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DETERMINING THE OPTIMAL DOSE OF 3-NITROOXYPROPANOL FOR REDUCING ENTERIC METHANE EMISSIONS FROM BEEF CATTLE FED A HIGH FORAGE DIET

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The objective of this study was to determine the dose response of the feed additive 3-nitrooxypropanol (NOP) on enteric methane (CH4) production and dry matter intake (DMI) for beef cattle fed a high forage diet. Fifteen crossbred yearling steers were used in an incomplete block design with two 28-d periods with a 7-d washout in between and treatments corresponding to six doses of NOP (0, 50, 75, 100, 150, 200 mg/kg DM). The NOP was provided in the ration daily with the dose increased gradually over the first 10 d of each period. Methane emissions were measured during 2 consecutive days using open circuit calorimetry chambers. No treatment effects were observed on overall DMI or DMI of cattle when in the chambers (PÉ 0.54). Total CH4 emissions (g/d) were reduced with supplemental NOP (P = 0.05) with the response at 200 mg NOP/kg DM (96.2 g/d) different from Control (143.8 g/d, P < 0.05). Similarly, CH4 yield (g/kg DMI) was linearly reduced with supplemental NOP (P < 0.01) and responses observed at 100, 150 and 200 mg NOP/kg DM (19.8, 18.6, 18.2 g/kg DM, respectively) differed from Control (23.6 g/kg DM, P < 0.05). Overall, results from the present study demonstrate that for beef cattle high forage diets supplementation of 100 to 200 mg NOP/kg DM reduces enteric CH4 emissions without negative effects on DMI.

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A NEW SWARD MANAGEMENT STRATEGY TO MITIGATE THE METHANE (CH4) EMISSIONS BY GRAZING RUMINANTS

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The aim of this study was to evaluate the effect of different sward management strategies on Italian ryegrass swards (Lolium multiflorum) in the CH4 emissions by grazing sheep. This experiment was conducted at the experimental field of the Universidade Federal de Rio Grande do Sul, Brazil, between May and October, 2014. Two sward management strategies were studied: 1) rotational stocking method (RT, the traditional method), with pre- and post-grazing target heights of 25 and 5 cm, respectively and; 2) rotational stocking (named rotatinuous (RN), a new sward management strategy), with pre- and post-grazing target heights of 18 and 11 cm, respectively. The grazing management was based on a 1-d strip grazing regime. The experimental animals were Texel Ã— Ideal growing lambs, with an average age of 10 months and weighing 26±0.9 kg. The experimental design was a randomized complete block with four replicates (paddocks). The hypothesis of this study is that the CH4 emissions by grazing sheep is lower in RN than in RT. The CH4 emissions per animal did not differ (P>0.05) among treatments (23.2 and 26.0 g animalâˆ'1 dayâˆ'1, RT and RN, respectively). The CH4 emissions per unit area was greater (P<0.05) in RT than in RN (1123.4 vs. 746.8 g ha-1 day-1, respectively). The daily emission per average daily gain (ADG) was also greater (P<0.05) in RT than in RN (1012.6 vs. 243.6 g CH4 kg ADG-1, respectively). The rotational stocking method (rotatinuous) based on a new sward management strategy was the most efficient in reducing CH4 emissions per unit area and per unit animal production than the classic rotational stocking method.

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EFFECT OF ENTEROCOCCUS FAECIUM ON IN VITRO RUMEN FERMENTATION AND METHANE PRODUCTION

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Enterococcus faecium have been widely used as direct-fed microbial. Some Enterococci species are known to have fumarate reducing potentiality. Thus, this study was conducted to determine the beneficial effects of E. faecium on in vitro rumen fermentation, methane production and microbial diversity. Ruminal samples were collected from ruminally cannulated Holstein Friesian cow and 40:60 rice straw to concentrate ratio were used as substrate at 1g dry matter (DM) per 100ml buffered rumen fluid. Fresh culture of E. faecium (750 million cfu/ml) at different inclusion rates were investigated using in vitro rumen fermentation. The following treatments were: non addition, 0.1% (75 million cfu), 0.5% (375 million cfu) and 1.0% (750 million cfu) of E. faecium and, hereafter referred to as control, treatments 1, 2, and 3, respectively. Increased in total gas production and ammonia nitrogen concentration over time were found in control and all treatments while decreased value was observed in pH. Addition of E.