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Effect of Different Slaughter Weights on some Carcass Characteristics and Sensory Evaluation of Meat in Karadi Male Lambs

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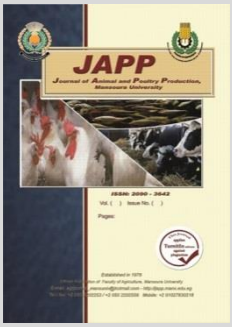

ABSTRACT

This study was carried out to evaluation the effect of slaughter weights on carcass characteristics and meat sensory evaluation of Karadi male lambs. A total 20 male Karadi lambs, with an average initial body live weight of 23.27 ± 0.28 kg and 3 to 4 months old were used in this experiment. Lambs were randomly allocated to 4 groups (5 lambs for each group). The experimental diet was consisting of concentrate feed 75% and 25% of wheat straw and prepared based on Cornell net carbohydrate and protein system software for growing lambs. Lambs were slaughtered according to Islamic way when each lamb has reached its target slaughter weights of 28, 33, 38 and 43 kg for treatments (T1, T2, T3 and T4), respectively, following fasting for 12 h, with free access to water. The slaughter weight (SW), empty body, hot and cold carcass weights were all significantly different ($p \leq 0.05$) among all treatments. The foreshank was significantly ($p \leq 0.05$) difference between T1 and T3, while T2 and T4 were not significant. The physical dissection of shoulder for (fat and bone) and foreshank for (meat, fat and bone) were significantly differences ($p \leq 0.05$) among treatments. The percentage of meat in neck were significantly differences ($p \leq 0.05$) among treatments. Fat thickness and sensory evaluation for (tenderness and juiciness) were significant differences ($p \leq 0.05$) among treatments. It was concluded that the Karadi male lambs slaughtered at weights between 38-43 kg improved carcass characteristics, physical dissection, carcass cuts and some sensory evaluation of their meat.

Keywords: Carcass characteristics, Karadi lambs, sensory evaluation, slaughter weight.

INTRODUCTION

When you compare it to the global daily consumption rates of protein and the population's protein requirement, meat is extremely important; over 50% of all the global protein demand is supplied by meat. Meat contains essential protein, fat, vitamins, minerals, and other biologically active substances (Pogorzelska-Nowicka *et al*., 2018). In future, Iraq will be of significance to the increasing population and demand for meat production, particularly lamb and mutton (Juma and Alkass, 2000). In Iraq, however, during weaning and 1-year old lamb is usually slaughtered. This method illustrates that lambs are slaughtered at different body weights and under various conditions such as 30kg or less (light), 40kg (average), and 50kg or more (heavy) (Rashid *et al*., 1987). Production costs are high and profit margins are low at all levels in the sheep industry. To sustain economic production and consumption, changes in meat quality must be compensated for. The amount and type of fat in the carcass influenced its quality as well. (Sen *et al*., 2006). The characteristics of carcass and the quality of the meat are affected by various factors, including breed, sex, age, feed method, slaughter weight and carcass weight (Santos *et al*., 2007). Several researchers discovered that slaughter weight has a major impact on carcass traits and composition (Teixeira *et al*., 2005). With rising slaughter weight, carcass fat production increases, while bone and lean proportion decreases (Wood, 1983). This concentrates special emphasis on muscle production and optimal distribution of fat and minimum bone levels (Prescott, 1979). In order to improve the production efficiency and to develop products that are suited to customer demands it is important to understand the growth and development and the factors affected (Rashid *et al*., 1987). The latest study has shown no significant differences in the percentage of carcass dressings of different slaughter weights, however, with increased slaughter of male Karayaka lambs, increasing fat levels and decreasing percentage of carcass lean and bone have been observed (Aksoy and Ulutaş, 2015). The main aim of this study was to demonstrate that Karadi male lambs were slaughtered with different weight for optimal slaughtering weight, carcass characteristics and meat sensory evaluation.

