BEEF SENSORY ANALYSIS OF STEERS FROM DIFFERENT GENOTYPES FINISHED IN PASTURE OR IN FEEDLOT SYSTEM

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Abstract – Sensory evaluation is a useful technique applied in the food production chain to ensure its quality. The goal of this study was to evaluate the beef quality based on the sensory traits of steers from eight genotypes: Angus, Angus x Caracu, Brangus, Hereford x Angus, Hereford, Nelore x Angus, Nelore x Brangus and Nelore, finished in feedlot or pasture. It was assessed the intensity of color, aroma, flavor, pork-like flavour, tenderness, juiciness and fatness in *Longissimus dorsi* (LD) and *Semitendinosus* (SE) muscle. Significant effects (P<0.05) were observed between the finishing systems and among genotypes in both muscles. The color demonstrated significant effect for genotypes in SE and in the interaction genotype*finishing system in LD. The finishing system were significantly divergent in flavor and pork-like flavor in SE, this last one also presented significant effect in LD. Feedlot samples had more pork-like flavor when compared to pasture ones. The juiciness were significant different among the genotypes. The samples more tender were the European breeds and its crossbreeds in LD. The fatness in LD showed genotype and finishing system effects. The feedlot system samples showed fatter when compared to the pasture ones. Feedlot system affected negatively flavor characteristic in both muscle beef samples.

I. INTRODUCTION

Sensory analyses can be applied to fill up the needs and demands of consumers, measuring the beef quality traits of the livestock production in different breeds along distinct feed systems. Those factors can affect aroma, flavour, tenderness, fatness, among others. Thus it is necessary to determine which genotypes, according to the production system, yield beef with better qualitative traits. In order to assess the effect of different genotypes finished in different feed systems on beef quality, was carried out sensory evaluation of meat from steers Angus (ANAN), Angus x Caracu (ANCR), Brangus (BNBN), Hereford x Angus (HHAN), Hereford (HHHH), Nelore x Angus (NEAN), Nelore x Brangus (NEBN) and Nelore (NENE), finished in pasture or in feedlot system.

II. MATERIALS AND METHODS

It was assessed the beef quality traits through sensory analyses in LD (between 12th and 13th rib) and SE beef samples from 8 genotypes: ANAN, ANCR, BNBN, HHAN, HHHH, NEAN, NEBN and NENE. The steers were kept at Embrapa Southern Region Animal Husbandry (CPPSUL) fields and finished in ryegrass plus oat grass pasture or in feedlot system (60%corn silage plus 40% animal feed). For the sensory evaluations, the previously frozen samples were thawed at 4°C for 24 hours and the beef sample preparation followed the AMSA [1] recommendations. Then, samples were roasted until reach 70°C internal temperature, cut parallel to the fiber muscle into 1.5cm^3 pieces and were offered to the assessors at 60°C in monadic way in individual chambers. The sensory technique of analyses followes the Meilgaard *et al* [2] recommendations. The intensity of each attribute (color, aroma, flavor, pork-like flavor, tenderness, juiciness and fatness) was assessed in *L. dorsi* (LD) and *Semitendinosus* (SE) muscle in different sessions, using a 9 cm scale, being 0 = little intense and 9 = very intense. The exception was for tenderness trait, which was consider 0 = extremely tender and 9 = extremely tough. The assessments were done at Meat Science and Technology Laboratory of CPPSUL by 8 trained assessors. The sensory panel has three years training for meat sensory evaluation. The type III *F* statistics were used to test the fixed effects in the model (Y=μ+genotype+finishingsystem+genotype*finishingsystem+animal(genotype*finishingsystem)+assessor(data)+residue). When significant, respective least squares means were compared using T Test (P<0.05).

III. RESULTS AND DISCUSSION

Mean values and the effects in data analyses are shown in Table 1 and 2. Significant effects (P<0.05) were observed between the two finishing systems and among genotypes in both muscles.

Table 1- Beef sensory traits assessed in *Semitendinosus* muscle at different genotypes in pasture or feedlot.

