BEEF FATTY ACID PROFILE OF CATTLE FROM DIFFERENT GENETIC GROUPS SUPPLEMENTED WITH POLYUNSATURATED FATTY ACIDS

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I. INTRODUCTION

Diet and animal genotype are known to affect the intramuscular fat (IMF) amount and its fatty acid (FA) profile in beef cattle [1]. Genetic groups with lower rate of IMF deposition are expected to have greater content of polyunsaturated fatty acids (PUFA) due to the high negative correlation between these traits [1,2]. However, IMF extracted from the meat of animals with lower IMF deposition is basically composed by phospholipids, which is known to be more difficult to modify by dietary supplementation of lipid sources than the triacylglycerol present in the IMF of animals with higher IMF deposition [1]. Thus, the aim of this work was to evaluate whether it is possible to modify the FA profile of meat from animals of different genetic predispositions for IMF deposition by increasing the dietary PUFA concentration.

II. MATERIALS AND METHODS

Thirty *Bos indicus* (BI; Nellore) and thirty crossbred *Bos taurus* x *Bos indicus* (CB; Angus x Nellore) (368 ± 28 kg body weight; 24 mo old) were allocated in individual pens according to the initial body weight (block) in a randomized block design with a 2 x 2 factorial arrangement (diet x genetic group) and 15 replications per treatment. Animals were fed for 133 d to one of two high concentration diets: control diet (CO; TDN = 78.9%; EE = 3.11%) and soybean oil diet (SB; TDN = 82.3%; EE = 6.45%). Diets contained corn silage (10%), sugarcane bagasse (5%), corn grain (58% for CO and 54.5% for SB), citrus pulp (16%), soybean meal (9%), urea (1.2%), mineral salt (0.8%) and soybean oil (0% for CO and 3.5% for SB). At the end of feeding period, animals were slaughtered and Longissimus muscle was sampled between 12th and 13th ribs and aged for 7 days to evaluate IMF content and FA profile of meat. The FA were quantified by gas chromatography (GC-2010 Plus - Shimadzu AOC 20i auto-injector) using a SP-2560 capillary column (100 m × 0.25 mm in diameter with 0.02 mm thickness, Supelco, Bellefonte, PA) and their content were expressed in percentage of total FA methyl ester quantified. Means were compared by Student's t test, and differences were considered statistically significant when $P \leq 0.05$. Effects of main factors and interaction were evaluated using the mixed procedure of SAS.

III. RESULTS AND DISCUSSION

Diet x genetic group interaction. No interaction between diet and genetic group was observed for any trait evaluated, so that their effects on those traits can be considered separately.

Diet effects. There was no difference of the PUFA supplementation on IMF (Table 1). Similar results were reported by Oliveira et al. (3), who observed no difference in the amount of IMF in the meat of BI fed with 3.8% soybean oil. However, these authors reported lipid contents higher than 3%, whereas in the present study it was not higher than 2%. Despite the low amount of lipid in the meat, some FA were modified by diet (Table 1). As soybean oil is rich in C18:2, animals fed SO diet had 68% higher conjugated linolenic acid (CLA) proportion from the biohydrogenation of C18:2 than animals fed CO diet. Oliveira et al. (3) feeding animals 3.8% soybean oil inclusion reported similar results. However, long chain PUFAs, such as C20:5, C22:5, and C22:6 had higher proportion in the meat from animals fed CO, which could be attributed to a probable greater action of Δ5 and Δ6 desaturase in those animals.

Genetic group effects. Fatty acid profile data were similar between BI and CB groups, as reported by Bressan et al. [2]. The BI animals were expected to have a lower amount of IMF and a better FA profile than CB animals [1,2]. In the present study, however, the amount of IMF was similar for genetic groups and, consequently, the FA profile was quite similar.

Table 1 Effect of diet (DT) and genetic group (GG) on fatty acids profile of meat

Traits, %	DT		GG		SEM	*P* value		
	CO	SO	BI	CB		DT	GG	DT*GG
Intramuscular fat	1.8	2.0	1.8	2.0	0.16	0.5457	0.2690	0.2116
C14:0	2.2	2.5	2.5	2.2	0.09	0.0199	0.1222	0.8648
C14:1 c9	0.54	0.50	0.56	0.47	0.032	0.0416	0.4205	0.4315
C16:0	22.1	21.9	21.1	21.9	0.30	0.5773	0.5722	0.2675
C16:1 c9	2.4	2.3	2.4	2.3	0.08	0.2367	0.2298	0.5729
C18:0	14.0	14.5	14.2	14.3	0.39	0.3914	0.7337	0.6602
C18:1 c9	34.7	31.6	33.5	32.9	0.74	0.0042	0.5864	0.5912
C18:2 n6	6.3	6.9	6.3	6.8	0.52	0.2154	0.3476	0.7853
C18:3 n3	0.31	0.29	0.32	0.29	0.025	0.5336	0.4076	0.9882
CLA c9 t11	0.22	0.37	0.32	0.27	0.025	<0.0001	0.2283	0.3825
C20:2 n6	0.09	0.08	0.08	0.09	0.006	0.3981	0.2391	0.9353
C20:3 n6	0.39	0.29	0.32	0.35	0.045	0.0499	0.5461	0.8971
C20:4 n6	1.5	1.3	1.3	1.5	0.21	0.2824	0.4301	0.8896
C20:5 n3	0.22	0.14	0.20	0.17	0.023	0.0133	0.3529	0.7729
C22:4 n6	0.19	0.15	0.16	0.18	0.028	0.1006	0.4206	0.9178
C22:5 n3	0.54	0.39	0.49	0.44	0.047	0.0217	0.4266	0.7802
C22:6 n3	0.06	0.04	0.05	0.05	0.006	0.0172	0.5518	0.6599

[1] CO = basal diet without soybean oil inclusion; SO = basal diet containing 3.5% soybean oil inclusion in replacing of ground corn grain. [2] BI = *Bos indicus*; CB = crossbred *Bos taurus* x *Bos indicus*.

IV. CONCLUSION

Increasing dietary PUFA concentration is an effective way to increase CLA in the IMF, but it decreases C18:1 c9 and some n-3 FA, whereas genetic group has a minimal effect on FA profile of IMF.

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