MATERIALS AND METHODS

1. Housing and health control

The research was undertaken from 24 March 2020 to 20 June 2020 in the field of animal science, the College of Agricultural Engineering Sciences (University of Sulaimani), Bakrajo, Sulaimaniyah, Iraq. Twenty male Karadi lambs purchased from the local market in the Kurdistan region with an average live body weight of 23.27± 0.28 kg and 3-4 months old were used in this experiment. After 14 days adaptation period, lambs were identified by ear tags, weighted and were assigned

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randomly to four groups based on their initial live body weights and housed individually in pens (1 × 1.5 m^2) up to slaughters weight of either 28, 33, 38, 43kg. Lambs were vaccinated using COGIVAX (Vaccine) polyvalent inactivated vaccine against Clostridial infections, adjuvanted with aluminium hydroxide gel which was used at the beginning of the experiment. The lambs were injected to Ivermectin 2% against ectoparasite and endoparasites using at the start of the experiment and 14 days later repeated it by subcutaneous routes.

2. Management and nutrition system

Lambs were randomly allocated into four groups all the lambs were received clean water and the mineral block was available constantly. The experimental diet was prepared on the basis of the sheep's nutritional system using the Cornell net carbohydrates program and the sheep protein system (CNCPS sheep), Cannas *et al.* (2004) published detailed calculations, and 9.32 MJ/Kg DM and dietary protein for rising lambs was reported to be metabolizable energy for this analysis. This study used a ratio of 75% concentrate feed and 25% of wheat straw. All lambs are fed the equal daily feed (3% of body weight) as feeding stuffs twice a day (9:00 am and 3:00 pm). Tables 1 and 2 present the formulation and about the chemical composition of the concentrate diet. From the beginning to the end of the experiment, lambs were weighed once weekly and their daily feed intake and refusal were recorded.

Table 1. The proximate analysis of each ingredient of experimental feed.

Item	Soybean meal	Barley grain	Wheat Bran	Corn grain	Wheat Straw
DM, % of feed	87.97	91.55	90.37	87.99	90.0
CP, % of DM	51.74	9.83	14.84	8.72	4.1
NDF, % of DM	20.95	20.56	16.53	9.00	77.9
*NFC, % of DM	18.57	64.0	61.18	76.59	8.5
Fat, % of DM	1.7	2.1	4.2	4.5	1.7
Ash, %	7.04	3.51	3.25	1.19	7.8

***NFC (Non-Fiber Carbohydrates) were calculated according to the formular= 100-(%CP+%Ash+%Fat+%NDF).**

Table 2. The formulation and proximate analysis of experimental rations.

Diet Ingredients	Total (%)
Wheat Straw	24.91
Barley Grain Ground	43
Corn	10.56
Soybean Meal	10.8
Wheat Bran	2.85
Calcium Carbonate	1.6
Minerals and Vitamins Premix	1.7
Salt	0.8
Sodium Bicarbonate	3.78
Total	100
Chemical analysis experimental feeds %DM	
Crude Protein (CP)	13.8
Neutral Detergent Fiber (NDF)	35.8
Non-Fiber Carbohydrate (NFC)	37.1
Ash	12.7
Fat	2.2
Metabolizable Energy (MJ /Kg)	9.10
Concentrate: Roughage feed (wheat straw)	75 : 25

3. Chemical analysis of experimental feeds:

In terms of laboratory analysis, all feed samples were dried at 60°C for 48 hours to determine the DM content. Before chemical analysis, dried samples were milled with a 1 mm screen. Feed samples were combusted at 550°C for 6 h for determination of Ash content. Content of crude protein (CP) in feed samples was analyzed using the macro-Kjeldahl nitrogen test with a Kjeltec digester and Kjeltec System distilling unit (Tecator) after that the total nitrogen multiplied by 6.25 to calculated CP% in the feeds. The contents of Neutral Detergent Fiber (NDF) were calculated using Van Soest *et al.* (1991)'s basic method, but without heat-stable amylase and with sodium sulfite.

4. Animal slaughtering

After a 12-hour fasting with free access to water, animals were slaughtered when each lamb achieved its target weight of slaughter (28, 33, 38 or 43 kg). The lambs were slaughtered by cutting the throat and main arteries in the neck according to the Islamic way. The head was removed on the atlantooccipital joint, and the carpal and tarsal joints on the forehead and hind feet immediately after slaughter. The carcass was partially skinned on the floor before being hung in the racks by its hind legs to finish skinning. The evisceration took place immediately after skinning and hot carcass and non-carcass components such as cardiac fat, mesenteric fat, omental, and certain visceral organs (heart, lung, spleen, liver, trachea, testes, and kidneys) were weighed. The gastrointestinal tract was weighted, then drained of its contents, cleaned, and reweighed to simplify calculation of empty body weight by excluding the weight of the intestine content from the slaughter weight.

