Effect of Intensive and Integrated Grazing Systems, in Seasons, on Methane Mitigation in Nellore

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The intensification of grazing systems and their integration with crops and forest components result in improvement of animal performance and bring beneficial effects to the environment by reducing enteric methane emissions when expressed per unit of product and/or area. Each production system has its potential to produce carcass weight per area, for example, intensification of grazing systems improves growth and muscle development of Nellore cattle and intensification of pasture cattle production systems produces more meat per hectare. The experimental design consisted of four animals (Nellore bulls - 18-24 mo) in each grazing system of which two animals were monitored for enteric methane production using the SF_6 technique. Animals were weighted every 28 days without fastening and the average daily gain (ADG) was calculated by regression between animal weight during the experimental period. Grazing systems evaluated included: degraded pasture - I and J, dryland pasture with moderate stocking rate (*Urochloa decumbens*) - G and H, dryland pasture with high stocking rate (*Megathyrsus maximus*) - E and F, livestock-forest system with moderate stocking rate (*Urochloa decumbens* and wooded with native forest species) - K and L, irrigated pasture with high stocking rate (*Megathyrsus maximus*) - C and D. Statistical analysis was performed using PROC MIXED of SAS 9.4, treatments were considered different when $P \leq 0.05$ by LSD FISHER test. In spring, there was a lower enteric methane emission per unit area (CH_4/ha) in the K and L systems (67.5 $g.day^{-1}.ha^{-1}$), whereas, the highest emission was in winter in the C and D systems (182.1 $g.day^{-1}.ha^{-1}$). The methane emission per ADG, defined as methane emitted per gain of 1 kg of body weight, was lower during the spring (CH_4/ADG) within the irrigated and more intensified systems C and D (0.4 $g.day^{-1}$) and higher during winter, within the integrated systems K and L (1.0 $g.day^{-1}$). Thus, methane emissions, when expressed per unit of area, product or weight gain were lower in intensified systems.

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