Mesopotamia Journal of Agriculture

https://magrj.mosuljournals.com

EFFECT OF CASTRATION AND SLAUGHTER WEIGHTS ON GROWTH PERFORMANCE, CARCASS TRAITS, MUSCLE AND FAT DISTRIBUTION OF BLACK GOAT AND MERIZ KIDS

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Article information
Article history:
Received: 22/05/2023
Accepted: 22/09/2023
Available: 30/09/2023

Keywords:
Performance, Body composition, Sex, Live body weight, Kids.

DOI:
http://10.33899/mja.2023.140507.1239.

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ABSTRACT

To study the influence of castration and slaughter weight, 24 weaned kids from each of Black goat and Meriz kids were divided equally into two groups, the first was castrated, while the second was left intact, and all were fed individually and slaughtered at 15, 20 and 25kg. Results revealed that the overall mean of daily gain (DG), feed conversion ratio (FCR), Dressing percentage (DP), rib eye area (REA) and fat thickness (FT) averaged respectively 0.073±0.003kg, 6.062±0.32kg/kg, 41.17±0.35%, 10.05±0.40 cm2 and 0.33±0.04mm. It seems that breed had no significant effect on DG and DP. Black goat had significantly higher FCR, REA and FT than Meriz kids, and intact kids had significantly ($P<0.05$) higher DG and FCR than castrated only. A significant effect was noticed of slaughter weight on DG, FCR, REA and FT being highest in kids slaughtered at 25kg. A significant effect was observed for the effect of breed, castration and slaughter weight on some of muscle groups (MG1, MG3, MG4, MG5, MG6, MG7, MG9). Breed and castration had no effect on total carcass fat. Meriz kids had significantly($P<0.05$) higher lean: fat ratio and lean: bone ratio.

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INTRODUCTION

Throughout the world, goat is considered an important farm animal especially in the developing countries (Thornton *et al*., 2009), due to its capability to survive and produce in harsh environmental particularly in dry areas, they are efficient in converting food (Richards, 2002), beside its low cost, small body size, suitability for small holders and its triple purpose (Orequi, and Falagan, 2006), (Fazalic, and Mirzaei, 2012).

It is known that in order to identify potential of genetic resources for carcass composition essential to study breed characteristic additionally understanding management alteration for different genotypes (Snowder, *et al*., 1994). Therefore, differences in performance characteristic among breed can help in improving production of meat in goat. Meriz goat is found in Kurdistan region and raised primary for fine hair, and adapted to survive under adverse condition of feed limitation (Alkass, and Juma, 2005). However, information related to the potential of this breed as well as native black goat for meat production is limited.

Growth is considerate an important trait for the production of meat and several methods such as breeding, feeding, castrate… etc. have been used in order to increase

meat production (Mahgoub, *et al*., 1998). Although, castration has been practiced, however, the difference in the rate of gain between castrated and entire kids are unclear. Therefore, the purpose of this study is to determine the influence of castration on fattening performance, carcass traits and body composition of Meriz and Black goat kids slaughtered at different weights.

MATERIALS AND METHODS

Study site

The current work was completed at Animal Farm. Animal Production department, College of Agricultural Engineering Science, Duhok University, from 4/7/2021 until 14/2/2022.

Animal management and experimental design

On the basis of weight and age, a total of 48 entire male kids (24 Meriz and 24 Black goat) were selected at weaning (90-120 days of age) and weighing 10.99 and 11.21kg, respectively from commercial goat farm. After an adaptation period for a week, the kids of both breeds were randomly divided into two equal groups, the first was castrated using rubber ring, whereas the second groups were left intact, and then were allocated to be slaughtered at 15,20 and 25kg live body weight. All kids were placed in individual pens and weighed at weekly interval. The offered concentrate in the form of pellets contained 15.5% crude protein and 2854 kcal was weighed daily, and refusal was collected and weighed before morning feedings. There was always fresh water and mineral blocks accessible. One black goat kid was died for unknown reason, and 2 Meriz kids were excluded from the experiment due to their abnormal growth.

