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# A Comparative Study on Growth, Carcass Traits and Tissue Distribution of Awassi and Hamdani Lambs

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**Abstract**
The present work was carried out at the Animal Farm, Collage of Agriculture, University of Salahaddin, where 10 weaned lambs (4-5 months old) from each of Hamdani and Awassi, and averaged 22.0± 0.25 and 23.1± 0.34 kg in weight, respectively were divided equally and randomly allocated to two slaughter groups (30 and 40 kg).Each group of lambs was kept in a separate pen and fed a concentrate diet at libitum containing 16.2% crude protein and 2637 k cal. Upon reaching the prescribed weight, each lamb was slaughtered and their carcass was evaluated.
Results revealed that Hamdani lambs surpassed significantly Awassi lambs in growth rate (0.348 vs. 0.307 Kg/ day), dressing percentage (47.97 vs. 46.59%) and percent of fat tail (15.20 vs. 12.15%). In contrast, it appears that Awassi lambs had thicker fat thickness, and their carcasses contain higher proportion of lean (+ 6.11%) and fat (+ 9.13%) and lower proportion of bone (-18.37%) as compared to Hamdani lambs. Also , as the weight at slaughter increased, there is a significant ( $p< 0.05$) decrease in average daily gain, an increase in rib eye area , fat thickness , lean and fat content and lower proportion of bone. The percent contribution of carcass, non-carcass and fat tail to the total body fat was 51.72, 2.63 and 45.63%, respectively.
**Keywords:** Growth, Carcass traits, Awassi, Hamdani, Lambs

## 1. Introduction

Sheep are considered the most important farm animals in Iraq, and the greatest portion of income comes from the sale of lambs. Nevertheless, their importance is further enhanced because they are the most suitable farm animals to the extensive area of arid and semi-arid lands of the country, as well as, the major source of livelihood for the rural inhabitants of these areas. Furthermore, sheep production in Iraq will continue to maintain its importance in the future due to increasing human population, and the increasing demand for meat production, particularly lamb and mutton (Juma and Alkass, 2000).
The economic usefulness of sheep in meat production would be enhanced by increased frequency and rate of reproduction, more efficient growth to heavier market weights and more desirable meat qualities (Dickerson *et al*., 1972). Thus, the production of heavier carcasses with acceptable quality for consumers could undoubtedly be advantageous for producers by providing higher profit from meat sales and for consumers by supplying more mature meat with better quality (Skapetas et al., 2006). However, in Iraq lamb is usually slaughtered between weaning and one year old .This procedure indicates that lambs are slaughtered under a wide range of body weights and fattening conditions, namely 30kg or less (light), 40kg (average) and 50kg or more (heavy). This situation is usually controlled by demand rather than following an efficient system for producing meat from lambs (Rashid et al, 1987).Therefore, optimal slaughter weight for each genotype, and its determination can help in obtaining carcasses of similar characteristics. Additionally, the commercial value of meat animal is determined by the carcass weight, proportion and distribution of carcass muscle, fat and bone and the proportion of expensive cuts. Therefore, the objective of the present study is to compare Awassi and Hamdani lambs slaughtered at a similar weights for their fattening performance, carcass trait and tissue distribution.

## 2. Materials and methods

### 2.1 Animals and management:

Ten entire weaned lambs (4-5 months old) from each of Hamdani and Awassi and averaged 22.0± 0.25 kg and 23.1± 0.34 kg in weight, respectively raised in the Aanimal Farm of the college of Agriculture, University of Salahaddin was used. After an adaptation period for 7 days, the lambs were weighed and randomly designated to prescribed slaughter weights at 30 and 40 kg.
Each group of lambs was kept in a separate pen and fed on a group bases. Concentrate was offered ad libitum, at 08.00 a.m. daily after quantifying and discarding the residue of the previous day. The concentrate mixture consisted of 40% barley, 33% wheat bran, 15% soybean meal, 10% corn and 2% vitamin and minerals and contained 16.2% crude protein and 2637 kcal energy. Clean water and mineral blocks were available constantly.

