

CONSUMER SENSORY EVALUATION OF MEAT FROM NELLORE STEERS FED WITH VEGETABLE OILS

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Abstract – The objective was to evaluate if vegetable oils in steers' diets can modify the taste and acceptability of meat by consumers. Ninety-six castrated Nellore cattle were fed with soybean, sunflower or linseed oils (3.5% DM) in diet, replacing corn. After 81 days of feeding, animals were slaughtered and the meat was evaluated by 100 untrained testers. The flavor and texture were not affected by treatments. Beef of sunflower oil treatment received higher scores for aroma than soybean oil. Beef of soybean oil diet did not show differences in the quantities of C18:2 n-6 and n-6 compared to the others sources. Control and sunflower resulted in higher juiciness, with greater global consumer acceptability, compared to soybean oil.

Key Words – linseed oil, flavor, beef.

I. INTRODUCTION

Feeding vegetable oils in the diet of ruminants is a way to improve the nutritional quality of the beef, including change in composition of fatty acids. The objective of this study was to evaluate if this fatty acid modification may alter the taste and acceptability of this meat by consumers.

II. MATERIALS AND METHODS

Ninety-six 20-month-old castrated Nellore males were fed with corn silage (21% DM) and concentrate containing 3.5% soybean, sunflower or linseed oils, in substitution of corn grain and a diet without oil. Diets were composed of 21% corn silage and 79% concentrate (dry corn grain, soybean meal, citrus pulp, urea, mineral nucleus and calcitic limestone) and the inclusion of oils was made by substitution of corn grain (3.5%). After 81 days of feeding, animals were slaughtered (507.5 ± 17.3 kg 5.2 mm of backfat thickness) and a steak of *Longissimus* muscle (2.5 cm thick) was collected at 12th rib level, vacuum packaged and frozen for further panel sensory analysis.

The samples were thawed (4 °C) for 24 hours, then roasted in an electric oven, preheated at 170 °C, until they reached an internal temperature of 71 °C [1], monitored by thermocouples.

Sensory analysis was performed, according to Meilgaard et al. [2], using the effective acceptance test with 100 untrained testers. The samples were coded and randomly served, one at a time. The evaluation was performed using sensory consumer panel and a hedonic scale structured with nine points, ranging from "dislike extremely" (note 1) to "like extremely" (note 9) for attributes of flavor, aroma, texture, juiciness and overall acceptability. The samples were analyzed also for 18:2 n-6, n-3 and n-6 fatty acids composition [3], [4] and total lipid [5].

The experiment was set up as a completely randomized design and the consumer was included as a random effect in the model.

III. RESULTS AND DISCUSSION

Flavor and texture were not affected by treatments (Table 1). Steaks from animals fed with sunflower oil had higher scores for aroma ($P < 0.01$) when compared to those fed soybean oil. High levels of C18:2 n-6 can harm the flavor of cooked meat [6], [7], and unbalanced proportions of n-3 and n-6 fatty acids can provide unpleasant taste (off-flavor) [7]. Meat of steers fed with soybean oil did not show differences in the quantities of C18:2 n-6 and n-6 compared to other treatments, however, they, as well as the sunflower treatment, showed greater proportions of n-6:n-3 ratio. In this way, the lowest scores for flavor attributed to soybean oil treatment may be associated to this greater relation of

n-6:n-3. However, this greater relationship does not negatively impact the flavor of the meat of animals fed with the sunflower oil diet, because they received the highest scores for flavor.

The meat of cattle fed the control diet and with sunflower oil were juicier and had greater global consumer acceptability ($P < 0.01$), compared to those fed soybean oil (Table 1). The juiciness is influenced by the amount of fat and water in the meat [8], however, there were no differences in the quantities of lipids (1.85%) among treatments. In this way, these differences cannot be attributed to amounts of fat.

Table 1. Consumer Panel Sensory analysis, linolenic, n-6 and n-6:n-3 fatty acids of *m. longissimus* from Nellore fed with different vegetable oils

Item ¹	Diet				SEM	Probability
	CON	SUN	LYN	SOY		
Aroma	6.1	6.0	5.8	5.8	0.12	0.28
Texture	6.1	6.1	6.0	5.9	0.15	0.67
Flavot	6.1ab	6.3a	6.0ab	5.7b	0.13	0.01
Juiciness	6.5a	6.5a	6.1ab	5.9b	0.15	0.01
Overall Acceptability	6.3a	6.3a	6.0ab	5.8b	0.13	0.02
C18:2 n-6 (linolenic)	5.3	6.9	5.7	6.6	0.49	0.44
n-6	7.6	9.0	7.7	8.9	0.70	0.77
n-3:n-6	5.5	8.8	4.2	7.7	0.55	0.05

¹CON: control diet without oil; SUN: diet with sunflower oil; LIN: diet with linseed oil; SOY: diet with soybean oil; SEM: standard error of mean; a,b = distinct letters at same line differ each other ($P < 0.05$).

IV. CONCLUSION

Sunflower and linseed oils can replace 3.5% of corn in finishing cattle diets without negatively influencing the sensory attributes of the meat. However, the soybean oil may decrease the acceptability of meat by consumers.

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