Slaughtering

At animal Farm abattoir, each kid was weighed and slaughtered when reached each one reached its target weight after fasting for 18 hours with availability of water. After skinning, the carcass and non-carcass components including (Head, Feet, Skin, Liver, Heart, Lung and Trachea, Spleen, kidney) were weighed.

Physical dissection

Following the methods of Butterfield (1988) the chilled half carcass was separated first into nine muscle groups and then each group was dissected into lean, fat and bone.

Fat Partitioning

The total of omental, mesenteric, heart, renal, and pelvic fat is known as non-carcass fat. Fat from the left side of the carcass was separated, including subcutaneous and intermuscular fat.

Data collection and statistical analysis

The experiment was designed as a factorial 2X2X3 including two breeds (Black goat vs. Meriz), two sex (Intact and Castrated) and three slaughter weight (15, 20 and 25kg). The Statistical computations were done using SAS software program (SAS, 2018). To compare means, Duncan's multiple range test (1955) was used:

$Y_{ijkl} = \mu + B_i + Tj + Sj + BTS_{(ijk)} + e_{ijkl}$

Where:

Y_{ijkl} = Variable dependent.
μ = Overall mean
B_i= Effect of Breed (Meriz and Black Goat).
T_j= Effect of Treatment (Intact and Castrated).
S_k= Effect of Slaughter wt. (15kg, 20kg and 25kg).
$BTS_{(ijk)}$: Effect of Interaction (Breed x Treatment x Slaughter wt).
e_{ij} = Error term.

RESULTS AND DISCUSSION

Growth rate

The average of (Weights at the start and end, fattening time, and average daily increase weight) in Black goat and Meriz kids of both sexes (Intact and castrated) and slaughtered at 15, 20, and 25kg are given in Table (1). The daily weight growth averaged 0.068 ± 0.004kg for Meriz and 0.077 ± 0.004kg for Black goat, respectively, and the difference was insignificant. The average daily gain recorded herein for both breeds are higher than the values recorded earlier by Al-Doori *et al*., (2002) and Dosky,(2010), but it is lower than those obtained by Alkass *et al*.,(2014) and Mayi and Alkass,(2010). Such variance may be caused by a number of reasons, including genetic and environmental conditions, the quantity and quality of feed available, and the age and weight at slaughter.

The effect of castration on daily weight gain reveal that castrated kids grow significantly at lower rate (0.067±0.004) than intact kids (0.079± 0.004) kg. Similarly, it was indicated that castration depressed the growth rate of castrated kids as compared to entire kids (Mahgoub and Lodge,1998; Koyuncu *et al*.,2007; Sulaiman and Alkass,2009 and Alkass and Mahmood,2015). The variation might be attributable to fat accumulation in castrated kids. In terms of the influence of slaughter weight on daily weight increase, it seems from Table (1) that kids slaughtered at 25kg had numerically ($p \leq 0.05$) higher daily gain (0.082kg) than those slaughtered at 15 (0.071kg) or slaughtered at 20kg(0.067kg). Such difference could possibly due to the effect of environmental temperature since the experiment was started on July, and extended till February. Also, other authors found that weight at slaughter has no significant effect on daily gain in weight (Taha,1990, Al-Kanzawi,1996 and Kaic *et al*., 2012).

It appears from Table (1) that both Black goat kids and intact kids had significantly ($P<0.05$) shorter time to attain their target weights (108.22 and 112.0 days) as compared to Meriz and castrated kids (133.18 and 129.23days) possibly due to the differences in their daily gain in weight. Obviously as slaughter weight increases there is an increase in time required to attain their prescribed weight.

From Table (1) it appears that Black goat kids are significantly ($P<0.05$) more efficient in converting feed to gain (5.36±0.33k/kg) than did Meriz kids (6.79±0.52kg/kg). Similarly, it was demonstrated that there are differences in feed

efficiency among studied breeds (Cameron *et al*.,2001 and Kosum *et al*.,2003). Also, it seems that intact kids are significantly ($P<0.05$) more efficient in converting feed to gain (5.37±0.37 kg/kg) as compared to castrated kids (6.78± 0.49kg/kg), and the reason could be due to deposition of fat in castrated kids. Similarly, El-Waziry *et al*., (2011) demonstrated that castrated goat was less efficient in utilizing feed than entire male Ardhi kids.