 

All lambs were weighed at weekly interval before feed is offered in the morning .

**2.2 Slaughtering the animals:**

The lambs were slaughtered when each of them was reached it's assigned slaughter body weight (30kg and 40 kg) following fasting for 18-h, with free access to water and weighed immediately prior to slaughter.

The animals were slaughtered in an experimental abattoir following the Islamic method by severing the throat and major blood vessels in the neck. Immediately after slaughter, the head was removed at the atlanto – occipital joint and fore and hind feet at the carpal and tarsal joints, respectively. Then the carcass was partially skinned on the floor and then hanged in the racks by hind legs and skinning was completed. Immediately after skinning, evisceration was carried out and the hot carcass and non carcass components including head, skin, feet and some visceral organs (spleen, liver, heart, lungs plus trachea, testes and kidney) were weighed.

Omental, mesenteric, kidney and pelvic fat and cardiac fat were separated and weighed. The digestive tract were removed and weighed, then empted of their content, washed, drained and weighed to facilitate the calculation of empty body weight.

**2.3 Carcass measurements:**

After chilling the carcasses at 4 C° for 24 hs, cold carcasses were weighed. The carcass was then split along the vertebral column into two halves using an electrical saw. The left half was cut into leg, loin, rack, neck, shoulder, breast, fore shank, and the fat tail. The weight of each cut was recorded and expressed as a percent of chilled carcass weight. Rib eye area was obtained by tracing the longissumus dorsi muscle (at $12^{th}$ rib) upon acetate paper and measured with planimeter (Tamaya Digitinizing Area-line meter), and the fat thickness over the midpoint of longissumus dorsi was measured with vernia. Each cuts of left half carcass was dissected completely into lean, fat and bone. The three components were weighed separately to determine their percentages.

**2.4 Statistical Analysis**

General Liner Model (SAS, 2001) was used to study the effect of breed, slaughter weight and their interaction on the studied traits.

Duncan multiple range test (1955) was also used to test the difference between the sub classes of each factor.

## 3. Results and discussion

**3.1 Growth performance**

The findings related to growth performance (initial and final weight ,fattening period and average daily gain in weight) of Awassi and Hamdani lambs slaughtered at two weight (30 and 40kg) are given in Table (1) .

In the present study, Hamdani lambs possessed significantly ($P<0.01$) higher daily gain (0.348±0.007) compared to Awassi lambs (0.307±0.005 g/day) (Table 1). The average daily gain obtained in the present study for Awassi and for Hamdani lambs is higher than those recorded earlier for Awassi lambs (Alkass et al.,1985;Alkass et al ., 1987; Rashid et al ., 1987; Al-Jaryan et al ., 1995) as well as for Hamdani (153.9 -281.0g/day) (Alkass and Juma (2005). Such result could be due to variation in the genetic make up as well as environmental conditions and feeding practice in particular.

Also, several authors found genetic variation among breeds for growth (Dickerson et al., 1972; Crouse et al., 1981; Godfrey and Weis, 2005). Lambs slaughtered at 40kg exhibited significantly ($P<0.05$) the lowest gain as compared to lambs slaughtered at 30kg (Table 1) .Such reduction in the gain is attributed mainly to deposition of fat tissues, and supported the findings reported earlier by Rashid et al .,(1987), Balci and Karakas (2007), Sefdeen and Alkass (2009). Fattening period for Hamdani and Awassi lambs are almost similar ($P>0.05$). However, it is obvious that lambs slaughtered at 40kg live weight will take longer time (55.60 days) to achieve the target weight compared to lambs slaughtered at 30kg live weight.

**3.2 Feed Conversion ratio**

Total feed intake required to produce one Kilogram live weight gain by Hamdani and Awassi lambs was almost the same either slaughtered at 30 kg (3.37 and 3.84) or 40 kg (4.75 and 4.78). Feed to gain ratio increased as slaughter weight increased from 30 to 40 kg. Such reduction mainly is attributed to the deposition of fat.

Similarly, Shelton and Carpenter (1972), Sents et al (1982) and Sefdeen and Alkass (2009) reported that feed efficiency declined with the increases in slaughter weight.

