



Effect of Feeding Regimen on Relationship between Carcass Measurements, Slaughter Weight and Hot Carcass Weight of Sudanese Desert Goats

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Abstract

The study was conducted to determine the effect of feeding diets, on growth performance and relationship between carcass measurements, slaughter weight and hot carcass weight, of 72 intact male desert bucks divided randomly into three groups; each group (24 males), the animals were slaughtered according to halal standard procedures. The results obtained indicated that correlation coefficients between slaughters weight and carcass measurements were significantly higher ($P < 0.01$) and positive. In free grazing group correlation coefficients between hot carcass weight and carcass measurements were significantly ($P < 0.01$) and positive. Also the relationship between slaughters weight and carcass measurements was significant and positive except internal chest length. In the group that grazing and supplemented with diets showed positive and significantly ($P < 0.01$) correlation coefficients between hot carcass weight and carcass measurements and between slaughters weight and carcass measurements were significant and positive except carcass length. The zero grazing groups obtained non not significant correlation coefficients between hot carcass weight and carcass measurements except slaughter weight and external chest length.

Keywords: Goat, Carcass measurements, hot carcass and slaughter weights.

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1. Introduction

The goat population of Sudan is mostly located in smallholder farming areas, and their function is the production of meat. The traditional production system is extensive, with grazing on natural grassland with herbs, shrubs and forest and with little or no feed supplementation and this is mainly based on natural, unimproved savannahs, which lead to poor animal performance [1, 2]. Goats are prominent browsers for herbs [3]. If herbs used in the diets of animals could have significant impact on feed intake, meat quality and composition [4-6]. The presence of high levels of herbs in feed have been reported to be responsible for decreased feed intake [6, 7] growth rate, feeding efficiency and live-weight gain [6, 8]. The Carcass characteristics and meat quality are important criteria for consumers when it comes to making purchasing decisions. Carcass classification for conformation and fatness are the main parameters for determining the marker price. The linear carcass measurements, included length of carcass, depth of chest, length of leg and width of leg [9]. Many authors had showed that nutrition had significant effect on slaughter weight, hot carcass weight and fore and hind quarter [10]. Therefore, the producers are encouraged to continue producing according to the traditional systems and methods because the products are well accepted to the consumers. The feeding trials are ongoing in order to recommend supplementation strategies for the use of relatively expensive concentrates with tropical forage for feeding local goats raised for meat. The aim of the pilot study was to evaluate the effect of feeding regimen and castration on relationship between carcass measurements, slaughter weight and hot carcass weight.

2. Materials and Methods

2.1. Study Area

This study was conducted at El-Obeid Agricultural Research Station, North Kordofan State, Sudan.

2.2. Experimental Animal's Management

Seventy two male desert goats weighing 12.1 Kg (aged 4-5 months) were divided randomly into three groups; each group content 24 males. Group one (free grazing only) on some dry grasses like *Eragrotis turmula*, *Zornia glochiidiata* and *Cenphrus spp* and browse the leaves of *Ziziphus spina chritis*, *Balanite aegyptiaca* and *Calotropis purocera*. Group two (grazing + concentrate supplement) and Group three (concentrate supplement only) *ad libitum* fed the experimental diet. The experimental diet given at a rate of 324g/ head/ day. Ingredients and chemical composition of experimental diet (Table 1). Live weight and external body measurements of each animal were recorded at the start of experiment, then weekly during the experiment, using spring balance. The animals were weighed in the morning at weekly interval for 12 weeks.

Table-1. Ingredients % and Chemical Composition of the Experimental Feed Stuffs.

Components	%	Chemical composition	%
Sorghum grains	30	Dry matter (DM %)	98.6
Wheat bran	38	Organic matter (OM %)	87.7
Ground nut cake	20	Crude protein (CP %)	22.0
Ground nut hay	10	Crude fiber (CF %)	25.0
Sodium chloride	1	Ether extract (EE %)	12.0
Limestone	1	Nitrogen free extract (NFE %)	31.0
		Ash (%)	08.0
		Energy density (ME(MJ/ Kg DM)	12.0

Note: ** Calculate as in MAFF [11].

2.3. Slaughter Procedure and Data Collection

Twelve animals from each group were slaughtered at 90 weeks. The animals were slaughtered according to halal standard procedures. The external and internal offals including gut content were weighed. Hot carcass, carcass halves were weight; the carcass was split along midline. The left half carcass were done according Owen [12] and cut into wholesale cuts, each cut was dissected according to Cuthbertson, et al. [13] into lean, fat, and bone.

2.4. Statistical Analysis

The data were statistically analyzed according to factorial experimental randomized design as a 3×2 (management Vs sex). Multiple range tests were used to compare the means using [14].