Table (1): Effect of Breed, Castration, and slaughter weight on growth performance

Traits		Initial weight(kg)	Final weight(kg)	No. of Days	ADG (kg)	Daily feed intake(kg)	F.C.R. (kg/kg)
Overall Mean		11.16 ±0.20	19.71 ±0.60	120.42 ±8.39	0.073 ±0.003	0.407±0.01	6.062±0.32
Breed	Meriz	11.04±0.35^{a}	19.58 ±0.88^{b}	133.18±13.36 ^{a}	0.068±0.004^{a}	0.424±0.01a	6.79±0.52^{b}
	B. goat	11.27 ±0.23^{a}	19.84±0.84^{a}	108.22±9.93^{b}	0.077±0.004^{a}	0.391±0.01b	5.36±0.33^{a}
Treatment	Intact	11.28±0.26^{a}	19.93±0.86^{a}	112.00±11.1^{b}	0.079±0.004^{a}	0.395±0.01a	5.37±0.37^{b}
	Castrated	11.03±0.32^{a}	19.48±0.86^{b}	129.23±12.72^{a}	0.067±0.004^{b}	0.419±0.01a	6.78±0.49^{a}
Slaughter weight	G1:15Kg	11.28±0.32^{a}	15.08±0.05^{c}	58.06±5.26^{b}	0.071±0.006^{a}	0.333±0.005b	5.32±0.48^{a}
	G2:20Kg	10.73±0.36^{a}	19.83±0.14^{b}	145.20±11.65^{a}	0.067±0.005^{a}	0.436±0.01a	7.15±0.70^{b}
	G3:25Kg	11.47±0.40^{a}	24.87±0.05^{a}	165.14±5.12 ^{a}	0.082±0.003^{a}	0.460±0.01a	5.73± 0.29^{a}

Within each column, means being different letters denote significant difference($P<0.05$).

Efficiency of feed conversion were averaged 5.32±0.48, 7.15±0.70 and 5.73± 0.29 kg/kg for kids slaughtered at 15, 20 and 25kg respectively and the difference among them was significant ($P<0.05$). The reason behind that kids slaughtered at 20kg are less efficient is not clear but possibly due to lower gain in this group. However, it was generally agreed that the feed conversion decreased gradually as the performance period advanced (Cameron *et al*.,2001; Taha,1990; Mayi and Alkass, 2010).

Dressing percentage

The dressing percentages based on the slaughter weight and empty body weight averaged 41.17±0.35 and 46.01±0.44, respectively (Table 2). The values obtained in this study is comparable to those obtained by Dosky (2010) for both studied breeds, whereas it was lower than previously recorded for Black goat (Taha,1990 and Sulaiman and Alkass,2009). Such differences among studies could be due to many factors such as age and weight at slaughter, nutrition and degree of body development. The influence of breed on dressing percentage reveals that there is no significant difference between them. Similar results have been reported earlier on the same native breeds (Dosky,2010 and Mayi and Alkass 2010) as well as other studied breeds (Al-Doori *et al*, 2002; Obeidat *et al*.,2020). It seems from Table (2) that no significant difference exists between intact and castrated kids in dressing percentage 1 and 2. Also, previously it was demonstrated that dressing percentage was not affected by castration (Sulaiman and Alkass,2009; El-Waziry *et al*.,2011; Rajkumar *et al*.,2017).

It seems from Table (2) found that the dressing percentage depending on slaughter weight was significantly greater (P≤0.05) for kids slaughtered at 20kg (43.03 ± 0.45%) compared to kids slaughtered at 15 kg (40.29± 0.63%) or at 25kg (0.45%±40.20).

However, the highest dressing percentage based on empty body weight was recorded in kids slaughtered at 15kg (47.87± 0.59%) and the lowest was at kids slaughtered at 25kg (43.02±0.52%). Such difference could be attributed to the variation in the gut content. According to Marichal *et al*. (2003), when slaughter weight increased, the dressing percentage reduced dramatically.