**3.3 Carcass characteristics**

In the present work, Hamdani had significantly ($P<0.01$) higher dressing percentage based on empty body weight (47.97± 0.46%) than Awassi (46.59± 0.85%) but not on the basis of slaughter weight (43.50 vs 43.17% ) (Table 2).This superiority of Hamdani lambs in dressing percentage based on empty body weight could be due mainly to the significantly ($P<0.01$) higher gastro-intestinal content of Awassi lambs (5.58±0.33%) as compared to Hamdani lambs (5.03± 0.33% ). Similarly, several authors found significant differences in dressing percentage among studied breeds (Alkass et al., 1987; Snowder et al., 1994; Cloete et al., 2004).

The dressing percentage of lambs slaughtered at 30kg is significantly ($P<0.01$) higher than those slaughtered at

 

40kg, based on either slaughter weight or empty body weight .This is possibly is due to significantly (P<0.01) higher gut content and weights of feet, lungs and testes in lambs slaughtered at 40%. Generally ,it was indicated earlier that dressing percentage usually tend to increase as weight increases (Sents et al ., 1980; Gohler ,1989; Askoy, 1995 ).However, our result is in accordance with the finding of Jeremiah et al .,(1997) who noticed that as slaughter weight increases, dressing percentage decreased.

Shrinkage averaged 4.54± 0.12% (Table 2) and the difference between studied breeds is not significant. Result also indicates that lambs slaughtered at 30kg possessed higher shrinkage percent (4.95± 0.15%) than lambs slaughtered at 40 kg (4.14 ±0.06%). Such finding is attributed mainly to the significantly (P<0.01) thicker subcutaneous fat for lambs slaughtered at a heavier weights (Table 2).

In the current investigation, rib eye area and fat thickness averaged 11.49 ± 0.34 $cm^2$ and 1.74 ±0.24 mm, respectively (Table 2).These values are within the range reported earlier for Awassi lambs (Alkass et al., 1987; Rashid et al ., 1987) and Hamdani lambs (Alkass and Juma ,2005). Results reveal that rib eye area of both Hamdani and Awassi are almost the same (11.47 vs 11.52 $cm^2$) (Table 2); but Awassi lambs laid significantly (P<0.01) higher subcutaneous fat over longissimus dorsi muscle than laid Hamdani lambs (2.00 vs 1.49 mm) (Table 2). This result is in accordance with those of Snowder et al (1994) who noticed a significant difference in fat thickness and not on rib eye area among Rambouillet, Targhee, Columbia and Polypay lambs. Carcass back thickness and rib eye area increased significantly (P<0.01) as slaughter weight increased (Table 2). Similarly, Rashid et al., (1987).Macit (2002), Balci and Karakas (2007) and Sefdeeen and Alkass (2009) reported that when the slaughter weight increased, the rib eye area was expanded and the fat was found to be thicker.

Comparison between the two studied breeds reveal that Hamdani lambs had a significantly (P<0.01) higher proportion of leg and fat tail than Awassi lambs. Conversely, Awassi lambs had a significantly (P<0.01) higher proportion of shoulder, neck, fore shank, flank and breast cuts (Table 3).These results are in agreement to those attained by Hopkins and Fogarty (1998) who found significant differences in carcass joint proportions in a study including Texel, Poll Dorset, Border Leicester and Merino sire breeds mated to Border Leicester x Merino and Merino ewes.

Lambs slaughtered at 40kg had significantly higher proportion of loin, rack, flank, breast and fat tail, and a significantly lower proportions of leg, neck and fore shank than those slaughter at 30 kg (Table 3). However, such changes reflect the different rates of maturity among the whole sale cuts previously reported by Palasson and Verges (1952) is that leg mature relatively early and the neck and loin are later maturity regions. Such changes are similar to those reported by Solomon et al., (1980) and Sents et al., (1982).