3. Results and Discussions

3.1. Effect of Free Grazing on Slaughter Weights and Carcass Characteristics

There is positive significant correlation between slaughters weight and carcass measurements Table (2). The highest correlation coefficients ($r = 0.73$, ($p < 0.001$)) was found between slaughters weight and proximal hind leg length and between hot carcass and slaughter weight ($r = 0.63$, ($p < 0.05$)). The slaughter weight and distal foreleg length exert lowest relationship and between hot carcass weight and internal chest length ($r = 0.56$, ($p < 0.05$)). This result was in agreement with the findings of Jibir, et al. [15] and Alexandre, et al. [1] who reported that the there is positive relationship between carcass measurements, slaughter weight and hot carcass weight were significant positive for animal depending on natural grazing.

Table-2. Correlation Coefficients between Slaughter Weights, Hot Carcass Weight and Carcass Measurements (Free Grazing)

	Slaughter Weight	Carcass Length	Distal Foreleg Length	Proximal Foreleg Length	Distal Hind Leg Length	Proximal Hind Leg Length	Internal Chest Length	External Chest Length
Hot carcass weight (Kg)	0.91***	0.60*	0.78***	0.61*	0.64**	0.73***	0.56*	0.73***
Slaughter weight (Kg)		0.45 ^{NS}	0.63*	0.68**	0.64*	0.73***	0.67**	0.68**

Note: ****, ** and * Significant at P<0.001, P<0.01 and P<0.05 respectively, NS= non significant

3.2. Effect of Free Grazing Plus Supplementation on Slaughter Weights, Hot Carcass Weight and Carcass Measurements

The linear carcass measurements are indices of skeletal development and indirectly help to determine carcass conformation. Diet had significant and positive ($P > 0.01$) effect on relationship exert between slaughters weight and carcass measurements except internal chest length Table (3). The significant and highest positive correlation coefficients were found between slaughter weight and external chest length($r = 0.85$, ($p < 0.001$), between hot carcass weight and carcass measurements and between hot carcass weight and slaughter weight($r = 0.96$, ($p < 0.001$) respectively. The values increased ($P < 0.01$) progressively with inclusion of concentrate in the diet. The lowest correlation coefficients ($r = 0.65$, ($p < 0.01$) between slaughter weight and distal foreleg length. and between hot carcass weight and distal foreleg ($r = 0.65$, ($p < 0.05$). Generally the increase in weights of the main carcass cuts was related to the carcass weight increase due to availability of energy and protein in diets. Diet and slaughter weight may be the main causes of the differences with the results obtained by Owen [12] and Abdullah and Musallam [16]. The increase in weights of between hot carcass and slaughter weight with internal chest length was related to be not vary significantly. This results is online with studied of Oman, et al. [17] who reported that fed goats produced heavier slaughters weight and carcasses measurements than pasture goats.

Table-3. Correlation Coefficients between Slaughter Weights, Hot Carcass Weight and Carcass Measurements (Grazing + Supplemented Group)

	Slaughter Weight	Carcass Length	Distal Foreleg Length	Proximal Foreleg Length	Internal Chest Length	External Chest Length
Hot carcass weight (Kg)	0.96***	0.83***	0.65*	0.80***	0.55 ^{NS}	0.85***
Slaughter weight (Kg)		0.84***	0.64*	0.82***	0.51 ^{NS}	0.79**

Note: ****, ** and * Significant at P<0.001, P<0.01 and P<0.05 respectively, NS= non significant

3.3. Effect of Zero Grazing on Slaughter Weights and Carcass Characteristics

Feed intake reported in (Table 4) followed the same trend as all correlation coefficients between slaughters weight and carcass measurements were significant and positive. Whoever, the highest correlation coefficients ($r = 0.87$, ($p < 0.001$) exert between slaughter weight and external chest length, and between hot carcass weight and slaughter weight ($r = 0.96$, ($p < 0.001$)

The lowest correlation coefficients ($r = 0.58$, ($p < 0.05$) between slaughter weight and distal hind leg length, and between hot carcass weight($r = 0.60$, ($p < 0.05$). All correlation coefficients between hot carcass weight and carcass measurements were not significantly except slaughter weight and external chest length which agree with Simela, et al. [18]. This is consistent with the results reported by Peña, et al. [19] and Marichal, et al. [20] who reported that the correlation coefficients between carcass measurements, slaughter weight and hot carcass weight were positive and significant. The variation between these results and that obtained by other authors may be due to differences in weight at slaughter and mature size of breed used.

Table-4. Correlation coefficients between slaughter weights, hot carcass weight and carcass measurements (zero grazing)

	Slaughter Weight	Carcass Length	Distal Foreleg Length	Internal Chest Length	External Chest Length
Hot carcass weight (Kg)	0.96***	0.52 ^{NS}	0.50 ^{NS}	0.35 ^{NS}	0.60*
Slaughter weight (Kg)		0.54 ^{NS}	0.58*	0.76**	0.87***

Note: ****, ** and * Significant at P<0.001, P<0.01 and P<0.05 respectively, NS= non significant.

4. Conclusions

Improvement in the plane of nutrition by supplementation of concentrates to grazing goats can promote faster daily live weight gain and increase slaughters weight and carcass measurements then have good and positive relationships between them, and thus enable the attainment of acceptable market weight at earlier age.

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