Table (2): Effect of breed, castration and slaughter weight on carcass traits

Traits		Carcass weight(kg)	Empty body weight(kg)	Dressing1 %	Dressing % 2	Rib eye area(cm^2)	Fat thickness(mm)
Mean		8.11 ±0.25	17.83 ±0.65	41.17 ±0.35	46.01±0.44	10.05 ±0.40	0.33 ±0.04
Breed	Meriz	8.05±0.36 [a]	17.82±0.94[a]	41.16±0.57[a]	45.66±0.63[a]	9.21±0.44[b]	0.30±0.05[b]
	B. goat	8.17±0.35[a]	17.85±0.93[a]	41.19±0.45[a]	46.34±0.62[a]	10.85±0.62[a]	0.36±0.06 [a]
Treatment	Intact	8.11±0.36[a]	17.90±0.94[a]	40.64±0.42[a]	45.79±0.59[a]	9.72±0.63[a]	0.33±0.06[a]
	Castrated	8.12±0.35[a]	17.77±0.93[a]	41.73±0.57[a]	46.23±0.67[a]	10.38±0.06[a]	0.34±0.06[a]
Slaughter weight	G1:15Kg	6.07±0.09[c]	12.71±0.19[c]	40.29±0.63[b]	47.87±0.59[a]	7.75±0.46[c]	00±0.00[c]
	G2:20Kg	8.53±0.11[b]	18.23±0.18[b]	43.03±0.45[a]	46.81±0.54[a]	10.29±0.51[b]	0.44±0.03[b]
	G3:25Kg	10.00±0.10[a]	23.27±0.13[a]	40.20±0.45[b]	43.02±0.52[b]	12.41±0.52[a]	0.60±0.02[a]

Within each column, means being different letters denote significant difference(P≤0.05).

Fat thickness and Rib eye area

In this study, rib eye area averaged 10.05±0.40cm2 the value recorded herein is higher than the values reported previously for Iraqi native Black goats (Al-Doori *et al*.,2002; Dosky,2010; Sulaiman and Alkass,2009; Alkass and Mahmood,2015), and Meriz kids (Dosky, 2010; Mayi and Alkass, 2010). However, Taha, (1990) and Mayi and Alkass (2010) recorded higher values in Black goat compared to the present result. Such difference could be attributed to the variation in age and /or body weight at slaughter.

Black goat kids had significantly (*P<0.05*) larger rib eye area (10.85±0.62 cm2) than Meriz kids (9.21±0.44 cm2). This result is in accordance with other investigators who found significant differences among different studied breeds (Al-Doori *et al*.,2002; Sebsibe *et al*.,2007; Gokdal,2013). The effect of castration on the rib eye region found no significant difference between intact and castrated children (9.72 vs. 10.38 cm2). Also, several authors indicated that castration had no effect on rib eye area (Sulaiman and Alkass, 2009; Alkass and Mahmood,2015).

It appears from Table (2) as the weight at slaughter increased from 15 to 25kg the rib eye area became significantly larger. Such results are expected due to the degree of maturity. Several authors were noticed similar finding (Al-Doori *et al*.,2002 and Gursoy *et al*.,2011).

In the present investigations, fat thickness over L. dorsi muscle averaged 0.33±0.04mm. The value recorded herein is lower than those obtained earlier for Iraqi goat (Taha,1990; Al-Doori *et al*.,2002; Sulaiman and Alkass,2009; Mayi and Alkass,2010 and Alkass and Mahmood,2015) which ranged from 0.76 to 1.63mm. However, such difference could be due to that fat deposition was almost nill in kids slaughtered at 15kg which affect this result.

Black goat kids laid down significantly (*P<0.05*) more fat than Meriz kids (0.36 vs. 0.30 mm). Such result is in accordance with other investigators who found that breed had a significant effect on fat thickness (Al-Doori *et al*.,2002; Das and Rajkumar,2010; Gokdal,2013).

In the present work, entire and castrated kids laid down almost similar amount of fat over L. dorsi muscle (0.33 ± 0.06 vs. 0.34±0.06mm). This result is comparable to the findings in Iraqi native goat (Sulaiman and Alkass,2009; Alkass and Mahmood,2015) as well as other breeds (Rajkumar *et al*., 2017). However, it was found by others that castrated kids had significantly (*P<0.05*) higher fat thickness as compared to intact kids (Taha,1990; El-Waziry *et al*.,2011).

