Steers were randomly designated to one treatment sequence: chitosan added at 0, 400, 800, 1200 or 1600 mg kg-1 DM of concentrate. Animals were individually allocated in paddocks (0.3 ha) uniformly covered with U. brizantha and were fed concentrate at 150 g 100 kg-1 of LW. Concentrate consisted of ground corn (435 g kg-1 DM), soybean meal (40.0 g kg-1 DM), urea (85 g kg-1 DM), and a mineral mixture (440 g kg-1 DM). Ruminal digesta samples (from five different sites in the rumen) were collected on day 21 of each experimental period before the concentrate provision (time 0) and 2, 4, 6 and 8 h relative to concentrate provision. Ruminal digesta samples were composited and strained in four layers cheesecloth. Aliquots (1600 µL) of these samples were mixed with methanoic acid (400µL; 98–100% H2CO2), being centrifuged at 7000 × g for 15 min at 4?C, and the supernatant of each sample was frozen for posterior short-chain fatty acid (SCFA) analysis. Ruminal SCFA concentrations were measured using a gas chromatograph. Data of ruminal fermentation was submitted to analyses of variance using the MIXED procedure of SAS 9.2. Analyzed as repeated measures adding the fixed effect of ruminal digesta collection (0, 2, 4, 6 and 8 relative to supplementation) and the fixed effect of treatment by time interaction. The differences among treatments were tested to linear and quadratic contrasts and significance level was set at 0.05. Chitosan linearly increased (P=0.007) ruminal propionate concentration (Y= 12.17 + 0.0013x; r2=0.45), but did not affect the total SCFA ruminal concentration in steers. Furthermore, CHI quadratically affected (P=0.044) the acetate to propionate ratio (Y= 4.81 + 0.0008x - 0.0000007x2; r2=0.75) in rumen juice. Chitosan supplementation to grazing steers positively affected increased ruminal propionate concentration. Based on regression equations we recommend 600 mg CHI/kg of concentrate for grazing steers in tropical pastures receiving concentrate at 150 g/100 kg of LW.

Palavras-chave: addictive, ruminal fermentation, antimicrobial, chitin