# The effect of increase of carcass weight on different carcass components of western Sudan Baggara cattle

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## SUMMARY

The effect of increase of carcass weight on carcass components 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, Band C. Group A 120 - 140, group B 100, -119 and group C 80 - 99 kg. The results revealed that the weight of the. fore quarters 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, Band C (respectively. Muscle weight increased steadly ($P>0.05$) with the increase of carcass weight and fat, bone and connective tissue weights showed the same pattern of increase of weight with the increase of carcass weight, but no significant ($P>0.05$) difference was observed between groups.

Muscle percent decreased steadly ($P>0.05$) while fat, bone and connective tissue percent increased steadly ($P>0.05$) with the increase of carcass weight.

M:B ratio was not affected by increase of carcass weight. The values were almost similar (3.02+0.53, 3.11 +0.59 and 3.07+0.62) for group A, B and C respectively. The results of m:b ratio showed no significant ($P>0.05$) difference among groups.

## 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, 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 pasture. The transportation of livestock on hoof from far production area in Western Sudan to the National Capital is an other 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
(Beng 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) during 2001-2002.

Twenty eight Western Sudan Baggara bulls, ranging from 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 kept in the fences of the (RTCMIHG) and fed on pelleted concentrate feed and sorghum Abu-70 as roughage. These fences are provided with shade feeding and watering facilities.

**Slaughter proceduse:-**

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 allantooccipital joint and the fore and hind feet were removed at carpal and tarsal joints, respectively. The animal was partially skinned, lying on its back on the floor. Then it was suspended by the hind legs for further 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 collected were divided according to carcass weight into (3) groups A, B, and C ranging from 80-140 kg, with a range of 20 kg between each two groups. Group A 120-140. Group B 100-119 and group C 80-99 kg.

**Statistical analysis:-**

The data were subjected to one way ANOV A analysis at (.05) level as described by computer programme statistical package for Social Science (SPSS) version 9 to test the significance level. In case of significant we use Duncan multiple comparison to compare means using the same computer programme.

## RESULTS AND DISCUSSION

This work was conducted to investigate the effect of increase of carcass weight on different carcass components and muscle: bone ratio as a parameter for carcass evaluation.

**Table (1)** showed 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.** Average weight (kg) of carcass tissues and percentage from carcass weight.

| **Treatment** | Mean ± S.D. of treatment group (A) 120-140 Kg (B) 100-199 Kg (C) 80-99 Kg | | |
|---|---|---|---|
| Carcass weight (kg) | 124 ± 3.14$^{a}$ | 108.85 ± 6.69$^{b}$ | 90.23 ± 6.24$^{c}$ |
| Fore quarter (kg) | 64.08 ± 3.61$^{a}$ | 55.00 ± 4.25$^{b}$ | 46.20 ± 3.45$^{c}$ |
| Hind quarter (kg) | 60.75 ± 3.14$^{a}$ | 54.00 ± 3.10$^{b}$ | 44.70 ± 3.89$^{c}$ |
| Muscle weight (kg) | 81.75 ± 5.86$^{a}$ | 72.28 ± 5.44$^{b}$ | 61.66 ± 6.05$^{c}$ |
| Fat weight (kg) | 4.16 ± 1.36$^{a}$ | 2.85 ± 5.44$^{b}$ | 2.00 ± 0.90$^{bc}$ |
| Connective tissue (kg) | 7.08 ± 1.02$^{a}$ | 6.14 ± 1.28$^{a}$ | 4.30 ± 1.20$^{b}$ |
| Bone weight (kg) | 31.83 ± 2.63$^{a}$ | 27.00 ± 87$^{b}$ | 22.26 ± 2.54$^{c}$ |
| Muscle: bone rah | 3.02 ± 0.53 | 3.11 ± 0.59 | 3.07 ± 0.62 NS |
| Muscle % | 65.45 ± 2.58 | 66.43 ± 4.86 | 67.55 ± 2.84 NS |
| Fat % | 3.35 ± 1.14 | 2.58 ± 1.89 | 2.25 ± 1.15 Ns |
| Bone % | 25.62 ±2.14 | 24.75 ± 1.82 | 24.69 ± 2.40 Ns |
| Connective tissue % | 5.68 ± 0.84 | 5.62 ± 1.05 | 4.78 ± 1.33 Ns |

*A-b-c = Means followed by different superscript in the same raw differ significantly (P<0.05).*
*NS = not significantly (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, 1965) 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 EI 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.

## ACKNOWLEDGEMENT

I would like to express my sincere appreciation to Dr. Ahmed Mustafa Hassan Undersecretary of Animal Resources-and Fisheries for interest, encouragement, provision of financial support and permission to publish this study.

Thanks ate extended to Tech. Um Salama Gami the head of department of meat technology at (RTCMIHG) and the staff of the department for their help in carcass analysis and provision of data.

## REFERENCES

**Abu-Groon, H.A., (2000).** Factors affecting the quality of Sudanese meat products. Proc. of workshop on quality control of food industry and a forecast of the 3rd Millenium. ( In Arabic). Arab Organization for Agricultural Development. Khartoum, Sudan (August 2000) and Sudan University of Science and Technology. Faculty of Agricultural Studies.

**Ahmed, D.A. ( 1999 ).** Dietary and production values of guar meal (Cymopsis tetragonoloba) fed to Friesian bull calves. Ph.D. Thesis. Sudan University of Science and Technology.

**Allan, D. and Kilkenny, B. (1984).** Planned beef production (2nd edn. ) Granada publishing Ltd., London.

**Berg, R.T. and Butter field, R.M. ( 1976).** New concepts cattle growth Sydney University press. Sydney.

**El Shafie, S.A. and Mc1enny, G.B. (1964).** Respond of western Baggara cattle to a

fattening ration composed of agricultural by-products. S.J. Vet. Sci. and Anim. Husb. 5: 1

**El Shafie, S.A and Osman A.H. (1971 ).** Carcass composition of Sudanese calves fattened on diets containing different levels of concentrates. Trop. Anim. Health. Prod. (3) P:140-145.

**El Tahir, E.E. (1994).** Beef production potential of western Baggara and Friesian crossbred cattle. M.Sc. Thesis. University of Khartoum.

**FAO (2002).** Production year book. Food and Agriculture Organization, Rome, Italy.

**Griffiths, T.W. (1980).** The relative efficiency of food utilization of British Friesian entire male and castrate male cattle at two levels of feeding. Anim. Prod. (30) 53-59.

**Guma, A. Y. (1996).** Beef production potential of some Sudan Zebu Cattle. Ph.D. Thesis, University of Khartoum.

**Taylor, J.C. (1964**). The relationship between growth and carcass quality in cattle and sheep. J. Exp. Agric .. (32) P. 191-204.

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# آثار زيادة وزن جسد الذبيحة على مكونات الذبيحة المختلفة

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**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 تشفيتها 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 ($P<0.05$) أغلى لوزن الأرباع الأمامية على وزن الأرباع الخلفية، وكان قيم الأرباع الأمامية والخلفية كما يلي: (64.08 – 60.75 / 55.00 – 54.00 / 64.20-44.70 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 ($P>0.05$) المجموعات.

أظهر البحث أن نسبة اللحم إلى العظم لم تتأثر بزيادة وزن الذبيحة حيث كانت قيمة نسبة اللحم إلى العظم شبه 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.