5. Carcass measurement

Hot carcass weight

Hot carcass weight was measured after slaughtering immediately on a portable electronic scale.

Cold carcass weight

Cold carcasses were measured by portable electronic scale after the carcasses were cooled at 4 °C for 24 hours. The fat tail was removed from the carcass, and around the vertebral column the carcass was divided in two sections. The left half has been cut into major (leg, loin, shoulder, and rack) and secondary cuts (neck, breast, foreshank and flank) and the weight is recorded and expressed in percentage of the weight of the chilled carcass. After that, the cuts were placed into polyethylene bags then closed tightly and stored in the freezer at(-18°C) until the physical dissection was performed. Fat thickness was measured by using an electronic Vernier device at the cross-section of the 12^{th} and 13^{th} ribs. Ribeye area (REA) was measured in square cm by a Plano meter from a tracing that was taken from the cut surface over the 13th ribs. Each cut of the left half carcass was dissected completely into three parts; lean, fat and bone. To assess their percentage, the three components were weighed separately.

Dressing percentage

Dressing percentage was calculated according to the following formula (Rouse *et al.*, 1970): for hot carcass weight (HCW), cold carcass weight (CCW) on slaughter body weight (SBW) and empty body weight (EBW)

$$\text{Dressing Percentage \%} = \frac{\text{HCW or CCW}}{\text{SBW or EBW}} \times 100$$

6. Sensory evaluation

The sensory test was conducted in the field of Animal Science, Dept. College of Agricultural Engineering Sciences, University of Sulaimani, seven semi-expert panellists were involved to evaluate the meat of the four groups. The evaluation included colour, flavour, juiciness, tenderness and overall acceptability (palatability) for longissimus dorsi (LD) muscle according to Griffin *et al.* (1985). The frozen meat sample from each group was thawed for 24 hr. in a refrigerator at 4ºC. The sample was then split into equal parts and wrapped in aluminum foil and oven-roasted for 45 minutes at 125°C (Griffin *et al.*, 1985).

The time of evaluating has set at eleven A.M. with having enough time between one evaluating and another just like (Lee *et al*., 1997) stated with necessary of drinking water between the evaluations. The evaluation was conducted according to the (Vesely, 1973).

7. Statistical analysis

All data were analyzed according to the statistical analysis system users guide XLSTAT (2016) for one-way analysis of variances. Separation among means was carried out by using Duncan's multiple range test (1955). The statistical model for the analysis of variance was:

$$Yij = \mu + Ai + eij$$

Where: Yij = observation j in different slaughter weight i of treatment groups A (j = 1,…..,5),
μ = overall mean, Ai = the effect of different slaughter weight groups i (i = 1,2,3,and 4), and
eij = random error associated with mean = 0 and variance δ 2e.

RESULTS AND DISCUSSION

Results:

1. Carcass characteristics

Table (3) shows the impact that slaughter weights have on carcass properties in male lambs of Karadi. On slaughter weight, hot carcass weight, and cold carcass weight, empty body weight, there was a significant difference ($p \leq 0.05$) among all treatments. The highest weights found in T4 but the lowest value has seen in T1. For the weight of gastrointestinal tracts content, dressing percentages based on hot carcass weight, hot dressing percentages on empty body weight, cold dressing percentages on empty body weight, and cold dressing percentages on slaughter weight, there are no significant differences across all treatments. T4 has the highest weights of hot, cold, and hot dressing percentages on slaughter weight and empty body weight, as well as cold dressing percentages on slaughter weight and empty body weight.

Table 3. Effect of different slaughter weight on carcass characteristics in Karadi male lambs (mean ±SE).

