RELATIONSHIP BETWEEN RESIDUAL FEED INTAKE AND DAILY METHANE EMISSION IN YOUNG NELORE BULLS[1]

RELAÇÃO ENTRE CONSUMO ALIMENTAR RESIDUAL E EMISSÃO DIÁRIA DE METANO EM NOVILHOS NELORE

ANA PAULA M. CALIMAN[2, 5], ELAINE MAGNANI[2], ALEXANDRE BERNDT[3], ROSA T. S. FRIGHETTO[4], RENATA HELENA BRANCO[2], MARIA EUGÊNIA Z. MERCADANTE[2, 5]

[1]Financial support: FAPESP and CNPq "REPENSA-Redes Nacionais de Pesquisa em Agrobiodiversidade e Sustentabilidade Agropecuária".
[2]Centro APTA Bovinos de Corte, Instituto de Zootecnia (IZ), Agência Paulista de Tecnologia dos Agronegócios (APTA). Rodovia Carlos Tonani, km 94, Sertãozinho-SP, Brazil. E-mail: mercadante@iz.sp.gov.br.
[3]EMBRAPA Pecuária Sudeste, São Carlos-SP.
[4]EMBRAPA Meio Ambiente, Jaguariuna-SP.
[5]CNPq scholarship.

The cattle production is a sector of agricultural activity that has impact on global warming due to enteric fermentation from digestive process that releases methane (CH_4), with energy loss of food and consequent inefficiency of system. Residual feed intake (RFI) is a feed efficiency trait defined as the difference between actual feed intake and the one predicted on the basis of requirements for body weight production and maintenance. There are evidences that more efficient cattle (low RFI) have lower methane daily emissions than less efficient cattle (high RFI). This study aimed to evaluate the pattern of CH_4 daily emission and its relationship with RFI obtained during the CH_4 collection in Nelore previously evaluated for this trait. A sample of 23 from 62 young bulls, previously classified into low RFI_{72} and high RFI_{72} in the 72-days performance test (RFI_{72}), were evaluated. After the 72-days test, the individual feed intake was recorded for a further 45 days. Another RFI was obtained from the last 32 days (RFI_{32}), and the animals were classified into two RFI_{32} classes: below zero (low RFI_{32}) and above zero (high RFI_{32}). CH_4 daily emissions of each animal were collected during the last 7 days of this period, being preceded by 7 days for adaptation of animals to the collection apparatus. The sulfur hexafluoride (SF_6) tracer technique was used for estimating enteric methane emissions. CH_4 and SF_6 local background were also collected each day from inside of the installation using the same apparatus. The SF_6 and CH_4 gases were analyzed by gas chromatography. The correlation between RFI_{72} and RFI_{32} was not high (0.41) as a 32 days is a short period for accurately measuring the average daily gain. However, the additional period of 32 days is more representative of age, weight and feed intake at the time of CH_4 collecting period than 72-days performance test itself. The averages of age, weight and CH_4 daily emission were 351±24 days, 343±34 kg, and 155.5 ± 20.2 gCH_4/day, respectively. RFI_{32} class had significant effect ($p=0.02$) in CH_4 daily emission. More efficient animals (low RFI_{32}) emitted almost 12% less CH_4 (g/day) than less efficient animals (high RFI_{32}), with average CH_4 daily emissions of 144.0±6.1 g/day and 163.0±4.9 g/day. This fact could be explained by the difference ($p<0.01$) of 12.5% less daily dry matter intake of animals classified as low RFI_{32} (7.099 ± 0.167 kg/day) from animals classified as high RFI_{32} (8.120 ± 0.141 kg/day). Although this difference in dry matter intake, there were no differences between the animals of both classes in average daily gain ($p=0.73$) and metabolic body weight ($p=0.61$) obtained during the 32 days. These results are consistent with those reported for *Bos taurus* and indicate the selection of beef cattle based on RFI can be an effective way of reducing the CH_4 daily emission without affecting meat production. Thus, the selection of low RFI cattle may contribute to mitigate greenhouse gas emissions from cattle without affecting production. However, studies on genetic parameters for RFI and CH_4 daily emission are necessary to strongly recommend the use of RFI in Nelore breeding programs to mitigate greenhouse gas emission.

Key words: beef cattle, *Bos indicus*, dry matter intake, feed efficiency.