**3.4 Tissue distribution in the carcass**

The proportions of separable carcass tissues of cuts and carcass side of Hamdani and Awassi lambs slaughtered at 30 and 40kg live body weight are presented in Tables 4 and 5. It seems from Table (4) that lean percentage of Hamdani lambs surpass significantly Awassi lambs in leg, neck and rack cuts. On the other hand, the proportions of lean in the breast, fore shank and flank cuts were significantly higher in Awassi lambs. Lean percent is almost similar in shoulder and loin cuts. With the respect to percent fat in different cuts, results indicate that with the exception of breast and fore shank, the proportion of fat in the remaining cuts of Awassi lambs excelled those of Hamdani lambs. Also, with the exception of breast cut, the proportion of bone in all carcass cuts was significantly higher in Hamdani carcasses as compared to Awassi carcasses.

Although, the weight of carcass side are almost similar for Hamdani and Awassi lambs (P>0.05), it appear that the carcass of Awassi lambs contain higher proportions of lean(+ 6.15%) and fat (9.13%) but lower proportion of bone (- 18.37%) , as compared with Hamdani carcass ( Table 5 ). In the current work, no significant difference was found in lean : fat ratio between Hamdani and Awassi lambs ( 3.04 vs 2.98 ) ( Table 5 ), Whereas, a significant (P<0.01) difference in lean : bone ratio exist between Hamdani and Awassi lambs (1.88 vs 2.45 ) ( Table 5 ). Similarly, several investigators noticed breed differences in carcass composition (Makarechian et al., 1978; Taylor et al., 1980; Wolf, 1982). Additionally, muscle content varied according to its location in the carcass. For instance, the highest muscle content (59.59 %) was in the leg, whereas the lowest (45.97 %) was in the breast cut. The variation in muscle mass is primarily due to differences in the total number of muscle fibers. Possibly the evolutionary increase in muscle fiber size is limited by physiological status in that normal cell function is maintained only as long as a certain limit in cell size is not exceeded (Rehefeldt et al ., 2002).

As slaughter weight increases from 30 to 40 kg, the lean proportion increased either significantly (P<0.01) in the shoulder, loin and neck cuts or numerically in the leg and rack cuts. However, a decrease in lean percent was noticed in the flank and fore shank cuts. Such result could be attributed to the fact that muscle distribution is affected by the differential rate of growth in individual muscle and muscle groups on the carcass (Butterfield, 1988).The increase of weight at slaughter from 30kg to 40kg was associated with increases in fat content of all cuts in the carcass as well as the carcass side. It is well known that fat is a late growing body tissue and therefore proportions in the carcass greatly changed with the progress of growth (Butterfield, 1988). A significant (P<0.01) decrease in the proportion of bone was found of all cuts in lambs slaughtered at 40kg live weight compared to

 

those slaughtered at 30kg . It is known that bone is an early maturing carcass component so it grows at a slower rate during post - natal life, consequently decreasing with the increasing body weight (Marchial et al., 2003; Limea et al., 2009). In general, the proportion of lean and fat in the half carcass increased by 2.06 and 15.08%, respectively. This increase was associated in a decrease in bone content by 17.51% (Table 5). Several authors found that as slaughter weight increased, there is mainly an increase in fat and a decrease in bone proportion of the carcass (Al-Jaryan et al., 1995; Galvani et al., 2008; Sefdeen and Alkass, 2009).

From the results presented in (Table 5), It appears that although lean: fat ratio was higher for lambs slaughtered at 30kg compared to those slaughtered at 40kg (3.19 vs 2.83), however, the differences between them was not significant .While it seems that lean: bone ratio was increased ($P<0.05$) with the increases in live body weight at slaughter (1.96 vs 2.38). Since the proportion of bone is decreasing with increasing body weight, therefore, this result is expected.