Carcass characteristics	T1	T2	T3	T4	sig
Slaughter weight (SW), Kg	27.93±0.40^{d}	33.13±0.13^{c}	38.13±0.53^{b}	43.27±0.27^{a}	*
Empty body weight (EBW), Kg	23.52±0.37^{d}	28.72±0.08^{c}	33.02±0.33^{b}	37.60±0.35^{a}	*
Hot Carcass weight (HCW), Kg	±0.31^{d}12.83	15.55±0.07^{c}	18.02±0.58^{b}	20.88±0.56^{a}	*
Cold Carcass weight (CCW), Kg	12.77±0.29^{d}	15.28±0.02^{c}	18.07±0.58^{b}	20.77±0.51^{a}	*
Gastro-intestinal tract contents, Kg	1.85±0.13^{a}	2.15±0.00^{a}	2.27±0.16^{a}	2.62±0.02^{a}	N. S
Hot dressing percentage/slaughter weigh	45.98±1.57^{a}	46.73±0.24^{a}	47.27±1.84^{a}	48.26±1.19^{a}	N. S
Hot dressing percentage /empty body weight	54.58±1.15^{a}	53.43±0.11^{a}	54.55±1.27^{a}	55.50±2.00^{a}	N. S
Cold dressing percentage /slaughter weight	45.75±1.51^{a}	46.13±0.23^{a}	47.28±1.83^{a}	±1.03^{a}47.49	N. S
Cold dressing percentage /empty body weight	54.31±1.09^{a}	53.22±0.09^{a}	54.55±1.27^{a}	55.26±1.85^{a}	N. S

Means with different superscripts letters within the row are significantly ($p \leq 0.05$) different. sig: significant, N.S: not significant

2. Carcass cuts

Table (4) summarizes the effect of slaughter weight (SW) on the percentage of major and secondary cuts in Karadi male lambs. There were no significant differences ($P>0.05$) in loin, leg, rack, breast, shoulder, flank and neck except a significant difference in foreshank between T1 and T3. The highest percentage of loin and breast were seen in T1 and T4. On the other hand, the highest percentage of the leg was found in T2 while the highest percentage rack, flank seen in T2 and T3. The highest percentage of the shoulder in T3. The highest percentage of foreshank in T1 and the highest percentage of the neck in T4. While the lowest percentage of loin and breast had seen in T2, T3. The lowest percentage of the leg in T4, rack and flank seen in T1and T4. The lowest percentage of the shoulder was found in T2 and the neck was found in T1 and the lowest percentage of fore shank seen in T3.

Table 4. Effect of different slaughter weight on the percentage of major and secondary carcass cut in Karadi male lambs (mean ±SE).

Whole cuts %	T1	T2	T3	T4	Sig
Loin	6.52±0.13^{a}	5.90±0.82^{a}	5.81±0.31^{a}	6.54±0.34^{a}	N. S
Leg	37.38±0.47^{a}	38.61±1.23^{a}	37.47±0.68^{a}	37.28±0.89^{a}	N. S
Rack	12.55±1.49^{a}	13.29±0.13^{a}	13.61±0.72^{a}	12.61±0.94^{a}	N. S
Breast	8.76±1.03^{a}	7.64±0.86^{a}	7.16±0.72^{a}	8.76±0.64^{a}	N. S
Flank	2.88±0.15^{a}	3.18±0.17^{a}	3.27±0.26^{a}	2.82±0.19^{a}	N. S
Shoulder	21.07±0.99^{a}	20.76±0.42^{a}	22.2 7±0.74^{a}	21.93±0.35^{a}	N. S
Foreshank	5.36±0.26^{a}	4.97±0.15^{ab}	4.69±0.17^{b}	4.92±0.16^{ab}	*
Neck	5.54±0.26^{a}	5.66±0.54^{a}	5.72±0.12^{a}	6.49±0.37^{a}	N. S

Means with different superscripts letters within the row are significantly ($p \leq 0.05$) different. sig: significant, N.S: not significant.

3. Physical dissection

In the present study, the effect of slaughter weight on physical dissection on major and secondary cuts in male Karadi lambs' results revealed that the percentage of lean, fat and bone in loin, leg, rack, breast and flank were not significantly($P> 0.05$) differences (Table 5). The percentage of fat and bone were differences among treatments in the shoulder cut. The highest percentage of fat in the shoulder was found in T2, but the highest percentage of bone was found in T3. While T1 and T4

were similar for both percentage of fat and bone in the same carcass cut.

The percentage of meat and fat were significantly (P≤ 0.05) differences among treatments in the foreshank cut. The highest percentage of meat in foreshank was found in T4. While T1 and T3 were similar to meat percentage in the foreshank cut, but the highest percentage of fat was found in T1 and it is the lowest in T2 and T3. Beside of T4 was the intermediate among treatment for fat percentage in foreshank cut. While the percentage of meat in the neck was significant differences (P≤0.05) among treatments, the highest value was found in T4, but the lowest value was noticed in T1. The greatest percentage of meat in the leg was found in (T4). The lowest percentage of meat in fore shank was found in (T1). The fatter part in the flank but the lowest percentage of fat in fore shank was found in (T2). The greatest percentage of bone in the foreshank was found in (T3), while the smallest percentage of bone in loin in the same treatment.