Sensory trait	ANAN	ANCR	BNBN	HHAN	HHHH	NEAN	NEBN	NENE	Finishing system		Effect | P
									Pasture	Feedlot	
Color	4.13	4.27	4.40	4.41	3.69	4.75	4.83	3.95	4.15	4.46	B*FS|0.01
Aroma	4.95	4.02	4.68	4.58	4.61	4.09	4.74	4.26	4.495	4.497	ns
Flavour	4.92	4.31	4.12	4.55	4.88	3.86	4.33	4.04	4.31	4.44	ns
Pork-like flavour	0.75	0.98	0.64	0.75	0.73	1.12	0.24	0.34	0.35^{a}	1.04^{b}	FS|0.01
Tenderness	3.9^{a}	2.87^{ab}	2.66^{a}	3.84^{a}	4.5^{ac}	5.04^{ac}	5.18^{ac}	5.05^{ac}	4.33	3.93	B |0.05
Juiciness	4.46	5.53	4.72	4.76	4.47	4.26	4.19	3.44	4.49	4.47	ns
Fatness	2.96^{a}	3.53^{ac}	2.54^{ab}	3.31^{abc}	2.34^{ab}	2.93^{ab}	2.43^{ab}	1.90^{b}	2.43^{a}	3.06^{b}	B,FS|0.01, 0.005

[a]same letters in same line do not differ significantly. [ns] not significant

Table 2- Beef sensory traits assessed in *L. dorsi* muscle at different genotypes in pasture or feedlot.

Sensory trait	ANAN	ANCR	BNBN	HHAN	HHHH	NEAN	NEBN	NENE	Finishing system		Effect | P
									Pasture	Feedlot	
Color	3.83^{a}	5.02^{b}	3.47^{a}	4.56^{ab}	4.80^{abc}	4.18^{ab}	3.94^{ab}	2.92^{a}	4.20	3.98	B |0.01
Aroma	4.53	4.53	4.79	5.19	4.87	5.27	4.24	4.07	4.69	4.69	ns
flavour	4.48	4.38	4.52	4.93	5.01	4.01	3.63	3.76	4.74^{a}	3.69^{b}	FS |0.03
pork-like flavour	1.06	0.86	1.67	0.59	0.57	1.21	1.13	0.98	0.59^{a}	1.42^{b}	FS | 0.01
tenderness	3.4	4.24	4.33	3.71	4.34	4.55	4.5	4.79	4.45	4.01	B*FS |0.03
juiciness	4.74^{a}	3.15^{b}	4.04^{ab}	5.19^{a}	4.32^{a}	2.79^{b}	3.79^{b}	3.41^{b}	3.86	4.00	B |0.03
fatness	2.31	2.78	2.84	2.87	3.17	2.78	2.26	1.15	2.71	2.40	ns

[a]same letters in same line do not differ significantly. [ns] not significant

The color trait demonstrated significant effect for genotypes in SE (higher results for ANCR, HHAN, HHHH, NEAN and NEBN) and in the interaction genotype*finishing system in LD. No significant effect was found for aroma. There was no significant effect in flavor trait in LD. The finishing system caused significant effect in flavor and pork-like flavor in SE, this last one was also significant in LD. Feedlot samples had more pork-like flavor when compared to pasture ones. This finding can be justified by the intake of corn silage by the feedlot animals as the major portion of its diet. The juiciness were significant different among the genotypes. The genotypes ANAN, BNBN, HHAN and HHHH showed the better results in SE. The samples more tender were ANAN, ANCR, BNBN, HHAN and HHHH in LD. Those zebu breeds or zebu-crossbreeds presented beef less juicy in SE while in LD showed be less tender. The fatness in LD showed genotype and finishing system effects. The NENE genotype presented the thinner sample when compared to others. The feedlot system samples showed fatter when compared to the pasture ones.

Resconi *et al* [3] found similar results regarding to steers fed only concentrate plus hay which produced beef that had an inferior sensory quality because they had more pronounced off-flavors and was tougher. In other hand, those authors found significant differences in aroma and flavor between pasture and feedlot animals.

IV. CONCLUSION

Genotypes and feed systems affected beef sensory traits. The most remarkable finding was that feedlot system affected negatively flavor characteristic in both muscle beef samples.

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