Enteric methane emission by steers grazing on Ipyporã and Mulato II brachiariagrasses pastures

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The reduction of enteric methane (CH_4) emitted by livestock is driven by pasture management, which can enhance forage accumulation and animal performance, supporting lower CH_4 emission per kg of meat produced. In this sense, new forage grasses can increase the pasture production (e.g.; quantity and quality) and average daily gain, reducing CH_4 emission and improving the efficiency of the forage-based livestock systems. Our objective was to compare the CH_4 emission by Nellore steers grazing on 'Ipyporã' [*B. ruziziensis* Germ. & Evrard × *B. brizantha* (Hochst. ex A. Rich.) Stapf] and 'Mulato II' (*B. ruziziensis* × *B. brizantha* × *B. decumbens* Stapf) brachiariagrasses pastures in Sinop, MT, Brazil. All experimental units were continuously stocked using a variable stocking rate from May 2016 to May 2018. The GreenFeed® was used to measure CH_4 emissions at 4-h intervals with up to eight drops of 50 g (feed supply) distributed in 40-s intervals for up to 5 min in each feeding period (Feb. 1 to Apr. 31, 2017, in the first year; and from Nov. 27, 2017, to Jan. 11, 2018, and from Mar. 29, 2018, to April 30, 2018, in the second year). The average CH_4 emissions were 59.1 and 71.9 ± 9.5 kg animal^{-1} year^{-1} for Ipyporã, and 55.8 and 71.9 ± 3.2 kg animal^{-1} year^{-1} for Mulato II, in the first and second years, respectively. The greater was the stocking rate and the gain ha^{-1}, the greater was the CH_4 emission per area in both forage-based systems, with the greatest values on Mulato II ($P<0.05$). Although a more intensive livestock system, with greater animal production per area, promotes a greater absolute CH_4 emission due to the increased stocking rate, it is important to consider the system efficiency. The CH_4 emission per area decreased as the average daily gain increased for the two grasses. In addition, when considering the gain ha^{-1}, which consists of the relationship of individual performance and the stocking rate, the greater the gain ha^{-1}, the lower the relative CH_4 emission per kilogram of meat produced. The CH_4 emission by the gain per area (kg CH4.kg gain ha^{-1}) presented a similar response pattern for both cultivars. For Ipyporã, relative emission decreases while the gain ha^{-1} increases up to 33.6 kg liveweight ha^{-1} per month, stabilizing the emission at 0.25 kg CH_4.kg gain ha^{-1}. On the other hand, the reduction in CH_4 emission per gain per area stabilizes at 0.27 kg CH_4.kg gain ha^{-1} for Mulato II, when the gain per area reaches 20.6 kg liveweight ha^{-1} per month. We concluded that forage-based systems producing more than 33.6 and 20.6 kg of liveweight ha^{-1} per month on Ipyporã and Mulato II pastures, respectively, are more efficient, emitting less CH_4 per unit of product.

Keywords: *Brachiaria*, forage-based systems, greenhouse gasses, sustainability, *Urochloa*

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