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EFFECT OF CASTRATION ON THE CARCASS QUALITIES OF CALVES

SADAQAT HAYAT HANJRA

The carcass qualities in two groups of 10 calves each raised as bulls and steers, respectively, and fed on an all concentrate ration were compared. The average dressing percentage in steers and bulls was 59.46 ± 1.74 and 59.21 ± 1.18 respectively. Some of the steers had better carcass scores as compared to bulls. The rib eye area in case of bulls was 14.67% larger than that of steers. The wholesale cuts in steers and bulls were approximately of the same percentage with the exception of rounds and chucks which were greater in bulls. Steers had slightly longer carcasses and the circumference of rounds was also greater in the steers. Length of rib eye was significantly greater in bulls.

INTRODUCTION

It is a common practice in Pakistan to slaughter thin and emaciated bullocks that are no longer fit for work and whose bodies consist of little more than hides and bones. This type of beef is not liked by the public for obvious reasons but there is seldom any other kind of beef available. Grading of animals before slaughter or meat after slaughter is not practised. In retailing meat, the same price is charged for all cuts, no matter what part of the body they come from. Grading is of utmost importance to get better quality beef. It provides a fair chance for the consumer to obtain somewhat satisfactory beef. In most of the foreign countries, this practice is followed invariably. As grading is not practised in Pakistan, for the reader's benefit various grades of beef are defined below :

Prime: Prime grade beef is produced from young and well fed beef type cattle. The carcass is thickly muscled and wide. The loins and ribs are thick and full. Rounds are plump The cuts have liberal quantity of fat interspread within the lean (marbling). The cuts are highly tender, juicy and flavoury.

Choice: The beef of this type comes from same kind of animal as in prime but with moderate amount of marbling. The carcass is moderately thick muscled and loins and ribs are moderately thick.

Good: Such carcasses are slightly thick muscled. The fat covering on the carcass is mild. The loins and ribs are slightly thick and full. The neck and shank are slightly long and thin. The carcass is moderately juicy.

Standard: The carcass of this grade has a very thin covering of fat and are thin muscled. The loins and ribs are flat and thin. The rounds are thin and slightly concave. The meat is mild in flavour and lack juicyness due to less marbling.

Commercial: Beef of this type is produced from older cattle. The carcass is rough and irregular. The rounds are thin and concave. The loins are slightly sunken. The neck and shanks are long. The meat is less tender and takes long time to cook.

Utility: This type of meat is produced from cattle advanced in age. The carcass is rangy and irregular in contour. The loins and ribs are flat with less flesh covering. The neck and shanks are long and tapering. The cuts lack tenderness and juicyness. The hip and shoulder joints are prominent.

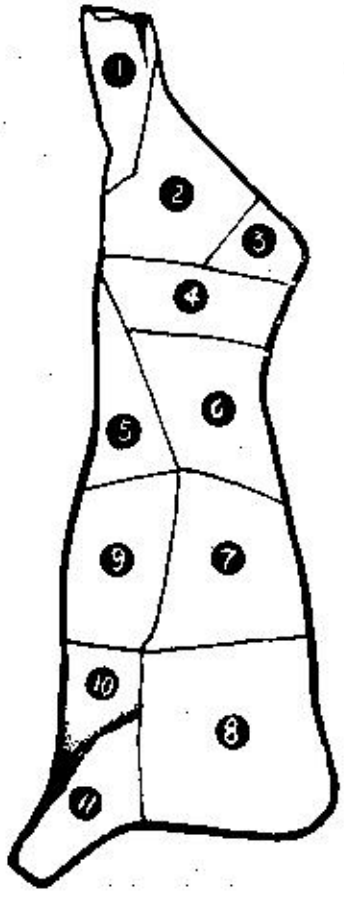
Cutter: This is the poorest quality of beef. The loins and ribs are flat and shallow. The rounds are very thin and concave. The neck and shanks are long and tapering.

Cammer: The beef of this type is seldom marketed in advanced countries and is converted into meat by products. It comes from thin emaciated and aged animals. The meat lacks juicyness and tenderness.

The commercial wholesale cuts generally used abroad have been shown in Figure 1 to give an idea to the reader. These are "Hind shank, Round, Rump, Loin, Shortloin, Flank, Ribs, Plate, Chucks and Brisket with Foreshank. The quality of beef is further determined by the dressing percentage, the ratio of fat, lean meat and bone, percentage of wholesale cuts and various carcass measurements.

The objectives of the present investigation was to determine the quality of beef from steers and bulls.

Fig. 1. Wholesale cuts of beef carcass



1. Hind Shank
2. Round
3. Rump
4. Loin
5. Flank
6. Short Loin
7. Rib
8. Chuck
9. Plate
10. Brisket
11. Fore Shank

REVIEW OF LITERATURE

Several experiments are reported on fattening and carcass quality of bulls and steers. Ivanov and Zahariev (1962) fattened 15 bulls and 15 steers for 240 days. They reported a heavier weight gain for bulls as compared to steers. Bulls had less abdominal fat as compared to steers. Richter *et al* (1961) studied the effect of castration on fattening performance, carcass value and carcass quality. Dressing percentage was 0.8 unit higher for bulls than for bullocks and bullock were judged to have the poorer carcass. Prescott and Lamming (1964) reported same dressing percentage for bulls and steers. The bulls had less external and internal marbling as compared to steers. The meat from bulls was found satisfactory.