Table 5. Effect of slaughter weight on physical dissection on major and secondary carcass cut in Karadi male lambs (mean ±SE).

Items	Percentage%	T1	T2	T3	T4	sig
Loin	Meat	52.97±1.84^{a}	54.69±5.53^{a}	55.93±2.05^{a}	51.24±5.20^{a}	N. S
	Fat	21.86±3.43^{a}	16.92±3.21^{a}	24.08±4.22^{a}	20.70±5.00^{a}	N. S
	Bone	23.75±5.77^{a}	27.68±6.59^{a}	19.21±4.36^{a}	28.27±5.08^{a}	N. S
Leg	Meat	60.08±0.43^{a}	58.39±1.49^{a}	56.79±2.32^{a}	61.64±2.31^{a}	N. S
	Fat	14.76±1.27^{a}	18.564±1.41^{a}	17.75±0.37^{a}	17.53±2.47^{a}	N. S
	Bone	24.48±1.82^{a}	22.71±0.76^{a}	25.26±2.04^{a}	20.49±0.20^{a}	N. S
Rack	Meat	42.36±2.65^{a}	47.24±6.88^{a}	42.79±4.23^{a}	50.69±0.46^{a}	N. S
	Fat	22.26±5.35^{a}	27.31±6.66^{a}	22.46±1.24^{a}	19.01±4.20^{a}	N. S
	Bone	34.53±3.87^{a}	24.45±0.54^{a}	33.86±4.37^{a}	29.51±4.01^{a}	N. S
Breast	Meat	43.14±2.08^{a}	41.36±4.43^{a}	35.84±1.16^{a}	39.89±1.48^{a}	N. S
	Fat	30.16±2.50^{a}	37.82±1.43^{a}	30.98±5.31^{a}	38.66±3.58^{a}	N. S
	Bone	25.53±3.30^{a}	22.60±1.22^{a}	32.57±4.90^{a}	20.90±4.23^{a}	N. S
Flank	Meat	52.04±3.90^{a}	45.44±2.09^{a}	57.22±5.94^{a}	52.70±4.87^{a}	N. S
	Fat	46.87±3.35^{a}	54.18±2.41^{a}	42.34±5.97^{a}	47.18±4.75^{a}	N. S
	Bone	--------	--------	--------	--------	-------
Shoulder	Meat	56.53±1.61^{a}	61.47±2.55^{a}	58.70±2.72^{a}	62.38±1.67^{a}	N. S
	Fat	14.64±2.46^{ab}	17.00±1.65^{a}	9.32±1.36^{b}	12.60±2.22^{ab}	*
	Bone	27.89±3.33^{ab}	21.91±1.95^{b}	31.44±3.77^{a}	23.65±0.71^{ab}	*
Fore shank	Meat	41.00±1.56^{b}	45.70±2.02^{ab}	41.10±0.87^{b}	47.03±2.03^{a}	*
	Fat	9.75±0.18^{a}	4.68±1.61^{b}	5.80±1.44^{b}	7.23±0.75^{ab}	*
	Bone	48.13±1.70^{a}	49.70±3.20^{a}	52.73±0.99^{a}	45.23±3.20^{a}	N. S
Neck	Meat	46.82±3.31^{c}	51.75±1.56^{bc}	55.65±0.61^{ab}	59.68±1.94^{a}	*
	Fat	15.53±4.10^{a}	11.01±0.99^{a}	7.57±1.56^{a}	7.08±3.15^{a}	N. S
	Bone	35.90±0.29^{a}	36.66±1.37^{a}	35.66±0.53^{a}	32.41±2.34^{a}	N. S

Means with different superscripts letters within the row are significantly (p≤0.05) different. sig: significant, N.S: not significant

4. Ribeye area and fat thickness

In the current work, the effect of slaughter different weight on the rib eye area and fat thickness on male Karadi lambs was presented in Table (6). The result showed there was no significant (P>0.05) effect in the rib eye area among all treatments. The highest value has seen in T3, while the lowest value in T1. But fat thickness there were significant differences (p≤0.05) between T1 and T3. The highest value inT3 and the lowest in T1, while both treatments (T2 and T4) were not significant between themselves.

