MEAT QUALITY OF ZEBU X HOLSTEIN CROSSBRED CATTLE HARVESTED AT TWO SLAUGHTER WEIGHTS

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I. INTRODUCTION

In Brazilian beef production system, Nellore genotype is predominant and little is known about the potential use and exploitation of dairy bulls. In contrast, in North America, dairy cattle are common in finishing feedlots for meat production. The *Bos taurus* x *Bos indicus* crossbred animal production has increased in beef production systems in tropical and subtropical regions to increase the quality of beef [1]. Beef tenderness is an important attribute of eating sensory quality; however, beef herds (Bos indicus) adapted to tropical and subtropical regions present lower beef tenderness, which is a problem for product acceptability [2]. Besides this, colour is the meat quality property that most influence consumers' purchase decisions [3]. Of all the meat colour parameters, redness is considered the most important, relative to purple or brown colours, for acceptability criteria [4]. Meat submitted from carcasses with an unfavorable colour can suffer depression and therefore represent a financial loss for producers and the beef industry. This study aims to evaluate the colour and tenders of crossbred Zebu x Holstein cattle harvested at two slaughter weights.

II. MATERIALS AND METHODS

There were used 32 bulls, 16 Nellore and 16 Zebu x Holstein crossbred, separated into groups according to final body weight: Light Nellore (554±21kg, N=8); heavy Nellore (622±31kg, N=8); Light crossbreds (557±20kg, N=8); Heavy crossbreds (634±29kg, N=8). After a 24h chilling period 2.54 cm thick steaks were cut from the Longissimus muscle between the 12th-13th ribs for meat colour and Warner-Bratzler Shear Force (WBSF) analysis. All analyses were performed on the samples at time zero and 14 days of maturation. The meat colour measurement was obtained using a Hunter MiniScan EZ colorimeter (4500L; Hunter Associates Laboratory, Inc., Reston, Virginia, USA). To determine WBSF, cooked steaks were cooled for 24 h at 4 °C, following the guidelines of the American Meat Science Association (AMSA, 1995) [5]. The WBSF was performed utilizing a WarnerBratzler shear device (G–R Electrical Manufacturing Company, Manhattan, KS, USA) equipped with a 1.1684 mm thick V-notched (60° angle) cutting blade at a constant speed of 2 mm/s and with a rechargeable 500 N digital force gauge (Mecmesin Basic Force Gauge) to measure and record peak force during sample processing. All data were analysed as a completely randomized design following a 2 (Nellore or Nellore x Hosltein) x 2 (Light or heavy weight at harvest) factorial arrangement of treatments. Analysis of variance (ANOVA) was performed to evaluate the effect of main factors and interaction on carcass and meat traits, using the GLM procedure of SAS. Once detected significant ($P < 0.05$) effect for weight at harvest or interaction, treatments least squared means were compared by Tukey's test. Tendendecy was assumed for $P<0.10$.

III. RESULTS AND DISCUSSION

The carcass's final pH evaluated 24 hours after animal slaughter was within the appropriate pH range, not differing between treatments (Table 1). Meat colour is influenced by both intrinsic factors such as genetics and sex and environmental factors, including diet, pre-slaughter management, chilling

conditions, and carcass weights [6]. The *L** colour parameters were different between the breeds evaluated at the two maturation times (0 and 14 hours) ($P < 0.05$, table 1). Unripened steaks, in the crossbred animal groups, had a higher *a** value than Nellore animals ($P = 0.03$), indicating a reddish colour for crossbred cattle. Of all meat colour parameters, redness (+ *a**) is considered more important than purple or brown colors for acceptability criteria. There is a tendency that Zebu x Holstein crossbred cattle to produce more tender meat than Nellore cattle ($P = 0.08$; Table 1).

Table 1 Effect of races (Nelore or Crossbred Zebu x Holstein) and weight carcasses on color and tenderness parameters of beef.

	Nelore		Crossbred[1]			P-value		
	Light	Heavy	Light	Heavy	SEM[2]	Race	Group	Race*Group
pH	5.49	5.46	5.52	5.46	0.0220	0.5771	0.0838	0.5471
Color *L** (0 hours)	33.59	35.18	32.78	31.95	0.8048	0.0166	0.6393	0.1419
Color *L** (14 days)	38.21	39.04	37.07	36.09	0.6513	0.0033	0.9090	0.1732
Color *a** (0 hours)	16.46	14.85	16.96	17.59	0.7415	0.0356	0.5095	0.1391
Color *a** (14 days)	15.83	14.31	15.04	14.61	0.4805	0.6097	0.0500	0.2681
Color *b** (0 hours)	15.98	16.18	15.69	16.22	0.4105	0.7749	0.3782	0.6878
Color *b** (14 days)	14.78	14.36	14.02	13.63	0.3742	0.0526	0.2875	0.9619
WBSF (Kg)[3]	7.39	6.85	6.61	6.55	0.3103	0.0887	0.3355	0.4433
WBSF (Kg, 14 days)[3]	3.41	3.26	3.49	2.89	0.2341	0.5402	0.1151	0.3512

[1]Crossbred = Crossbred Zebu x Holstein cattle, [2]SEM = Standard error of the mean,[3]WBSF = Warner-Bratzler Shear Force

IV. CONCLUSION

Crossbred dairy bulls may be a new red meat niche to be explored in Brazil. These animals have the potential to produce meat with a more attractive and tender colour.

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