# INFLUENCE OF CASTRATION ON MEAT COLOR OF NELLORE CATTLE FED A DIET HIGH OR LOW IN CONCENTRATE THROUGHOUT FATTENING

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### I. INTRODUCTION

Castration and diet can considerably influence carcass weight, affect final pH, and meat color [1, 2], and consequently influence consumers' purchase decisions [3]. Therefore, the goal of this study was to evaluate the beef color of Nellore young bulls and steers fed a high or low-concentrate diet throughout fattening.

# II. MATERIALS AND METHODS

A total of 28 young Nellore cattle, averaging 295.6  $\pm$  8.05 kg of body weight and 8.0  $\pm$  0.07 months of age, were used in this study. Half of the calves were randomly selected for surgical castration one week after weaning. Post-weaning, calves were confined for rearing and subsequently adapted to two finishing diets with different roughage:concentrate ratios:50:50 and 15:85. Therefore, four experimental groups were obtained: Steers 50:50, N=7; Steers 15:85, N=7; Bulls 50:50, N=7; and Bulls 15:85, N=7. The animals were slaughtered after 122 days of feedlot trial, with an average weight of 454.4 ± 30.0 kg. The pH was measured in the Longissimus lumborum (LL) muscle, using a portable pH meter, Mettler Toledo Pro2Go, and a digital food thermometer (-50°C to +300°C) used to measure the temperature, 24 hours after slaughter. After 24-hour chilling period, 2.54 cm thick steaks were obtained from the Longissimus muscle between the 12th and 13th ribs for water retention capacity [4], meat and fat color analysis. The color measurements were performed using a Hunter MiniScan EZ colorimeter (4500L: Hunter Associates Laboratory, Inc., Reston, Virginia, USA). All data were analyzed as a completely randomized design following a 2x2 factorial arrangement of treatments (2 sexual conditions and 2 roughage to concentrate ratios). 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 effect ( $P \le 0.05$ ) for sexual condition at diet or interaction, treatments were compared by Tukey's test. Also, tendency was assumed when  $0.05 < P \le 0.10$ .

# III. RESULTS AND DISCUSSION

The final pH of the bull group tended to be higher than the pH of the steer group (P = 0.082). A towards a sexual condition x diet interaction was observed for meat pH (P = 0.058). Compared to steers, bulls are more susceptible to pre-slaughter stress, leading to the production of meat with a higher pH and darker cut [5]. The same can happen with animals that have received a less energetic diet, with low muscle glycogen reserves [6]. Which can ultimately affect the profitability of the beef industry [7]. There was a difference in the beef color component  $b^*$  for diet (P = 0.048) and a trend for sexual condition (P = 0.068) indicating a redder color for cattle in the heavy group. On the other hand, fat color was not affected by diet and sexual condition (P > 0.05 for component color), but interaction between sexual condition and diet was observed for fat color.

	Steers		Bulls			P- value		
	50:50	15:85	50:50	15:85	SEM	Sexual condition	Diet	Sexual condition*Diet
pH 24h	5.41 <sup>A</sup>	5.42 <sup>A</sup>	5.49 <sup>A</sup>	5.49 <sup>A</sup>	0.02	0.082	0.632	0.058
T 24 h, °C	10.93 <sup>A</sup>	11.27 <sup>A</sup>	10.76 <sup>A</sup>	11.80 <sup>A</sup>	0.22	0.310	0.506	0.392
WRC, %	20.02 <sup>A</sup>	22.09 <sup>A</sup>	19.93 <sup>A</sup>	21.90 <sup>A</sup>	0.58	0.961	0.157	0.295
Beef Color								
L*	41.24 <sup>A</sup>	42.30 <sup>A</sup>	41.09 <sup>A</sup>	42.35 <sup>A</sup>	0.33	0.854	0.126	0.085
a*	13.54 <sup>A</sup>	13.15 <sup>A</sup>	13.10 <sup>A</sup>	14.34 <sup>A</sup>	0.28	0.303	0.109	0.944
b*	12.13 <sup>A</sup>	12.16 <sup>A</sup>	11.32 <sup>B</sup>	12.26 <sup>A</sup>	0.21	0.068	0.048	0.108
Fat Color								
L*	65.64 <sup>A</sup>	67.54 <sup>A</sup>	67.19 <sup>A</sup>	67.68 <sup>A</sup>	0.46	0.340	0.741	0.770
a*	9.61 <sup>A</sup>	8.68 <sup>A</sup>	8.68 <sup>A</sup>	10.02 <sup>A</sup>	0.33	0.300	0.253	0.993
b*	19.95 <sup>A</sup>	19.12 <sup>A</sup>	18.93 <sup>AB</sup>	18.41 <sup>B</sup>	0.32	0.209	0.690	0.017

SEM: Standard error of the mean; For each variable, within a row, means without a common superscript letter are significantly different. Significant differences at 5% probability ( $P \le 0.05$ ). Tendency was assumed when  $0.05 < P \le 0.10$ . T: Temperature 24 h (°C); WRC: water retention capacity.

# IV. CONCLUSION

This study indicates that the color of meat from carcasses with normal pH may be more influenced by diet than by castration.

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