It appears from Table (2), a significant($P<0.05$) increase in fat thickness was found as the weight at slaughter increased. Also, it was noticed by other authors similar results (Taha,1990; Gursoy *et al*.,2011).

Muscle distribution

In the current investigation, the proximal hind limb (MG1) accounted for the greatest proportion (25.85±0.54%) of the weight of side muscle, accounting for about (50.62±0.63%) of the total weight (Table 3). According to Warmington and Kirton (1990), whereas goats have a larger proportion of total muscle, their distribution in the high-priced muscle group is less beneficial than that of sheep. However, the significant proportion of high-priced slices in the goat carcass (> 50%) showed a considerable potential for goat meat production. This was about the same value (51%) for the group of muscle in sheep (Butterfield, 1988). This conclusion is also consistent with those published previously by Mahgoub and Lodge (1994) of the Jabel Akhder goat.

Significantly ($P<0.05$) Black goat kids had higher percentage of (MG1) (27.31±0.83 vs. 24.32±0.55), (MG5) (15.15±0.35 vs.13.74±0.68) and (MG6) (3.66± 0.18 vs. 3.24±0.17)) than Meriz kids. While, Meriz kids surpass Black goats in the percentages of MG7(11.40 ±0.39 vs. 9.59±0.51) and MG9 (11.59±0.79 vs. 9.07±0.60). Similarly, Mahgoub and Lu, (1998) reported that there was a significant breed effects on the distribution of muscle within the carcass of Omani goats. Dhofari goats had higher proportion of group muscles in MG1 ($p<0.001$), MG3 ($P<0.001$), MG4 ($P<0.05$), but lower proportion of muscles in the MG5 ($p<0.001$), MG6 ($p<0.001$), MG7 ($P<0.05$), MG9 ($P<0.001$) and total forequarter muscles ($P<0.001$) than Batima goats. While, Alkass and Hassan (2014) demonstrated that the different muscle groups of Awassi, Karadi and their crossbred were not affected by breed.

There is no statistically significant variation in muscle group percentages between intact and castrated kids except that castrated kids had higher percentage of MG3 and marginally lower percentages of MG1, MG2, MG7, MG8 and MG9 than intact kids. In contrast to these results, Mahgoub *et al*., (2004) and Mahgoub and Lodge (1996) found that intact Omani kids had significantly lower proportion of MG1, MG2 and MG3 but higher proportion of muscles in groups of MG5, MG6, MG7, MG8 and MG9 than castrated kids. Moreover, Mahgoub and Lodge (1998) demonstrated that the intact Batina kids had higher proportion of expensive muscles (MG1, MG3 and MG5) and lower proportion of Fore-quarter muscles (MG5, MG7, MG8 and MG9) than castrated kids.

Kids slaughtered at 25kg had significantly ($P<0.05$) higher percentages of MG1 and MG9 and lower percentage of MG2, MG3, MG4, MG5 and MG6 than kids slaughtered at 15 and 20kg. Also, Mahgoub and Lu, (1998) reported that increasing the slaughter weight from 11 to 18kg decreased the proportion of MG1, MG2, MG5, MG6 and EMGs (MG1, MG3 and MG5). Also, Work with Omani goats revealed that the degree of maturity affects muscle distribution in the carcass, resulting in changes in the number of muscle groups (Mahgoub and Lodge,1996; Mahgoub,1997; Mahgoub *et al*.,2005).

Table (3): Effect of breed, castration and slaughter weight on muscle groups.

