Effects of polymer coated slow-release urea on ruminal fermentation and nutrient total tract digestion of beef steers

Rodrigo Gardinal, Jefferson Rodrigues Gandra, Gustavo Delfino Calomeni, Thiago Henrique Annibale Vendramini, Caio Seiti Takiya, José Esler de Freitas Júnior, Heraldo Namorato de Souza, Francisco Palma Rennó

Abstract: The objective of this study was to evaluate the effects of polymer coated slow-release urea (SRU) in high-forage diets of beef steers on nutrient intake and digestibility, ruminal fermentation, microbial protein synthesis, and energy balance. Eight 24-mo-old rumen-fistulated castrated Nellore steers (average body weight = 418.0±40.0 kg) were used in a replicated 4 × 4 Latin square design. Animals were randomly distributed to receive one of the following diets: no urea inclusion; 1.0% inclusion of feed grade urea in the diet (dry matter [DM] basis); 1.0% inclusion of slow-release urea 1 in the diet (DM basis); and 1.0% inclusion of slow-release urea 2 in the diet (DM basis). Slow-release urea 2 had a similar composition to that of slow-release urea 1 and differed in that it contained 2.95% sulfur. A high-forage diet was provided (75% of total DM) and corn silage was used as the forage source. Diets with urea had increased crude protein (CP) intake, and CP and total digestible nutrients total tract digestion. Urea sources increased ruminal concentrations of ammonia nitrogen and acetate, and decreased butyrate concentrations. The polymer coated urea did not alter ruminal fermentation when compared with feed grade urea. Diets did not affect the energy balance of steers. Feed grade urea presented greater microbial protein synthesis than polymer coated slow-release urea. The partial replacement of soybean meal by 1% slow-release urea in a diet with 75% forage does not improve ruminal fermentation and microbial protein synthesis, and shows similar results as feeding feed grade urea to beef steers.

Key Words: ammonia, digestibility, microbial protein, Nellore, non-protein nitrogen, soybean