

## Monensin and functional oil addition in feed behavior and methane emission of Nellore bulls fed low-fiber diets

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In order to minimize unwanted effects of high levels of grains in feedlot diet, antibiotic feed additives are used, but its security is challenged and the discovery of alternative natural substances becomes necessary. The aim of the study was to evaluate the effect of increasing levels of the forage neutral detergent fiber (NDFf) and additives in feeding behavior and enteric methane emissions. Seventy Nellore bulls, ( $408 \pm 14.17$  kg initial LW), were distributed in a factorial arrangement  $2 \times 3 + 1$ , where two additives ( $500 \text{ mg kg}^{-1}$  DM, of a blend of castor oil and cashew nut shell liquid, Essential Oligo Basics, Brazil, or  $30 \text{ mg kg}^{-1}$  DM of monensin), three levels of NDFf (6, 9 and 15% in DM), and control group, without additive. The diet was composed by *Brachiaria* hay, ground corn, citrus pulp, soybean meal and mineral salt. The experiment lasted 105d, the enteric methane emission was estimated by indicator gas SF<sub>6</sub> methodology, in two collections for five straight days, the intake behavior was performed through rumination sensors (Heatime® HR), evaluated in five animal per treatment. Data were analyzed using the SAS's MIXED, 5% significance evaluated by contrasts. The monensina increased ( $P < 0.05$ ) the dry matter intake (DMI), final live weight (FLW), and methane emission compared to oil treatment, the averages  $8.29 \pm 0.06 \text{ kg d}^{-1}$ ,  $518.73 \pm 5.7 \text{ kg}$  and  $183.22 \pm 4.6 \text{ g d}^{-1}$  for monensin and  $7.48 \pm 0.04 \text{ kg d}^{-1}$ ;  $489.8 \pm 8.9 \text{ kg}$  and  $161.33 \pm 4.83 \text{ g d}^{-1}$  for functional oil. Regarding the NDFf levels, the DMI was higher for 15% of NDFf compared to other levels ( $P = 0.0156$ ), the averages were respectively  $8.69 \pm 0.03$ ,  $7.10 \pm 0.04$  and  $7.99 \pm 0.05 \text{ kg d}^{-1}$ . The methane emission increased ( $P = 0.0006$ ) as the NDFf level was increased ( $139.03 \pm 4.97$ ;  $165.51 \pm 3.4$  and  $213.72 \pm 4.64 \text{ g d}^{-1}$  for the 6 and 9% levels, respectively), with no changes when methane was analyzed by kg of DMI ( $P = 0.1308$ ). There was an effect on NDFf levels on rumination time ( $P = 0.0106$ ) with  $23.25 \pm 0.62$ ;  $21.30 \pm 0.30$  and  $26.94 \pm 0.43 \text{ kg of DM d}^{-1}$  for 6, 9 e 15% levels, respectively. As well the monensina increased ( $P = 0.0030$ ) the rumination time compared to the functional oil ( $25.56 \pm 0.38$  and  $23.98 \pm 0.49 \text{ kg of DM d}^{-1}$  respectively). The diet with 15% of NDFf and the monensin were more effective in DMI, FLW and rumination, the functional oil contributed to the reduction of enteric methane emission.

**Keywords:** Additive; enteric fermentation; neutral detergent fiber; ruminants.

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