Traits %	Mean	Breed		Treatment		Slaughter weight		
		Meriz	Black goat	Intact	Castrated	G1 15kg	G2 20kg	G3 25kg
MG1	25.85±0.54	24.32±0.55 b	27.31±0.83 a	26.42±0.70 a	25.25±0.84 a	23.85±0.80 b	25.74±0.78 b	28.25±0.95 a
MG2	3.71±0.16	3.45±0.1 a	3.95±0.20 a	3.93±0.2 a	3.47±0.2 a	3.80±0.19 ab	4.13±0.9 a	3.15±0.13 b
MG3	10.30±0.38	10.14±0.55 a	10.45±0.55 a	9.43±0.57 b	11.22±0.45 a	12.39±0.51 a	10.10±0.46 b	8.13±0.53 c
MG4	10.30±0.31	10.75±0.39 a	9.87±0.48 a	9.87±0.37 a	10.75±0.51 a	11.10±0.51 a	10.23±0.57 a b	9.47±0.51 b
MG5	14.46±0.39	13.74±0.68 b	15.15±0.35 a	14.03±0.60 a	14.91±0.48 a	16.52±0.42 a	14.10±0.56 b	12.50±0.61 c
MG6	3.45±0.13	3.24±0.17 b	3.66±0.18 a	3.29±0.18 a	3.62±0.18 a	3.75±0.12 a	3.94±0.21 a	2.58±0.17 b
MG7	10.48±0.35	11.40±0.39 a	9.59±0.51 b	10.77±0.55 a	10.17±0.43 a	10.47±0.53 a	9.83±0.57 a	11.18±0.73 a
MG8	11.06±0.43	11.27±0.46 a	10.86±0.74 a	11.87±0.75 a	10.21±0.36 a	10.72±0.79 a	11.03±0.91 a	11.48±0.51 a
MG9	10.30±0.52	11.59±0.79 a	9.07±0.60 b	10.31±0.85 a	10.29±0.61 a	7.31±0.46 c	10.81±0.97 b	13.18±0.44 a
EMG	50.62±0.63	48.22±0.84 b	52.92±0.65 a	49.88±0.93 a	51.39±0.84 a	52.76±0.75 a	49.95±1.07 b	48.89±1.28 b

Within each row, means being different letters denote significant difference($P<0.05$).

Partitioning of fat

Fat is well recognized as the most changeable tissue in the carcass. Variances in the amounts and characteristics of subcutaneous and intramuscular fat across and within breeds are major variables resulting in variances in meat quality in goats. (Tshabalala *et al*.,2003). In the current work, the proportional contribution of distinct fat depots to total body fat was intermuscular fat (29.80 ± 0.86), omental and mesenteric fat (29.67 ± 0.90), kidney and pelvic fat (22.32±0.70), subcutaneous fat (13.74±0.78) and cardiac fat (4.41±0.34). According to Derwesh (2013) and Mahgoub and Lodge (1998), intermuscular fat accounts for the greatest amount of total body fat, followed by subcutaneous fat, omental and mesenteric fat, kidney, and pelvic fat.

In the present study, weight of total body fat, carcass fat and non-carcass fat averaged 1.15±0.03, 0.50± 0.19 and 0.65± 0.02 respectively. Black kids had a slightly greater percentage of total carcass fat and a lower percentage of total non-carcass fat than Meriz kids. Similar findings were reached by Mahgoub and Lu (1998), who discovered that little goats (Dhofari) had a larger proportion of total body fat and total non-carcass fat than large goats (Batina). According to the findings of this study, intact kids had a larger percentage of subcutaneous fat than castrated kids (14.63±1.05 vs. 12.81±1.14). Also, it was found that castrated kids had significantly higher fat percentage in their carcasses than intact kids (Mahgoub and Lodge,1996; Simela *et al*.,2011; El-Waziry *et al*., 2011 and Rajkumar *et al*.,2015).

Kids slaughtered at 25 kg had significantly($P<0.05$) higher percentages of total carcass fat, non-carcass fat, total body fat, subcutaneous fat and kidney and pelvic fat than kids slaughtered at 15 and 20kg (Table 4). Derwesh (2013) found kids slaughtered at 30kg had considerably greater omental and kidney fat, total non-

carcass fat, subcutaneous fat, intramuscular fat, total carcass fat, and total body fat than kids slaughtered at 20kg. According to Mahgoub and Lodge (1996), Jebel Akhdar kids slain at 28kg had greater total body fat than kids slaughtered at 11kg.

