CASTRATION METHOD AND TYPE OF WEANING INTERFERE IN THE PRODUCTIVE CHARACTERISTICS OF CONFINED ANGUS X NELLORE CROSSBREED BOVINE

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I. INTRODUCTION

Castration is a procedure that alters hormonal effects on metabolic pathways and the growth development of livestock animals, affecting meat quality attributes [1]. In Brazil, surgical castration is the most common method, but this practice can present post-surgical complications that cause stress and slow recovery. In this way, castration by rubber ring becomes a less invasive method that consists of fixing a high-pressure elastic ring around the base of the scrotum to suspend blood circulation until the testicles atrophy and are eliminated [2]. According to Coetzee [3], castration with a rubber ring leads to lower concentrations of blood stress indicators (35% lower cortisol) when compared with conventional surgical castration. Regarding weaning, this procedure is commonly performed in Brazil when calves reach between 7 and 9 months of age. However, early weaning carried out with animals aged 3 to 5 months has been gaining ground in livestock farming due to the development of the rumen caused by dietary changes, allowing for faster animal growth and a shorter production cycle. Therefore, the aim is to test whether early weaning or castration with a rubber ring benefits the performance and carcass characteristics of Angus x Nellore crossbred cattle finished in feedlots.

II. MATERIALS AND METHODS

A total of 24 Angus x Nellore crossbred cattle aged 12 months and live weighing 425 ± 6.93 kg were confined for 125 days following a completely randomized design in 2 x 3 factorial arrangement: two castration methods (surgical and rubber-ring) and two types of weaning (early and traditional), totaling 4 treatments with 3 replications of 2 animals each. The animals were kept under the same management conditions, receiving the same diet *ad libitum*. The performance analysis considered dry matter intake (DMI, kg/d), initial and final body weight (IBW and FBW, kg), average daily gain (ADG, kg) and feed efficiency (FER) as the ratio between ADG and DMI. The carcass traits evaluated considered hot carcass weight (HCW, kg), carcass yield (CY, %), pH, rib eye area (REA, cm^2), backfat thickness (BFT, mm) and marbling score. The results were analyzed using PROC MIXED in SAS, considering the fixed effect (castration methods and type of weaning). The means of the results were compared using the *F* test, and the effects were considered significant when $P \leq 0.05$ and a tendency when $0.05 \leq P \leq 0.10$.

III. RESULTS AND DISCUSSION

The results of the performance and carcass characteristics of Angus x Nellore crossbred male cattle are shown in Table 1. The treatments did not affect IBW, FBW, HCW, and marbling ($P>0.05$). It was observed that animals castrated with a rubber-ring were 13.3% more efficient (higher FER, $P=0.0357$), increased ADG by 0.29 kg/d ($P=0.0109$), and CY by 2.3% ($P=0.0328$) compared with surgically castrated animals. There was a lower pH in males castrated with a rubber-ring compared with the pH values of surgically castrated cattle ($P=0.0002$). Similarly, there was a tendency towards lower REA and DMI (difference of 0.88 kg/d) between animals castrated with a rubber-ring and

those castrated surgically (P=0.0702; P=0.0918). Lastly, there was a significant tendency for DMI and BFT (P=0.0523; P=0.0794), in which early-weaned cattle had lower BFT and a 0.94 kg/d decrease in DMI compared with cattle from traditional weaning.

Table 1. Mean performance and carcass characteristics of Angus x Nellore crossbred cattle

[2]Variable	Castration (C)		Weaning (W)		[1]P-Value		
	Surgical	Rubber-ring	Early	Traditional	C	W	W x C
IBW, kg	436.00	409.00	433.67	411.33	0.1743	0.2542	0.3441
FBW, kg	558.03	555.37	562.06	551.35	0.9140	0.6450	0.5932
ADG, kg	1.14[b]	1.43[a]	1.25	1.32	0.0109	0.3994	0.1013
DMI, kg/d	8.86	9.74	8.83	9.77	0.0918	0.0523	0.2957
FER	0.13[b]	0.15[a]	0.14	0.13	0.0357	0.3082	0.1665
CY, %	56.45[b]	57.76[a]	56.99	57.22	0.0328	0.6355	0.3739
HCW, kg	317.53	318.22	322.61	313.13	0.9671	0.5629	0.6999
Marbling	511.95	535.73	504.04	543.64	0.7213	0.5285	0.4864
pH	5.59[a]	5.50[b]	5.55	5.54	0.0002	0.3829	0.3609
BFT, mm	12.02	12.14	10.58[B]	13.58[A]	0.9452	0.0794	0.6518
REA, cm²	74.18[b]	81.67[a]	77.61	78.24	0.0702	0.8606	0.1667

[1]Means followed by the same lowercase letters in each row and factor does not differ by F test (P<0.05 or trend 0,05 ≤ P ≤ 0,10). [2]Initial body weight, IBW; Final body weight, FBW; Average daily gain, ADG; Dry matter intake, DMI; Feed efficiency ratio, FER; Carcass yield, CY; Hot carcass weight, HCW; Backfat thickness, BFT; Rib eye area, REA; pH.

IV. CONCLUSION

Early weaning does not affect the cattle's productive traits and has brought small benefits regarding DMI and BFT. Cattle (F1 Angus x Nellore) castrated with an elastic ring showed slight benefits in productive characteristics such as ADG, FER, CY, and REA, indicating that it could be an alternative procedure for use in Brazil's cattle production system. However, more studies should be carried out to verify the effectiveness of the castration technique by increasing the number of animals tested.

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