CARCASS CHARACTERISTICS OF STEERS AND YOUG BULLS

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INTRODUCTION

Castration of young bovines is a traditional practice in Brasil. This practice aims to produce a more docile animal and would make the management systhem in extensive pastures of the Brasilian Ranches and at the same time, producing carcasses of better quality. In the last few years, however, research has shown intact males grow more rapidly, utilize feed more efficiently and produce a higher-yielding carcass (more retail products) with less fat and more red meat than castrates (Seideman at al., 1982). The economic advantages that bulls present im comparison with steers, arouse in many ranchers the thought of stop castrating their males. There is however a strong consumer resitance to buy this kind of meat due to the belief that meat from intact males have low quality, mainly because of differences in color, fat deposition, tenderness and flavor.

Glimp et al. (1971) reported that bull carcasses are more mature physiologically on the basis of bone ossification and lean color than steers of the same chronological age. In relation to tenderness, a review done by Field (1971) revealed that bull meat was slightly less tender than steer meat. In other studies, Glimp et al. (1971) , Albaugh et al. (1975) and Ntunde at al. (1977) reported that bull meat had acceptable tenderness ratings,although the rates were slightly lower than those from steer meat.Landon et al. (1978) in contrast, observed no differences due to sex condition in Warner-Bratzler shear force values.

The main objective of the present study, was to define how bull carcasses and meat compares with that from steers raised managed in the peculiar conditions of Southern portion of Brasil.

EXPERIMENTAL

Forty Angus calves were bought at weaning (7 months-fall season) from a local Ranch. They taken to the Animal Science Department of the University where they were randonly distributed into two groups: twenty calves were

immediately castrated and the other twenty were left intact. They were raised on cultivated pastures (Rye-grass) during the winter time and in native pasture during summer. They were slaughtered at two years of age in a nearby Packing Plant. After 24 hs. chill, several measurements were taken. The right side of the carcasses were ribbed between the 12 and 13th rib, the Longissimus muscle was traced, fat thickness was measured and marbling, color and texture of lean were subjectivelly evaluated. From the left side, carcass composition was estimated using the 9-10-11 rib cut following the procedure of Hankins and Howe (1946). A portion of the Longissimus muscle was taken to the University Meat Laboratory for palatability studies. The 2,5 cm thick steaks were roasted in oven to an internal temperature of 70 C and tenderness was evaluated through taste panel and using the Warner-Bratzler shear device.

RESULTS AND DISCUSSION

Table 1 shows that bull carcasses were heavier than steers, had better conformation, more depth in the loin and a larger loin area ($P < .05$).

TABLE 1. COMPARISON BETWEEN STEERS AND BULLS WITH RESPECT TO SEVERAL CARCASS MEASUREMENTS

		Steers n= 20		Bulls n= 20		
		Mean	SD	Mean	SD	
Hot carcass weight	Kg	211.50	21.08	236.90	29.41	*
Conformation [a]		8.27	1.48	10.50	1.43	*
Carcass length	cm	121.10	4.20	121.40	4.54	
Leg length	cm	63.55	2.55	62.69	2.30	
Loin depth	cm	7.31	.57	8.91	.13	*
Loin area	cm^2	55.37	4.19	66.95	6.52	*
Fat thickness	mm	4.17	1.48	.85	.25	*

[a] 1-3 = Inferior, 7-9 = Fair, 10-12 = Good, 16-18 = Superior

That intact grow faster have been demonstrated previously by several workers (Arthaud et al., 1977 and Seideman et al., 1982). The better conformation and increased musculature development as evidenced by the Longissimus hypertrophy exibited by bulls, is a result of a positive nitrogen balance wchich has been ascribed to the protein anabolic effects of testicular hormones (Galbraith et al., 1978).

No significant differences were found for the length of carcass and leg between the two groups. The castrated males displayed a better finish what is in agreement with the data found by Glimp et al.(1971) and Field (1971). Estimated carcass composition for the two groups is presented in table 2.