Table (4) Effect of breed, castration and slaughter weight on fat partitioning

Traits	Mean	Breed		Treatment		Slaughter weight		
		Meriz	Black goat	Intact	Castrated	G1 15kg	G2 20kg	G3 25kg
Total Carcass Fat(kg)	0.50±0.19	0.51±0.30 a	0.49±0.02 a	0.50±0.30 a	0.50±0.02 a	0.36±0.01 c	0.51±0.01 b	0.64±0.01 a
Non-Carcass Fat(kg)	0.65±0.02	0.66±0.03 a	0.64±0.03 a	0.64±0.03 a	0.66±0.02 a	0.56±0.02 b	0.65±0.04 b	0.76±0.04 a
Total body Fat(kg)	1.15±0.03	1.17±0.05 a	1.14±0.05 a	1.14±0.05 a	1.17±0.04 a	0.92±0.03 c	1.17±0.03 b	1.40±0.04 a
Intermuscular Fat	29.80±0.86	29.53±1.13 a	30.07±1.32 a	29.06±1.28 a	30.57±1.17 a	31.79±0.91 a	31.21±1.98 a	26.01±0.97 b
Subcutaneous Fat	13.74±0.78	13.34±1.22 a	14.12±0.99 a	14.63±1.05 a	12.81±1.14 b	8.86±0.62 c	13.28±0.62 b	19.82±0.83 a
Total Car. Fat %	43.45±0.91	42.25±1.36 a	44.60±1.20 a	44.11±1.44 a	42.77±1.11 a	40.43±0.97 b	44.44±1.97 a b	45.84±1.42 a
Omental& Mesenteric Fat	29.67±0.90	30.77±1.48 a	28.63±1.05 a	30.12±1.29 a	29.21±1.29 a	35.02±1.10 a	27.05±1.11 B	26.38±1.43 b
Kidney & Pelvic. Fat	22.32±0.70	22.53±1.16 a	22.12±0.83 a	21.35±1.04 a	23.33±0.91 a	20.13±0.94 b	23.37±1.43 a b	23.69±1.08 a
Cardiac Fat	4.41±0.34	3.79±0.24 a	5.01±0.62 a	4.78±0.60 a	4.03±0.32 a	4.15±0.20 a	5.04±0.91 a	4.05±0.50 a
Total Non-carcass Fat %	56.54±0.91	57.74±1.36 a	55.39±1.20 a	55.88±1.44 a	57.22±1.11 a	59.56±0.97 a	55.55±1.97 a b	54.15±1.42 b

Within each row, means being different letters denote significant difference($P<0.05$).

Distribution of carcass tissue

In this study, bone, lean, fat percentage, lean: fat and lean: bone ratio averaged 62.40, 11.76, 25.80% 5.52 and 2.70 respectively. (Table 5). Meriz carcasses had significantly ($P<0.05$) more lean, lower fat and bone content than Black goats' carcasses (Table 5). This result is consistent with the finding of other workers (Cameron *et al*.,2001; Dhanda *et al*.,2003). Moreover, Meriz kids had significantly ($P<0.05$) higher lean: fat and lean; bone ratio than Black goats kids contrary to the results obtained by (Mayi and Alkass 2010). The current study found not any significant differences in lean, fat, or bone percentages between intact and castrated kids. This result was in accordance with results found by other workers (Koyuncu *et al.*,2007; Sulaiman and Alkass,2009; Alkass and Mahmood,2015). Also, lean: fat and lean: bone ratio was not affected by castration. Similar results were obtained by other investigators (El-Hag *et al*.,2007; Koyuncu *et al*.,2007; Sulaiman and Alkass,2009; Simela *et al*.,2011).

According to the data in table (5), kids slaughtered at 25kg had a considerably larger proportion of lean and a lower proportion of bone than kids slaughtered at 15 and 20kg. Similar results were found earlier by other investigation (Mahgoub and lodge,1998; Marichal *et al*.,2003). Also, kids slaughtered at 25kg had higher percentage of lean: fat and lean: bone ratio compared to kids slaughtered at 15 and 20kg. Similar result was found by Marichal *et al*., (2003).

Table (5): Effect of breed, castration and slaughter weight on carcass tissue distribution.

