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Fatty Acid Composition of Meat Retail Display from Nellore Steers Fed Different Oil Sources

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Objectives

The aim was to evaluate the fatty acids (FA) composition of meat samples exposed to retail display conditions for 3 d from Nellore steers fed different oil sources during the feedlot finishing.

Materials and Methods

Ninety-six Nellore (*Bos indicus*) steers were fed for 81 d with diets containing different oil sources: soybean (SOY– 6.6% ether extract- EE), sunflower (SUN– 6.9% EE), linseed (LIN– 6.8% EE) and a diet control (CON- without addiction of oil- 3.5% EE). Diets were composed of 21% corn silage and 79% concentrate (dry corn grain, soybean meal, citrus pulp, urea, mineral nucleus and calcitic limestone) and inclusion of oils (3.5%) was made by partial substitution of corn grain. After 81 d of feeding, animals were slaughtered (507.5 ± 17.3 kg LW and 5.2 mm of backfat thickness) and samples of *longissimus* muscle (2.5 cm thick) were collected at 12th rib level after 48 h *postmortem*. Steaks were placed on Polyfoam trays, overwrapped with an oxygen-permeable polyvinylchloride film and stored for 3 d under simulated retail display conditions of illumination (Halogen light; 2000 lx) and temperature (0 to 2°C). After this period, steaks were frozen and analyzed for FA composition using the methods by Folch et al. (1957) and Kramer et al. (1997), and quantified using a gas chromatography. The experiment was set up as a completely randomized block (initial body weight) design and analyzed using the mixed model, considering diets as fixed effects.

Results

No effect ($P > 0.05$) of oil addiction in diet was observed for most FA percentage (average among all treatments): c9 t11 CLA (0.42% ± 0.04) and total concentrations of monounsaturated (45.17% ± 0.86), saturated (SFA; 41.13% ± 0.75), polyunsaturated (PUFA; 10.06% ± 0.85), n-3 (1.50% ± 0.20), n-6 (8.3% ± 0.70). The c6 18:1 concentration was higher ($P = 0.04$) in meat from steers fed LIN (0.36% ± 0.03) and SOY (0.37% ± 0.03), in comparison to CON (0.19% ± 0.04). This c6 18:1 increased concentration is seen as beneficial to human health because of *cis* positional configuration. Linolenic acid was in higher concentration ($P = 0.01$) in animals fed LIN (0.96% ± 0.05) compared to other treatments (0.46% ± 0.05), which would be expected due to the high concentration of 18:3 n-3 in linseed oil. This is a desirable result, because the goals of feeding LIN were to increase n-3 FA in the meat because of their benefits to human health. In consequence, meat from LIN fed animals had a high n-6:n-3 ratio (4.15 ± 0.55) which is close to the recommended ratio (4.0) by the World Health Organization– WHO (2003). The meat of animals fed SUN and SOY showed n-6:n-3 ratio of 8.75 and 7.66, respectively, which are higher than recommended by the WHO. Despite no differences among treatments for n-6 FA, the high n-6:n-3 ratio observed for SUN and SOY occurred probably due to the high amount of 18:2 n-6 in these oils. The PUFA:SFA (0.25 ± 0.02) ratio was not affected by diets ($P > 0.05$) and was below the recommended ratio which is greater than or equal to 0.4. The index of enzymes activity Δ9 desaturase C16 (11.05% ± 0.36), Δ9 desaturase C18 (72.07% ± 1.18) and elongase (65.48% ± 0.50) were not influenced by diets ($P > 0.05$).

Conclusion

The LIN diet provided meat with better FA composition considering the higher concentration of linolenic acid and adequate relation of n-6:n-3, which is positive for human health.