MATERIAL AND METHODS

Twenty male calves of almost same age and weight fed on all-coucentrate ration were utilized in this study. They were randomly divided in two groups designated as group A and group B. The calves of group A were castrated while those of group B were left as bulls. The composition of ration fed, feeding regime and other managemental practices have already been published (Hanjra 1972).

The animals of both groups were weighed before slaughter add just after slaughter and the dressing percentage was calculated for each individual After dressing the carcass was split along the backbone as accurately as possible into two equal halves. The carcass was then washed with warm water, weighed and transferred to a cooling chamber operating at 32 to 34°F for an aging period of seven days after which the following carcass measurements were taken:

1. Length of the carcass as measured from the frontal edge of the 1st rib to the tip of aitch bone.
2. Depth of the carcass at the 6th rib.
3. Maximum circumference of the round.
4. Thickness of fat cover over the mid point of the longissimus dorsi muscle at an incision made between 12th and 13th rib.
5. Length and depth of the same muscle at same site.
6. Rib eye area.

After aging the carcass was divided into the regular U.S. wholesale cuts as described by Bull (1951) shown as Figure 1. The weight of each cut was recorded in pounds and percentages of dressed carcass were calculated.

The 9-10-11th rib section was taken from the wholesale rib cut and carefully separated into lean, fat and bone. The percentage of lean, fat and bone in the whole carcass was calculated according to the formulae developed by Hopper (1944). The data thus collected was statistically analysed.

RESULTS AND DISCUSSION

The dressing percentage, carcass grade and rib eye area calculated in steers and bulls was compared (Table I).

TABLE I. Dressing percentage, carcass grade and rib eye area in steers and bulls.

	Steers				Bulls		
No.	Dressing %	Carcass grade	Rib eye area (cm)	No.	Dressing %	Carcass grade	Rib eye area (cm)
114	57.40	Good	83.54	103	60.31	Good	86.31
115	58.31	Choice	65.36	104	59.40	Good	77.42
116	62.34	Choice	71.35	105	60.09	Good	96.54
117	60.70	Choice	69.61	106	59.06	Good	93.60
118	60.60	Choice	70.21	107	60.00	Good	75.00
119	56.32	Good	65.38	108	58.80	Good	77.38
120	59.20	Good	70.76	109	60.40	Good	76.80
121	60.66	Good	74.23	110	58.93	Good	80.23
122	60.60	Choice	71.52	111	56.10	Good	77.60
123	58.60	Good	68.92	112	59.04	Good	74.38
Average	59.46		71.10		59.21		81.53

The average dressing percentage in steers was 59.46 ± 1.74. The steers with high carcass score (grade) had the highest dressing percentage. The bulls had an average dressing percentags of 59.21 ± 1.18. The differences between the dressing percentage in steers and bulls were found to be non significant. Richter *et al* (1961) reported 0.80 per cent higher dressing in steers than in bulls. The average rib eye area in steers was 71.10 ± 5.14 sq. cms. Thus the rib eye area in case of bulls was 14.67 per cent larger than that of steers. The difference was found to be highly significant.

The average carcass qualities as adjudged by the percentage of wholesale cuts, carcass measurements and carcass composition of both groups of experimental animals (steers and bulls) have been presented in Table 2.

Table 2. Average percentage of wholesale cuts in steers and bulls

	Steers	Bulls
Round	24.58	26.06
Sirloin	8.96	8.59
Short loin	7.34	6.97
Flanks	5.54	4.84
Ribs	9.75	9.40
Chucks	23.09	24.37
Foreshank	7.14	7.06
Plates	7.36	6.85
Brisket	6.24	5.86
Length cm	116.89	113.69
Depth	59.70	58.66
Circumference of round	107.94	105.66
Length of rib eye area	12.92	13.96
Width of rib eye area	6.68	7.12
Fat	27.83 ± 3.64	20.75 ± 1.80
Lean	56.13 ± 3.35	63.27 ± 2.28
Bone	19.99	15.97

It was noticed that the percentages of round and chucks were significantly higher in the bulls than in the streers but there were no significant differences between streers and bulls in respect of other wholesale cuts. Steers had slightly longer carcasses than the bulls with measurements of 116.89 ± 0.83 and 113.69 ± 1.48 cms respectively. The depth of the carcass and the circumference of rounds was also greater in steers. Length and width of rib eye area was significantly greater in bulls ($t = 4.56^{**}$).

Average fat percentage in steers was significantly higher (27.83 ± 3.64) than (20.75 ± 1.80) in bulls ($t = 5.28^{**}$). The average lean percentage for steers was 56.13 ± 3.35 against 63.27 ± 2.23 for bulls. This difference was again highly significant ($t = 5.57^{**}$). There was no significant differences in bone percentage which was 15.99 and 15.97 in steers and bulls respectively. Visual inspection of the carcass showed more fat cover and marbling of rib eye of steers carcasses. These results agree with those of Ivanov and Zahariev (1962) and Lamming (1964) who reported more abdominal and internal fat in steers than in bulls.

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