CARCASS AND MEAT QUALITY ATTRIBUTES OF FOUR PUREBRED **ZEBU YOUNG BULLS**

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INTRODUCTION ١.

Meat production in Brazil relies on Bos taurus indicus (Zebu) animals due to their high rusticity and resistance to parasites. A portion of this production comes from purebred animals, which have information proving their genetic lineage. Research on these animals is crucial for standardization of meat quality, adding commercial value, and selecting desirable characteristics for genetic improvement. Thus, the objective of this study was to compare the carcass and meat quality of young bulls from four purebred Zebu breeds.

MATERIALS AND METHODS Ш.

Purebred uncastrated young bulls (n = 110) from four breeds, Brahman (n = 17), Guzerá (n = 25), Sindi (n = 23) and Tabapuã (n = 41), were kept under the same conditions since wean. Animals were fed on pasture for 10 months supplemented with mineral salt, and finished for 120 days in feedlod. After weighing the animals and slaughtering, carcass attributes (dentition, carcass weight, fat cover, marbling, loin eye area, and backfat thickness) were evaluated. After carcass cooling, a ~20 cm portion of the striploin (Longissimus lumborum) were collected after 48 hours of slaughter. Samples were vacuum-aged for 14 days for meat quality evaluation: pH; moisture, total lipid, and total protein (AOAC, 2007); cooking loss and shear force (AMSA, 2015).

The fat cover and marbling data were evaluated by descriptive analysis. The other data was analyzed using Statistica 10.0 software, using Analysis of Variance and the Tukey test (5%); Pearson's correlation was also evaluated.

RESULTS AND DISCUSSION III.

All animals were under 24 months, with zero permanent incisor teeth. The fat cover was mostly similar for all breeds. The degree of marbling was low for all breeds, with a predominance of Practically Devoid, followed by Traces (Figure 1).



Figure 1. Fat thickness and degree of marbling in Zebu bulls.

Despite the animals being subjected the same handling conditions, the performance of the Brahman, Guzerá and Tabapuã breeds was superior to that of Sindi, both in terms of live weight and carcass weight (P < 0.05) (Table 1).

Loin eye area was higher in the Brahman and Tabapuã breeds, with the Brahman differing from the Guzerá and Sindi. When carcass weight was adjusted to 300 kg, the adjusted loin eye area was higher for the Brahman and Sindi breeds, and lower for the Guzerá and Tabapuã (P < 0.05). Regards to backfat thickness, Tabapuã showed the greater thickness, differing only from the Guzerá (Table 1).

There were no differences between the breeds for pH, moisture, and total lipid (P > 0.05). The total protein was significantly lower for the Sindi breed compared to the other breeds (Table 1).

Parameters	Brahman (n=17)	Guzerá (n=25)	Sindi (n=23)	Tabapuã (n=41)	P-value
Live weight, kg	628.86 ± 11.53 ^a	602.72 ± 9.85 ^a	508.64 ± 11.21 ^b	622.91 ± 8.34 ^a	<0.001
Carcass weight, kg	342.1 ± 6.70 ^a	333.4 ± 5.94 ^a	285.8 ± 7.25 ^b	353.9 ± 5.35 ^a	<0.001
LEA, cm ²	85.35 ± 3.23 ^a	75.34 ± 1.43 ^b	73.28 ± 1.48 ^b	79.33 ± 1.43 ^{a,b}	<0.001
Adjusted LEA*, cm ²	74.67 ± 1.99 ^a	67.91 ± 0.90 ^b	77.44 ±1.45 ^a	67.44 ± 1.02 ^b	<0.001
Backfat thickness, mm	3.79 ± 0.40 ^{a,b}	3.28 ± 0.22 ^b	$3.63 \pm 0.43^{a,b}$	4.45 ± 0.28^{a}	<0.05
рН	5.59 ± 0.02^{a}	5.61 ± 0.01 ^a	5.59 ± 0.01 ^a	5.58 ± 0.01 ^a	0.58
Moisture, %	72.82 ± 0.20 ^a	72.91 ± 0.16 ^ª	73.20 ± 0.14 ^a	73.13 ± 0.09 ^a	0.24
Total lipid, %	2.65 ± 0.26 ^a	2.63 ± 0.13^{a}	2.32 ± 0.12^{a}	2.53 ± 0.06^{a}	0.29
Total protein, %	24.22 ± 0.20^{a}	23.94 ± 0.14 ^ª	23.16 ± 0.16 ^b	23.70 ± 0.11 ^a	<0.001
Cooking loss, %	20.94 ± 0.42 ^a	21.11 ± 0.44 ^a	20.66 ± 0.33 ^a	20.33 ± 0.26 ^a	0.33
Shear force, kg	4.13 ± 0.19 ^b	$4.47 \pm 0.22^{a,b}$	5.17 ± 0.28 ^a	4.51 ± 0.16 ^{a,b}	<0.05

Table 1 – Carcass and meat quality attributes of Zebu young bulls.

^{a,b} Means (± standard error of mean) with different letters in the same row differ from each other by analysis of variance (P <0.05). LEA: Loin eye area. *LEA ÷ carcass weight × 300.

Cooking loss was not affected by breed (P > 0.05), but the Sindi breed had the highest average of WBSF value compared to the Brahman breed (P < 0.05) (Table 1). According to the classification proposed by ASTM (2011), samples from Brahman animals are considered tender (with a range of 4.0 to 4.4 kg), while the other breeds were classified as tough (WBSF > 4.5 kg). These characteristics are crucial when making decisions about introducing a particular breed into a meat brand.

Negative correlations were observed between shear force with live weight (r = -0.25; P < 0.05), carcass weight (r = -0.19; P < 0.05), backfat thickness (r = -0.23; P < 0.05), and with total intramuscular lipid (r = -0.33; P < 0.001). Heavier and fatter carcasses tend to decrease the speed of carcass chilling, avoiding the occurrence of cold shortening. In the case of intramuscular fat, higher values are related to tender meat. It may explain the negative correlations with instrumental tenderness (Miller, 2024).

IV. CONCLUSION

The four breeds exhibited variations in carcass and meat quality metrics. Brahman bulls demonstrated superior growth performance, displaying the highest animal weight and carcass weight, alongside the higher loin eye area and backfat thickness. Moreover, the meat from these animals exhibited enhanced quality, characterized by a tender texture compared to other breeds.

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