PERFORMANCE, CARCASS TRAITS, AND MEAT QUALITY OF NELLORE CATTLE SUBJECTED TO DIFFERENT POST-WEANING FEEDING STRATEGIES

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I.   INTRODUCTION

Cattle nutrition and growth after birth have a great influence on performance and body composition during the post-weaning growing phase. The backgrounding phase in Brazil occurs mainly in grazing systems and alters the quantity and quality of the meat that is produced at finishing stage [1, 2, 3]. The current study aimed to evaluate the performance, carcass traits, and meat quality of Nellore cattle subjected to different post-weaning feeding strategies. It was hypothesized that certain feed strategies offered during the post-weaning phase, before the finishing diet, would exert a higher or lower influence on carcass and meat quality.

II.   MATERIALS AND METHODS

A total of 36 young Nellore bull calves, averaging 295.6 ± 8.05 kg of body weight and 7.0 ± 1 months of age, were used in this study. The calves were randomly selected to one of four treatments in the backgrounding and finishing phases: 0 + 140 days; 28 +112 days; 56 + 84 days; 84 + 56 days, respectively. The diets were formulated according to BR-CORTE recommendations to achieve average daily gains of 0.6 kg/day and 1.2 kg/day for backgrounding and finishing phase, respectively. During the experimental period, initial body weight (iBW), final body weight (fBW), and average daily gain (ADG) were measured. After harvest, data on hot carcass weight (HCW), cold carcass weight (CCW), and carcass yield (CY) were obtained. *Longissimus lumborum* (LL) samples were collected for meat quality analysis. The subcutaneous fat thickness (SFT) was measured in the *Longissimus lumborum* (LL) muscle using a digital caliper, and the Warner-Bratzler shear force (WBSF) was determined following American Meat Science Association guidelines [4]. Sarcomere length (SL) was estimated according to the laser diffraction technique [5]. The myofibrillar fragmentation index (MFI) was assessed by measuring the turbidity of homogenized samples in a standardized protein concentration [6]. Analysis of variance (ANOVA) was performed to evaluate the effect of main factors, using the GLM procedure of SAS. Once detected significant effect ($P \leq 0.05$) the treatments were compared by Tukey's test. Also, tendency was assumed when $0.05 < P \leq 0.10$.

III.   RESULTS AND DISCUSSION

There was a difference in fBW (P = 0.002), ADG (P < 0.001), HCW (P < 0.001), CCW (P = 0.001), CY (P = 0.012), and MFI (P = 0.019) among treatments (Table 1). In addition, a strong tendency was observed for SFT (P = 0.055; Table 1). For all these variables, the animals that received directly the finishing diet had improved carcass and meat quality than animals that received 84 days with a high-forage diet in the post-weaning growing phase. This effect can be due to the longer confinement period when compared to other periods. This would justify using a strategy of placing the animals directly in the feedlot after weaning, optimizing space, and intensifying the production system.

Table 1 – Performance, carcass traits, and meat quality of Nellore cattle subjected to different post-weaning feeding strategies.

	Post-weaning growing phase - days with high-forage				
Variables	0	28	56	84	*P- value*
Feedlot days	157.33 ± 2.87^A	157.67 ± 2.59^A	157.89 ± 2.61^A	158.11 ± 2.80^A	0.569
iBW	265.78 ± 30.44^A	264.67 ± 28.03^A	265.72 ± 31.22^A	263.83 ± 29.57^A	0.892
fBW	442.55 ± 48.42^A	417.44 ± 32.52^A	408.50 ± 50.20^A	361.39 ± 46.67^B	0.002
ADG	1.12 ± 0.17^A	0.97 ± 0.08^B	0.90 ± 0.19^B	0.62 ± 0.15^C	<0.001
HCW	274.57 ± 30.23^A	257.64 ± 20.74^A	249.32 ± 31.55^A	216.77 ± 24.93^B	<0.001
CCW	271.44 ± 30.22^A	254.67 ± 20.42^A	246.83 ± 31.10^A	214.21 ± 25.00^B	0.001
CY	61.35 ± 1.55^A	61.00 ± 1.10^A	60.40 ± 1.24^{AB}	59.37 ± 1.42^B	0.012
SFT	4.44 ± 2.65^A	3.10 ± 1.33^A	3.79 ± 2.59^A	2.47 ± 1.06^B	0.055
WBSF	5.50 ± 1.62^A	4.6 ± 0.64^A	4.76 ± 1.33^A	4.74 ± 1.12^A	0.263
SL	1.28 ± 0.19^A	1.29 ± 0.16^A	1.19 ± 0.05^A	1.32 ± 0.33^A	0.802
MFI	23.69 ± 1.02^A	21.46 ± 3.24^{AB}	19.87 ± 2.54^B	$19.\pm3.75^B$	0.019

iBW: Initial body weight (kg); fBW: Final body weight (kg); ADG: Average daily gain (kg); HCW: Hot carcass weight (kg); CCW: Cold carcass weight (kg); CY: Carcass Yield (%); SFT: Subcutaneous fat thickness (mm); WBSF: Warner-Bratzler Shear Force (KgF); SL: Sarcomere length (µm) MFI: Myofibrillar fragmentation index (%).

[A, B, C]: For each variable, within a row, means without a common superscript letter are significantly different. Significant differences at 5% probability (P⩽0.05). Tendency was assumed when 0.05 < P ≤0.10.

IV. CONCLUSION

These results reveal that bulls receiving a finishing diet after weaning, fed longer on a high-grain diet, have higher performance, higher carcass traits, and greater potential for producing higher meat quality than Nellore cattle subjected fed longer on a high-forage diet. Maintaining animals in a feedlot diet during the backgrounding phase may be an alternative method to obtain heavier animals at slaughter with greater, carcass traits and meat quality.

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