

The effect of increase of carcass weight on different carcass characteristics of Sudan Baggara cattle

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SUMMARY

The effect of increase of carcass weight on carcass characteristics was investigated. Twenty-eight bulls were slaughtered, dressed, divided into quarters and deboned. The data collected were stratified according to carcass weight into 3 groups A, B and C. Group A 120 - 140, group B 100 - 119 and group C 80 - 99 kg. The results revealed that the weight of the forequarters were significantly ($P < 0.05$) heavier than the hind quarters. The values of fore and hind quarters were (64.08 - 60.75, 55.00 - 54.00 and 46.20 - 44.70 kg) for group A, B and C respectively. Muscle weight increased steadily ($P > 0.05$) with the increase of carcass weight and fat, bone and connective tissue weights showed the same pattern of change with the increase of carcass weight, but no significant ($P > 0.05$) differences were observed between groups.

Muscle: bone ratio was not affected by increase of carcass weight. The values (3.02+0.53, 3.11 +0.59 and 3.07+0.62) were almost similar for group A, B and C respectively.

INTRODUCTION

FAO (2002) estimated cattle population in Sudan as 38.3 million heads and about 2.7 million heads were slaughtered per annum yielding about 121 kg carcass weight per head thus producing a total of 325.000 metric tons of meat and 56.000 metric tons of fresh cattle hides. Therefore, *the* Sudan possesses a high potentiality of beef products and beef play an important role in the economy of the country. In Sudan feeding of livestock depend mainly on natural pasture. The transportation of livestock on hoof from far production area in Western Sudan to the National Capital is another factor affecting productivity and quality of meat produced from these cattle. Fattening in dry-lot around the National Capital of Sudan, where there is abundant agro-industrial by-products is highly needed. There is growing demands for beef and veal for both local consumption and exportation.

Ideal carcass should have high proportions of lean, minimal bone and the proportion of the fat specified by the market (Allen and Kilkenny, 1984). Much emphasis in meat animal research has been placed on the proportion of high priced cuts (Berg and Butterfield, 1976) This is for consumer interest, where as the net concern of the meat producers is the quality of edible meat and fat which fairly represented by carcass yield.

Greater attention and research projection should be given to cattle finishing, Deboning and meat grading. The aim of this study was to investigate the effect of carcass weight on different carcass components.

MATERIALS AND METHODS

Source of Data:-

The data used in this study were taken from records of the department of meat technology at the Regional Training Centre for meat Inspection, Hygiene and Grading (RTCMIHG), Sudan during 2001-2002.

Twenty eight Baggara bulls, of 2 to 3 years of age were used in this study. The bulls were purchased from western Omdorman livestock market (El Mewalih). The animals were housed in pens of the (RTCMIHG) provided with shade feeding and watering facilities and fed on pelleted concentrate feed and sorghum Abu-70 as roughage.

Slaughter procedure:-

The animals were slaughtered at the small scale modular slaughterhouse at RTCMIHG, according to Muslims practice by severing the carotid arteries and veins, the trachea and oesophagus by a single slash of a sharp knife. After slaughter and complete bleeding the head was removed at the atlantooccipital joint and the fore and hind feet were removed at carpal and tarsal joints, respectively. Following skinning all abdominal and thoracic organs were removed. The carcass weight was recorded. The carcass was then split along the vertebral column into left and right sides and each side was separated into fore and hind quarter. The weight of the fore and hind quarters was recorded.

Deboning:-

Each quarter was physically separated into muscle, bone, fat and connective tissues. The weight of the total lean. Bones, fats and connective tissues of the whole carcass were recorded. The data of each weight group was kept separately.

Statistical analysis:-

Data was statistically analysed using SPS and Duncan range test was used to detect difference between means.

RESULTS AND DISCUSSION

Table (1) shows the average mean values of carcass weight, carcass tissues and their percentage out of carcass weight. The average carcass weight 124.00, 108.85 and 90.23 kg for treatment A, Band C respectively. The (fore and hind quarter) were (64.08, 60.75), (55.00, 54.00) and (46.20, 44.70) for treatment A, B and C respectively. In the present study the weight of the fore quarters were significantly ($P < 0.05$) heavier than the hind quarters, this was in agreement with the findings of (Abu-Groon, 2000) who reported (95.1, 81.1), (114.5, 97.7) and (91.2, 78.8) for the fore and hind quarter of three treatments semi-fattened, fattened and not fattened bulls respectively.

Table 1. Carcass weight and composition

Parameter	Mean \pm S.D. of treatment groups		
	A	B	C
Carcass weight (kg)	124 \pm 3.14 ^a	108.85 \pm 6.69 ^b	90.23 \pm 6.24 ^c
Forequarter weight (kg)	64.08 \pm 3.61 ^a	55.00 \pm 4.25 ^b	46.20 \pm 3.45 ^c
Hindquarter weight (kg)	60.75 \pm 3.14 ^a	54.00 \pm 3.10 ^b	44.70 \pm 3.89 ^c
Muscle weight (kg)	81.75 \pm 5.86 ^a	72.28 \pm 5.44 ^b	61.66 \pm 6.05 ^c
Fat weight (kg)	4.16 \pm 1.36 ^a	2.85 \pm 5.44 ^b	2.00 \pm 0.90 ^{bc}
Connective tissue weight (kg)	7.08 \pm 1.02 ^a	6.14 \pm 1.28 ^a	4.30 \pm 1.20 ^b
Bone weight (kg)	31.83 \pm 2.63 ^a	27.00 \pm 87 ^b	22.26 \pm 2.54 ^c
Muscle % carcass weight	65.45 \pm 2.58	66.43 \pm 4.86	67.55 \pm 2.84 NS
Fat % carcass weight	3.35 \pm 1.14	2.58 \pm 1.89	2.25 \pm 1.15 Ns
Bone % carcass weight	25.62 \pm 2.14	24.75 \pm 1.82	24.69 \pm 2.40 Ns
Connective tissue %	5.68 \pm 0.84	5.62 \pm 1.05	4.78 \pm 1.33 Ns
Muscle: bone ratio	3.02 \pm 0.53	3.11 \pm 0.59	3.07 \pm 0.62 NS

A-b-c = Means followed by different superscript in the same raw differ significantly ($P < 0.05$).