TABLE 2. ESTIMATED CARCASS COMPOSITION OF STEERS AND BULLS

		Steers n = 20		Bulls n = 20	
		Mean	SD	Mean	SD
Muscle	%	62.58	1.90	71.24	3.18 *
Fat	%	19.20	2.04	9.95	2.00 *
Bone	%	17.98	.91	18.45	1.40
Edible Portion	%	81.79	1.34	81.23	2.09
Edible Portion/Bone		4.52	.41	4.38	.58

Bull carcasses presented a higher proportion of muscle and a lower percentage of fat steers. Since bulls displayed better muscling and a thinner layer of external fat, this could be expected.

No significant difference was found for bone and edible portion percentage or the ratio of edible portion to bone. In the present work, edible portion comprises the lean plus the external fat not superior to 5 mm.

The effect of castration on the meat quality and palatability, is presented in table 3.

TABLE 3. EFFECT OF CASTRATION ON BOVINE MEAT QUALITY

	Steers n = 20		Bulls n = 20	
	Mean	SD	Mean	SD
Color of lean [a]	4.23	.97	2.90	.56 *
Texture of lean [a]	4.20	.76	3.90	.52
Marbling [b]	8.80	3.05	2.90	1.36 *
Warner-Bratzler shear Kg	6.48	2.30	5.90	2.80
Panel tenderness [c]	6.20	1.20	6.80	1.80
Panel juiciness [c]	5.00	.37	4.60	.51
Panel flavor [c]	5.25	.26	4.30	.90 *

[a] 1= Very dark, very coarse 5 = Bright red, very fine

[b] 1-3 = Traces, 7-9= Small, 10-12 = Average

[c] 1= Ext. tough, dry, undesirable flavor, 9= Ext. tender, juicy, flavorful

Bulls presented a significant ($P < .05$) darker color of the lean, less marbling and a non significant coarser texture. Glimp et al. (1971) stated that the darker color of bull meat is because they are more mature physiologically than steers. Field (1971) also reported that meat from bulls is darker in color and coarser in texture than meat from steers. He suggested that the darker color is because bulls are more prone to be stressed and therefore are candidates for dark cutters.

No significant differences were found for tenderness and juiciness what agrees with the data reported by Landon et al. (1978). Bulls however, were rated by the taste panel as having a less desirable flavor, in accordance with the results of Reagan et al. (1971).

Simple correlation coefficients between carcass weight and some variables are presented in table 4.

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TABLE 4. SIMPLE CORRELATION COEFFICENTS BETWEEN HOT CARCASS WEIGHT AND SOME CARCASS PARAMETERS IN BOVINES [a]

Conformation	.40 **
Carcass length	.84 **
Leg length	.86 **
Lion depth	.40 **
Loin area	.70 **
Fat thickness	.14

[a] Calculated for all 40 animals

Carcass and leg length presented the higher coefficients:.84 and .86 respectivelly. Carcass weight normally presents a hight coefficient with the deposition of sub-cutaneous fat. In the present work the coefficient was low because was calculated for all animals and the bulls that were heavier, had little deposition of fat.

Table 5 presents regression equations to estimate weight and proportion of edible portion of the carcasses

TABLE 5. REGRESSION EQUATIONS TO ESTIMATE THE EDIBLE PORTION OF THE CARCASSES IN BOVINES [a]

Weight of edible portion (Kg)	$y = -26.29 + .92$ (Hot Carcass Weight, kg)
	$R^2 \times 100 = 98,67$ S. E. Mean = 1.06
% of edible portion	$y = 40.76 + .31$ (Carcass Length, cm) + .05 (Loin area, cm^2)
	$R^2 \times 100 = 68.00$ S. E. Mean = .42

[a] Calculated for all 40 animals

Hot carcass weight alone is responsible for almost 99% ot the variation of weight of edible portion. The

proportion of edible portion was better estimated by the two variables: carcass length and loin area with a coefficient of determination of 68%.

It can be concluded from the present work and taking into consideration the preferences of Brazilian consumers, that the main objection to bull meat acceptance by them, would be the lack of fatness.

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