Abstract: Grassfed dairy production systems often rely on alternative diet supplements such as apple cider vinegar (ACV) to improve productivity. The objectives of this study were to 1) compare rumen fermentative patterns resulting from diets consisting of forages harvested at mature and vegetative stages, and 2) evaluate the effects of ACV supplementation on fermentation metrics of vegetative forage mixtures using ruminal batch culture, performed as two different experiments. In each experiment, treatments were arranged as a randomized design with three periods per experiment. In experiment 1, 15 mL tubes were supplemented with 1.0 g DM of either vegetative 50% red clover + 50% orchardgrass (VEG) or mature 50% red clover + 50% orchardgrass (MAT). Tubes were inoculated with a 3:1 buffer: rumen fluid mixture (12 mL) and incubated at 39°C under anerobic conditions for 48 h. In experiment 2, tubes received either 1.0 g DM VEG substrate only or 1.0 g DM VEG substrate + 0.125 mL ACV. Samples were collected at 0, 1, 2, 4, 6, 8, 12, 18, 24, and 48 h, pooled, and analyzed for carbohydrates (WSC), pH, in vitro DM disappearance (IVDMD), methane (CH₄), and ammonia N (NH₃-N). Data were analyzed using PROC GLIMMIX of SAS at P ≤ 0.05. The VEG treatment produced more CH₄ than the MAT treatment (4.98 mg/ dL v. 2.87 mg/ dL; P < 0.0001); however, CH₄ from the VEG treatment was not affected by ACV. Tubes receiving VEG had greater WSC (2.39 mg/mL v. 1.56 mg/mL; P ≤ 0.05), IVDMD (81.7% v. 77.3%; P ≤ 0.05), and mean pH compared with those receiving MAT. Tubes receiving MAT had greater concentrations of NH₃-N (P < 0.01) compared with tubes receiving VEG. Fermentation metrics of VEG tubes were not affected by ACV; however, considerations need to be made for forage maturity.

Keywords: apple cider vinegar, batch culture, pasture-based dairy

Abstract: Better understanding of N₂O emissions from interactions between urine or feces, with different levels of nitrogen (N) fertilization on tropical pastures would be helpful in developing strategies to mitigate emissions and improve N₂O inventories. The objective of this study was to evaluate N₂O emissions from feces or urine samples collected from Nellore young bulls, isolated or in association with different levels of N fertilizer. Study was designed as completely randomized block design with five replications per treatment. Treatments were two levels of excreta (Feces or Urine) and three levels of N fertilizer (0, 75 and 150 kg N ha⁻¹). Ammonium nitrate was used as source of N (32% of N). One liter of urine or 1.5 kg of feces was used per chamber with the respective N dose directly applied on excreta sample. Gas emissions were evaluated using the static chamber closed method and quantified using gas chromatography. Chambers were closed for 40 min and gas samples were collected at 0, 20 and 40 min. After treatment imposition, gas was sampled three times during week 1, twice during week 2, 3, and 4 and once during week 5, 6, 7 and 8, and subsequently every 2 weeks for two consecutive years. Type of excreta samples did not affect N₂O emissions. Additionally, associative effects of N fertilizer onto feces or urine was similar. Cumulative N₂O emissions linearly increased with increasing levels of N regardless of source, and ranged from 5.95, 32.1 to 74.7 mg of N₂O/m² for 0, 75 and 150 kg/ha/year of N. Similarly, emissions factor of N₂O were linearly increased with increased N fertilizer (0.15, 0.36 and 0.73%, for excreta, excreta + 75 kg N and excreta + 150 kg N). Therefore, the interaction between N fertilizer and excreta on N₂O emissions in tropical pastures was additive.

Keywords: ammonium nitrate, beef, greenhouse gas emissions