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Methane emission by grazing steers under integrated crop–livestock system

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Introduction

Major global issues are occurring due to negative impacts caused by human actions that violate the carrying capacity of grasslands environments. Several studies show that the integrated systems such as crop-livestock besides intensifying land use and diversify production have the potential to contribute to reducing emissions of greenhouse gases (GHG) such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), per unit of agricultural product. The objective in this study was to evaluate how strategies for grazing management targets can influence animal production and methane emission in areas on Integrated Crop-Livestock Systems (ICLS).

Material and Methods

The experiment was conducted in a long term protocol in an area belonging to Espinilho Farm, at southern Brazil. The ICLS model was based on soybean (*Glycine max*) as summer crop in rotation with cool season pasture-common oats (*Avena strigosa*) plus annual ryegrass (*Lolium multiflorum*). The grazing phase was continuosly stocked with Angus x Hereford steers with 4 treatments based on sward height (10, 20, 30 and 40 cm). Daily CH_4 emission was measured using the SF_6 tracer technique reported by Johnson et al. (1994). The air sampling system used stainless steel cylinders (0.5 L volume) as sample collection device with sample flow regulated by a brass ball-bearing (Gere and Gratton, 2010). CH_4 emissions were assessed twice in 2013 and three times in 2014 on 36 animals.

Results and Conclusions

In ICLS, steers continuously stocked on moderate/low grazing intensity (treatments 20,30 and 40 cm of target) shown better live weight (LW) gain per individual as well as high CH_4 emission per individuals. The values of daily methane emission was 183,02 ± 49,52. CH_4 emission efficiency was better on treatment 20 cm of sward height when CH_4 emissions per kg of LW gain was minimized (0.159 kg CH_4 / kg LW gain). The results shown a strong relationship between the data of evaluation and the mean emission of CH_4 pointing out other explaining factor as forage digestibility and inter-individual variations. Integrated crop-livestock systems (ICLS) with steers continuously stocked on black oat/Italian ryegrass pastures with moderate grazing intensity maximized LW gain and optimized CH_4 emission efficiency.

References cited

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