Influence of mixed grass-legume pasture or supplementation with ammonium nitrate in cattle enteric methane emission

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The objective of the study was to evaluate the enteric methane emission in mixed pastures of Macrotiloma Legume and Marandu Palisadegrass compared with Marandu Palisadegrass exclusive pasture with or without ammonium nitrate supplementation, in continuous stocking. The study was carried out at Instituto de Zootecnia (Nova Odessa/SP). Twelve Jersey heifers (424.167 ± 44.62 kg) were evaluated. The experimental period was twenty-five days in e January 2021 (summer in Brazil). Gas samples were collected using the SF_6 tracer gas technique during the last five days of experimental period. The experiment was in a complete randomized block design, with three treatments and four replications. The experimental treatments were: Grass (G): Exclusive pasture of *Urochloa brizantha* cv. Marandu; Grass + Protein Supplementation (GP): Exclusive pasture of *Urochloa brizantha* cv. Marandu with ad libitum protein supplementation (Ingredients: 45% ground corn, 15% growth core, 10% NaCl and 30% ammonium nitrate; Chemical composition: 81.94% DM, 31.94% ASH, 65.16% CP, 9.10% NDF, 2.92% ADF and 0.91% EE); Grass + Legume (GL): mixed pasture with *Urochloa brizantha* cv. Marandu and legume *Macrotyloma axillare* (E. Mey. Verd accession NO 279). The total forage mass: G = 5119.75 kg ha^{-1}, GP = 5947.717 kg ha^{-1} and GL = 5620.3 kg ha^{-1}. The Proportion of botanical components in the forage: G (grass = 88.80% and dead material = 11.20%), GP (grass = 87.13% and dead material = 12.87%) and GL (grass = 62.17%, legume = 25.87% and dead material = 12.87%). Statistical analyzes were performed using SAS 9.4 MIXED procedure. Data were evaluated using the least significant difference test (LSD) and a significant effect was considered when P≤0.05. There was no statistical difference for CH_4 emission per animal (261.93 ± 31.37 g day^{-1}). The animals average daily weight gain (DMG) during the experimental period (G= 0.52^b kg day^{-1}, GP = 0.78^a kg $day^{-1}$and GL = 0.84^a kg day^{-1}; SEM = 0.07; P = 0.03).Thus, when we calculate methane emission by the DMG (G = 569.76^a g kg^{-1} day, GP = 306.97^b g kg^{-1} day and GL = 309.09^b g kg^{-1} day; SEM = 43.13; P<0.01). We observed that treatment GP decreased methane production per kilo per day by 54% when compared to G. The treatment GL decreased methane production by 53% when compared to the G, reducing the methane unit per kilo of product generated, contributing to the sustainability of the ruminant production system.

Keywords: Ruminant nutrition and production; greenhouse gases (GHG); *Macrotyloma axillare* (NO 279), continuous stocking with cattle, *Urochloa brizantha* cv. Marandu.

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The experiment followed the guidelines established in accordance with the ethical principles of animal experimentation of the Commission of Ethics in the Use of Animals of Instituto de Zootecnia (CEUA/APTA/IZ; n°291-19).