Traits		%			Lean: fat	Lean: bone
		Lean	Fat	Bone		
Mean		62.40±1.13	11.76±0.35	25.80±0.98	5.52±0.21	2.70±0.17
Breed	Meriz	64.37±1.82^{a}	11.02±0.50^{b}	24.58±1.59^{b}	6.11±0.33^{a}	2.99±0.28^{a}
	Black goat	60.52±1.29^{b}	12.46±0.39^{a}	26.96±1.21^{a}	4.96±0.21^{b}	2.42±0.18^{b}
Treatment	Intact	62.05±1.55^{a}	11.56±0.41^{a}	26.36±1.40^{a}	5.54±0.25^{a}	2.60±0.22^{a}
	Castration	62.76±1.68^{a}	11.97±0.53^{a}	25.21±1.44^{a}	5.50±0.34^{a}	2.80±0.27^{a}
Slaughter weight	G1:15Kg	55.87±0.78^{c}	11.96±0.58^{a}	32.11±0.48^{a}	4.82±0.24^{b}	1.74±0.04^{c}
	G2:20Kg	62.28±1.81^{b}	12.08±0.72^{a}	25.61±1.39^{b}	5.52±0.47^{ab}	2.62±0.26^{b}
	G3:25Kg	69.99±1.08^{a}	11.19±0.36^{a}	18.78±0.99^{c}	6.33±0.22^{a}	3.87±0.23^{a}

CONCLUSIONS

According to the data reported in the text, it appears that Black goat and intact kids outperform Meriz kids and castrated kids in terms of daily growth. While castrated kids had significantly higher rib eye area and expensive muscles. As slaughter weight increases, there is an increase in most studies traits.

ACKNOWLEDGMENT

The authors wish to express their thanks to Prof. Dr. Nasr N. Al-Anbari, College of Agricultural, University of Bagdad for his valuable help in statistical analysis of the data.

CONFLICT OF INTEREST

We declare that we don't have affiliation or entity with any organization regarding the financial a non- financial interest in this subject matter discussed in this article.

تأثير الخصي والوزن عند الذبح في أداء النمو وصفات الذبيحة وتوزيع العضلات والدهون لجداء الماعز الأسود والمرعز

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الخلاصة

بهدف دراسة تأثير كل من الخصي والوزن عند الذبح فلقد تم توزيع 24 جدي من كل من الماعز الاسود والمرعز الى مجموعتين اذ تم خصي المجموعة الاولى واما الثانية فلقد اعدت مجموعة سيطرة وغذيت بصورة فردية ولتذبح عند اوزان 15 و20 و25 كغم. تشير النتائج بأن معدل الزيادة الوزنية وكفاءة التحويل الغذائي ونسبة التصافي ومساحة العضلة العينية وسمك الطبقة الدهنية قد بلغت 0.073± 0.003 كغم،

6.062 ±0.32 كغم/ كغم، 41.17 ±0.35% ، 10.05±0.40 سم2 ، 0.33± 0.04 ملم على التوالي. كما تبين بعدم وجود تأثير معنوي للسلالة في الزيادة الوزنية ونسبة التصافي. في حين تفوقت جداء الماعز الأسود على نظيراتها المرعز معنويا في كفاءة التحويل الغذائي، المساحة العضلة العينية وسمك الطبقة الدهنية وكذلك تفوقت معنويا مجموعة السيطرة على نظيراتها المخصية في الزيادة الوزنية وكفاءة التحويل الغذائي. كما تفوقت الجداء المذبوحة بوزن 25كغم معنويا في كل من الزيادة الوزنية وكفاءة التحويل الغذائي ومساحة االعضلة العينية وسمك الطبقة الدهنية. وان للعوامل قيد الدراسة تاثير على بعض المجاميع العضلة (المجموعة العضلية الاولى (MG1)، المجموعة العضلية الثالثة (MG3)، المجموعة العضلية الرابعة (MG4)، المجموعة العضلية الخامسة (MG5)، المجموعة العضلية السادسة (MG6)، المجموعة العضلية السابعة (MG7)، المجموعة العضلية التاسعة(MG9) ولم يكن للسلالة والخصي تاثير في محتوى الذبائح من الدهن الكلي وتفوق المرعز على الماعز الأسود في كل من اللحم: الدهن ونسبه اللحم الى العظم.

الكلمات المفتاحية: الاداء، تركيب الجسم، الجنس، وزن الجسم الحي، جداء.

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