EFFECT OF THE DIETARY POLYUNSATURATED FATTY ACID LEVEL ON CONSUMER SENSORY RATINGS OF BEEF FROM DIFFERENT GENETIC GROUPS

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Abstract – This study aimed to evaluate the effects of dietary polyunsaturated fatty acid (PUFA) level on consumer sensory ratings of beef from different genetic groups. Thirty Nellore and 30 crossbred Angus x Nellore were feedlot and fed diets containing low (LPF) or high PUFA level (HPF). Consumer quantitative and qualitative sensory ratings were evaluated. A genetic group x diet interaction was observed for qualitative sensory tenderness. Higher ratings for overall liking of purebred than for crossbred animals were observed. Animals fed LPF diet had higher scores for overall liking, quantitative sensory tenderness and juiciness than animals fed HPF diet. Increasing PUFA had a negative effect on qualitative sensory tenderness of *B. indicus* and crossbred animals.

Key Words – crossbred, eating quality, Nellore, soybean oil

I. INTRODUCTION

Genetic group has a direct effect on growth rate of animal and site and amount of intramuscular fat, which are related to the fatty acids (FA) profile of the meat [1]. *B. indicus* animals have a lower growth rate and intramuscular fat content than *B. taurus* animals [2]. Several studies have shown that meat FA profile can be changed by feeding diets with high levels of polyunsaturated FA [1]. In addition, FA profile of intramuscular fat have been associated to the higher consumers' liking of the meat [3]. Because distinct genetic groups have different potentials for depositing intramuscular fat, feeding high levels of polyunsaturated FA can also affect differently the FA profile and therefore the eating quality of meat. Therefore, this study was carried out to evaluate the effects of the dietary polyunsaturated FA levels on consumer sensory ratings of beef from different genetic groups.

II. MATERIALS AND METHODS

Thirty Nellore and 30 crossbred Angus x Nellore (368 ± 28 kg bodyweight; 24 mo old) were feedlot and fed diets containing low (LPF) or high (HPF) levels of polyunsaturated FA. The LPF diet contained corn silage (10%), sugarcane bagasse (5%), corn grain (58%), citrus pulp (16%), soybean meal (9%), urea (1.2%), and mineral salt (0.8%). For the HPF diet, soybean oil (3.5%) was added in replacing of corn grain. After 133 days on feed, animals were harvested and samples of *Longissimus* muscle (12^{th} rib level) were taken, vacuum packed and aged for 7 days. After that, consumer quantitative and qualitative sensory analysis were evaluated according to AMSA [4]. For the quantitative sensory analysis, an acceptance test assessed by a 100-consumer panel using a nine-point hedonic scale (dislike extremely – 1; like extremely – 9) was performed. Likewise, for the qualitative sensory analysis a five-point hedonic scale was used coupled to a just-about-right test, ranging from "much too weak, tough or dry" (note 1) to "much too strong, tender or moist " (note 5) according to the flavour, tenderness and juiciness traits, respectively. Means were compared by Student's t test. Differences were considered statistically significant when $P \leq 0.05$.

III. RESULTS AND DISCUSSION

Genetic group x diet interaction. A genetic group x diet interaction was observed for tenderness scored for qualitative sensory ($P = 0.0209$). Purebred animals fed LPF diet had higher ratings than crossbred animals fed LPF diet ($P = 0.0385$; 3.8 x 3.4, respectively). Likewise, purebred animals fed LPF diet had higher ratings than purebred animals fed HPF diet ($P < 0.0001$; 3.8 x 2.9, respectively), as well crossbred animals fed LPF diet had higher scores than crossbred animals fed SBO diet ($P = 0.0321$; 3.4 x 3.0, respectively). A mean value of shear force (SF) above 42 N could have a decrease

in the score given in the sensory analysis [5]. Statement that can explain the lower scores for sensory qualitative tenderness of purebred animals fed CON (40.1 N) and SBO diet (43.4 N), as well crossbred animals fed CON (41.2 N) and SBO diet (45.8 N). However, no difference was observed between purebred and crossbred animals fed HPF diets for tenderness scored for qualitative sensory (P = 0.9310; 2.9 x 3.0, respectively).

Genetic group. Higher ratings for overall liking (P = 0.0440) of purebred animals when compared to crossbred animals were observed, probably due to the more pronounced taste of meat in these animals as well as scored higher ratings for quantitative flavour. Those results were unexpected, since genetic groups with lower intramuscular fat deposition rates produce meat with greater amount of polyunsaturated FA, given by high negative correlation between those traits [6].

Diet. Animals fed LPF diet had higher scores for overall liking (P < 0.0001), quantitative sensory tenderness (P < 0.0001) and juiciness (P = 0.0009) than animals fed HPF diet (Table 1). Results that are contrary to those found by Okumura et al. [3], who noted a higher polyunsaturated FA led to higher overall liking of meat.

Table 1 Means, standard errors (SEM) and probabilities (P-value) of the meat quality according to the genetic group and diets.

Traits	Genetic group (GG)		Diet (DT)[1]		SEM	*P*-value		
	B. indicus	Crossbred	LPF	HPF		GG	DT	GG x DT
Quantitative sensory[2]								
Overall liking	6.7	6.4	6.9	6.3	0.12	0.0440	<0.0001	0.6342
Flavour	6.7	6.5	6.5	6.7	0.12	0.0444	0.0533	0.8432
Tenderness	6.4	6.2	6.8	5.8	0.16	0.2984	<0.0001	0.3788
Juiciness	6.6	6.3	6.7	6.2	0.13	0.1141	0.0009	0.8431
Qualitative sensory[3]								
Flavour	2.9	2.8	2.9	2.9	0.05	0.0755	1.0000	0.3313
Juiciness	3.3	3.2	3.3	3.2	0.07	0.1645	0.1309	0.6718

[1]LPF = low polyunsaturated fatty acid level; HPF = high polyunsaturated fatty acid level.
[2]For the quantitative sensory analysis a structured hedonic scale of nine points was used, ranging from “dislike extremely” (note 1) to “like extremely” (note 9).
[3]For the qualitative sensory analysis a structured hedonic scale of five points was used coupled to a just-about-right test, ranging from “much too weak, tough or dry” (note 1) to “much too strong or moist” (note 5) according to the flavour and juiciness traits, respectively.

IV. CONCLUSION

Increasing dietary polyunsaturated FA had a negative effect on qualitative sensory tenderness of *B. indicus* and crossbred animals; however, that effect did not affect the quantitative sensory tenderness and overall liking of meat.

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