Table 6. Effect slaughter weight on the rib eye area and fat thickness in Karadi male lambs (mean ±SE).

Item	T1	T2	T3	T4	Sig
Ribeye area (cm^2)	4.82±0.553^{a}	5.08±0.586^{a}	5.76±0.306^{a}	5.71±0.321^{a}	N. S
Fat thickness (inch)	0.0433±0.007^{b}	0.070±0.007^{ab}	0.090±0.014^{a}	0.075±0.021^{ab}	*

Means with different superscripts letters within the row are significantly (p≤0.05) different. sig: significant, N.S: not significant

5. Sensory evaluation

Table (7) shows the results of a sensory evaluation of meat Karadi male lambs, which reported significant differences (p≤0.05) in sensory characteristics scores for both treatments (tenderness and juiciness). It seemed that T3 had a significantly higher score of tenderness (4.50) compared to T1 (3.00) and T2 (2.50), but T4 (3.50) was intermediate among other treatments. T3 had a higher juiciness score (3.83) compared to T2 (2.67), both treatments (T1 and T4) were similar in juiciness. While there were no significant effects in colour, flavour and overall acceptability. The largest values of colour and flavour had found in T4 and the overall acceptability highest score was seen in T3 and T4. The lowest score of colour was found in T3 while the smallest score of flavours showed in T2, and the lowest score of overall acceptability was found in T2.

Table 7. Effect of slaughter weight on sensory evaluation of Karadi meat male lambs (mean ±SE)

Items	T1	T2	T3	T4	Sig
Colour	3.17±0.31^{a}	3.00±0.37^{a}	2.67±0.42^{a}	3.33±0.49^{a}	N. S
Flavour	3.67±0.42^{a}	3.50±0.43^{a}	4.00±0.29^{a}	4.33±0.33^{a}	N. S
Tenderness	3.00±0.37^{b}	2.50±0.43^{b}	4.50±0.22^{a}	3.50±0.34^{ab}	*
Juiciness	3.00±0.37^{ab}	2.67±0.33^{b}	3.83±0.40^{a}	3.17±0.31^{ab}	*
Overall acceptability	3.83±0.30^{a}	3.17±0.40^{a}	4.17±0.40^{a}	4.17±0.48^{a}	N. S

Means with different superscripts letters within the row are significantly (p<0.05) different. sig: significant, N.S: not significant

Discussion

In this study, we found a significantly ($p \leq 0.05$) increase in empty body weight, hot carcass weight and cold carcass weight observed with increase slaughter weight. This result may be due to the negative correlation with the increase in slaughter weight. For the weight of gastrointestinal tracts content, dressing percentages based on hot carcass weight, hot dressing percentages on empty body weight, cold dressing percentages on slaughter weight, and cold dressing percentages on empty body weight, there are no significant differences across all treatments (Table 3). This result similar to the finding by (Vergara *et al*., 1999) reported that slaughter weight affects carcass weight whereas dressing percentages, based on slaughter weight and empty body weight, were not affected.

The result in Table (4) shows the percentage of major and secondary cuts in Karadi male lambs, there were no significant differences ($p>0.05$) except foreshank cut between T1 and T3. This result may be due to our calculations percentage for the cuts if it was based on weight, the result may be would be different. There is a significant difference ($p \leq 0.05$) in foreshank which is similar to finding of Aksoy and Ulutaş (2015), who showed that the significant ($p \leq 0.001$) increasing of carcass cuts weight with an increasing slaughter weight of Karayaka lambs. Another research by Lado Milton *et al* (2015) found that slaughter weight has an impact on slaughter traits and wholesale cuts. The proportion of wholesale cuts increased as slaughter weight increased.

The effect of slaughter weight on physical dissection on major and secondary cuts in male Karadi lambs' results showed that the percentage of lean, fat and bone in (loin, leg, rack, breast and flank) were no significant differences among treatments (Table 5). While the percentage of (fat and bone) in the shoulder, (meat and fat) in foreshank and meat in the neck were significantly differences ($p \leq 0.05$) among treatments.