NS = not significant ($P > 0.05$).

In this study the highest weights of muscle, fat, bone and connective tissues (81.75, 4.16, 31.83 and 7.08 kg) were recorded by treatment A while the lowest value (61.66, 2.00, 22.26 and 4.30 kg) were recorded by treatment C respectively. In these parameters there was significant ($P < 0.05$) difference between groups. As shown in table (1) muscle, bone, fat and connective tissue percent were found ranging from (67.55 - 65.45), (25.62 - 24.69), (3.35 - 2.25) and (5.68 - 4.78) respectively, but the difference between groups was not significant ($P > 0.05$). However, EI Tahir (1994) reported lower muscle and bone percent as (64.6) and 21.4) and higher fat percent as (14.1) with Western Sudan Baggara bulls. Muscle percent recorded by Griffith (1980) were found higher (76.5 - 75.6) than the present muscle percent as (67.55 - 65.45). The present findings of bone percent ranging from (25.62 - 24.69) were found higher than what declared by (EI Shafie and Mcleroy, 1964) that the percent of bone in wholesale cuts of Western Baggara and Butana bulls ranged from (20 - 15) and (22 to 14) respectively. Muscle: bone ratio is an important character in carcass evaluation for it determines the quantity of muscle in comparison to bone and hence its importance in meat trade also.

In this study the best muscle: bone ratio was obtained by treatment B (3.11) while the least was that of treatment A (3.02). The present results of muscle: bone ratio where higher than the values obtained by (Ahmed, 1999) ranging from (1.98 to 1.30) for five treatments of Friesian bull calves. However, the present results of muscle: bone ratio where lower than

the values reported by (Guma, 1996) for Sudanese Kenana cattle as (4.0) and Baggara cattle as (4.4). Also El Shafie and Osman (1971) reported higher values of muscle: bone ratio of (3.0) and (4.1) for bulls of western Baggara.

Slaughtered at 300 kg and 310 kg live weight respectively. The higher muscle: bone ratio reported in these previous studies may be due to higher slaughter weight and carcass weight compared with low muscle: bone ratio and low carcass weight used in this study. These results coincide with finding of (Taylor, 1964) who stated that muscle: bone ratio has direct effect on the edible meat yield and that it increases with the increase in live weight and fatness.

In this study it had been found that there is no effect of carcass weight on muscle: bone ratio. However, muscle percent increase ($P > 0.05$) as the carcass weight decrease, while. Bone, fat and connective tissue percent decrease ($P > 0.05$) as carcass weight decrease.

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آثار زيادة وزن جسد الذبيحة على مكونات الذبيحة المختلفة

عباس صديق الفاضل

مركز التدريب الإقليمي لفحص وصحة ودرجات اللحوم بالكندرو

الخرطوم بحري ص. ب. 87

ملخص البحث:

استخدم في هذه الدراسة عدد (28) عجل من عجول أبقار البقارة عمر 2-3 سنوات. بعد الذبح والسلخ والتفريغ تم تقسيم الذبيحة إلى نصفين وكل نصف إلى ربعين ومن ثم تشغيثها إلى لحم وعظم وشخت ودهن، ثم ترتيب وتصنيف المعلومات المجمعة من هذه العجول إلى ثلاثة مجموعات أ، ب، ج على أساس وزن جسد الذبيحة المجموعة (أ) تتراوح أوزانها من 120-140 كجم، (ب) 100-119 كجم و(ج) من 80-99 كجم.

أظهرت النتيجة فرق معنوي ($P < 0.05$) أعلى لوزن الأرباع الأمامية على وزن الأرباع الخلفية، وكان قيم الأرباع الأمامية والخلفية كما يلي: (64.08 - 60.75 / 55.00 - 54.00 / 44.70-64.20 كجم) للمجموعات أ، ب، ج على التوالي.

أظهرت النتيجة أن وزن اللحم والعظم والشحم والشخت زاد زيادة مطردة مع وزن الذبيحة لكنها لم تسجل فروقات معنوية ($P > 0.05$) بين المجموعات.

نسبة اللحم انخفضت بطريقة مطردة مع زيادة وزن الذبيحة بينما نسبة الدهن والعظم والشخت زادت مع زيادة وزن الذبيحة لكن الفروقات الإحصائية لم تكن معنوية ($P > 0.05$) للمجموعات.

أظهر البحث أن نسبة اللحم إلى العظم لم تتأثر بزيادة وزن الذبيحة حيث كانت قيمة نسبة اللحم إلى العظم شبيهة متساوية كما يلي (3.02 / 3.11 / 3.07) للمجموعات أ، ب، ج على التوالي كذلك الدراسة الإحصائية لم تظهر فروقات معنوية ($P > 0.05$) بين مجموعات الاختبار.