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Use of sunflower (oil and/or seeds) as dietary fat in fattening dairy beef bulls fed high-concentrate diets: performance and enteric CH4 emissions

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The aim of this study was to evaluate the use of sunflower (oil and/or seeds) as a dietary fat source in dairy beef bulls feed high-concentrate diets on performance and enteric CH4 emissions. Eighty-six bulls (281 ± 3.7 kg BW, and 190 ± 1.2 days of age) were group-housed in 6 pens and fed concentrate and straw separately, both ad libitum. Concentrate offered to bulls differed in dietary fat source: 1) SO (n=27), 3.5% sunflower oil; 2) SO-SS (n=30), 2.5% sunflower oil and 2.6% sunflower seeds; and 3) SS (n=29), 9.5% sunflower seeds. The study lasted 168 days. Individual feed intake was recorded daily. Bulls were weighed every 2 weeks. Enteric emissions were recorded daily during the first 42 days of the study with a CH4 and CO2 sniffer's methodology installed in each concentrate feeder per pen. Daily CH4 production (L/day) was estimated based on Madsen et al. (2010). Carcass quality was assessed at the slaughterhouse. Data were analyzed using a mixed effects model. Body weight was higher (P<0.01) in SS than in SO between days 70 and 126. Concentrate intake was lower (P<0.01) in SO-SS and SS than in SO during the first month. Time by treatment interactions (P<0.01) with no clear pattern were observed for average daily gain, feed efficiency, daily CH4 production, and daily CH4 production expressed by BW. However, in the first 14 days, daily CH4 production expressed by concentrate intake was greater (P=0.02) in SS than in SO (35.2 vs. 25.6 ± 4.15 L CH4/kg). Carcass quality was similar among treatments but dressing percentage tended (P=0.07) to be greater in SO-SS than in SO (55.2 vs. 53.9 ± 0.55%). The type of sunflower source (oil and/or seeds) in fattening dairy beef bulls fed high-concentrate diets did not have relevant effects on performance; however, due to reduced concentrate intake with consumption of the seeds diets during the first days, the daily CH4 production expressed by concentrate intake decreased with consumption of the oil diet at the beginning of the study.

Farming system is the main driver of enteric methanogenesis in grass-based veal calves

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Developing grass-based veal production from male dairy calves could be a low-input solution for raising such animals, particularly in organic systems. However, the impact of grazing on enteric methane emissions of young animals is not well assessed, yet. The study included three genotypes – Brown Swiss, Limousin × Brown Swiss, and Swiss Fleckvieh – raised in four distinct farming systems: a hay-based indoor system and three pasture-based systems, representing intensive, permanent, and alpine grasslands. While all grazing calves received comparable amounts of maize and alfalfa pellets, and a limited soy-free concentrate, the indoor control group followed a slightly different feeding regimen. Hay was provided ad libitum in all systems. Each genotype × system interaction comprised four male calves, raised together from day of life 90 to 180 in the respective systems. Rumen fluid was sampled by intubation after 11 weeks. In vitro gas production (ml/200 mg DM), absolute methane emissions (mg), and methane yield (mg/ml) were analysed after 24h of incubation at 38°C in a batch system. The time between sampling of the rumen fluid and start of the test run in vitro was different due to physical distances between sites and laboratory. It was included as a correction variable in the model. Analysis revealed a significant impact of the farming system on methanogenesis, whereas genotype effects were marginal and never significant. Total gas production volume was highest in the intensive grassland system and lowest in the alpine system (46.2 ml and 44.6 ml, respectively). Methane production was lowest in the indoor and intensive grassland systems, whereas the permanent and alpine grassland systems produced the highest levels—showing increases of 16% and 8%, respectively, in methane production (mg) compared to the indoor system. These results show relative differences between systems and genotypes. Scaling to emission values per unit of product is not possible, though. Further research on dietary strategies, economic feasibility, and land use efficiency is necessary to assess the sustainability of grass-based veal production.