The current study looked at the impact of slaughter weight on rib eye area and fat thickness in male Karadi lambs, and found no significant ($p>0.05$) differences in rib eye area across all treatments. Nevertheless, fat thickness there were significant differences ($p \leq 0.05$) between T1 and T3 (Table 6). This increase in fat thickness was attributed to an increase in slaughter weight (Cross, 1988), who reviewed objective methods for determining the composition of cattle and swine; ultrasound was found to be acceptable for measuring ribeye area and different fat thickness measurements. Rather than relying on time-consuming and costly progeny monitoring, breeders might pick young breeding cattle with less fat thickness and greater ribeye size in relation to weight. The increase in the fat depot with increasing slaughter weight indicates that targeting for heavier carcass weight in this breed would lead to fatter deposition. Our results are in agreement with the observation by (Das *et al.*, 2008) and (Prasad and Sinha, 1991).

The observation showed in Table (7) there were significant differences ($p \leq 0.05$) among treatments in sensory characteristics scores for both (tenderness and juiciness). It seemed that T3 had a significantly higher score of tenderness (4.50) which was significantly higher than T1 (3.00) and T2 (2.50). T3 had a higher juiciness score (3.83) compared with that of T2 (2.67). While there were no significant effects in colour, flavour and overall acceptability. This improvement in tenderness may be due to an increase in slaughter weight and this leads to increase muscle fibre and fat depots in carcasses (Solomon *et al*., 1980) observed crossbred lambs meat from the heavy slaughter weight group showed high juiciness than meat from lightweight lambs. In contrast, the studies by many authors Sañudo *et al*. (1996) and Santos-Silva and Portugal (2001) found that the carcass weight did not affect flavor and overall satisfaction but juiciness scores were slightly higher for heavier carcasses.

CONCLUSION

It was concluded that better slaughter weights for some carcass characteristics of Karadi male lambs such as empty body weight, hot and cold carcass weight were found in 38 and 43 kg or T3 and T4, respectively. The highest percentage of carcass cuts, some physical dissection for (meat and fat), fat thickness, sensory evaluation (tenderness and juiciness) was seen in optimal slaughter weights of both T4 and T3.

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تأثير أوزان الذبح المختلفة في بعض صفات الذبيحة والتقييم الحسي للحوم في ذكور الحملان الكرادي

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أجريت هذه الدراسة لتقييم تأثير أوزان الذبح في بعض الصفات الذبيحة والتقييم الحسي للحوم ذكور الحملان الكرادي. تم استخدام 20 ذكر من الحملان الكرادي بمتوسط وزن حي بدائي 23.27 ± 0.28 كجم وبعمر 3 - 4 أشهر في هذه التجربة. تم توزيع الحملان بشكل عشوائي على أربع مجموعات (خمسة حملان لكل مجموعة). تكون النظام الغذائي التجريبي من علف مركز 75٪ و25٪ من تبن القمح وتم تحضيره على أساس برنامج كورنيل صافي الكربوهيدرات ونظام البروتين لتربية الحملان. تم ذبح الحملان على الطريقة الإسلامية عند وصول كل حمل إلى وزن الذبح المحدد لها بأوزان 28 و33 و38 و43 كجم للمعاملات (المعاملة الاولى والثانية والثالثة والرابعة) على التوالي، بعد التصويم لمدة 12 ساعة، مع حرية الوصول إلى الماء. كان وزن عند الذبح (SW) ووزن الجسم الفارغ وأوزان الذبيحة الحار والبارد جميعها مختلفة معنوياً ($p\leq0.05$) بين جميع المعاملات. كان الفروقات معنويا ($p\leq0.05$) بين المعاملة الاولى والثالثة، بينما لم تكن الفروق بين المعاملة الثانية والرابعة معنوية. سجلت نتائج الفصل الفيزيائي للكتف لكل من (الدهون والعظام) والجزء الأمامي من (اللحوم، الدهون والعظام) فروق معنوية ($p\leq0.05$) بين المعاملات. وسجلت النسبة المئوية للحوم في الرقبة فروق معنوية ($p\leq0.05$) بين المعاملات. اختلفت نتائج تقييم سمك الدهن والتقييم الحسي لكل من (الطراوة والعصيري) معنويا ($p\leq0.05$) بين المعاملات. خلصت الدراسة إلى أن ذبائح الحملان الكرادي بأوزان تتراوح بين 38-43 كجم حسنت خصائص الذبيحة والفصل الفيزيائي وقطع الذبيحة وبعض صفات التقييم الحسي للحوم.