**3.5 Partitioning of fat**

It is well established that fat is the most variable tissue in the carcass and it varies not only in its total amount but also its distribution between the various deposits which alter markedly during growth, and the proportions and location of the fat in the body are important in meat animals. Because of this variation in the quantity of fat laid down in different parts of the body, the percentage contribution is also differ between breeds. Therefore, it seems from ( Table 6 ) that the greatest part of the body fat in Hamdani lambs is deposited in fat tail (50.05 vs 41.22 % ) as compared with Awassi lambs, In contrast , Awassi lambs deposited most fat in the carcass (55.55 vs 47.40 % ) and non-carcass fat ( 3.21 vs. 2.04%) as compared to Hamdani lambs , . Kempster (1981) reviewed knowledge on fat partitioning in sheep and pointed out that it has been recorded by Hammond (1932) that sheep differed considerably in the manner in which they partitioned their body fat. The first suggestion that this difference of partitioning may be related to the environmental origin of breeds appear to have come from Palsson's (1940) report that mountain breeds partition more of their fat internally than other sheep. Also, Seebeck (1968) showed breeds differences in partitioning of fat, in that Merino had less subcutaneous fat than Dorset Horn- sire crossbred.

In the present study, it appears that body weight at slaughter affect the proportions of fat in sheep body in absolute terms. The increase in total body fat, carcass fat, non-carcass fat and fat tail for lambs slaughtered at 40 kg as compared with lambs slaughtered at 30kg was 32.8, 32.1, 55.8 and 32.5%, respectively. It is known that fat is a late growing body tissue and deposited at a different rate in various parts of the body, therefore proportions in the carcass greatly changed with progress of growth (Mahgoub et al., 2012) Thus it was noticed from the results given in Table (6) that the proportion contribution of only non-carcass fat increased as the slaughter weight increased. In general, Butter field (1988) concluded that relative to the growth of the total dissectible fat of Merino rams on high plane of nutrition ,the impetus pattern of inter muscular ,subcutaneous, carcass fat and non-carcass fat is low, average, low and high, respectively.

**4. Conclusion**

It can be concluded that differences in carcass traits and tissue distribution between the two studied breeds exist, and further studies to find the optimum slaughter weight for both breeds is needed.

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Table 1: Growth performance of Hamdani and Awassi lambs slaughtered at 30 or 40 body weight:

| **Trait** | **Overall mean** | **Breed (B)** | | **Slaughter wt. (kg) (S)** | | **Significance** | |
|---|---|---|---|---|---|---|---|
| | | **Hamdani** | **Awassi** | **30** | **40** | **(B)** | **(S)** |
| **No.** | 20 | 10 | 10 | 10 | 10 | ___ | ___ |
| **Initial wt. (kg)** | 22.55± 0.25 | 22.00± 0.25 | 23.10± 0.23 | 22.50± 0.40 | 22.60± 0.30 | * | n.s. |
| **Final wt. (kg)** | 35.24± 1.13 | 35.21± 1.67 | 35.28± 1.23 | 30.29± 0.08 | 40.20± 0.05 | n.s. | * |
| **Gain (kg)** | 0.328± 0.006 | 0.348± 0.007 | 0.307± 0.005 | 0.338± 0.005 | 0.317± 0.008 | ** | * |
| **Days to slaughter** | 39.30± 3.77 | 38.50± 5.34 | 40.10± 5.62 | 23.00± 0.84 | 55.60± 0.71 | n.s. | ** |

*P<0.05 ** p<0.01 n.s. = not significant

Table 2: Carcass characteristics of Hamdani and Awassi lambs slaughtered at 30 or 40 kg body weight:

| **Trait** | **Overall mean** | **Breed (B)** | | **Slaughter wt. (kg) (S)** | | **Significance** | |
|---|---|---|---|---|---|---|---|
| | | **Hamdani** | **Awassi** | **30** | **40** | **(B)** | **(S)** |
| **No.** | 20 | 10 | 10 | 10 | 10 | __ | ____ |
| **slaughter wt. (kg)** | 34.84± 1.13 | 34.86± 1.66 | 34.81± 1.61 | 29.91± 0.06 | 39.76± 0.07 | n.s. | ** |
| **Empty body wt. (kg)** | 32.08± 1.22 | 31.77± 1.82 | 32.38± 1.72 | 26.76± 0.17 | 37.39± 0.13 | ** | ** |
| **Hot carcass wt. (kg)** | 15.07 ± 0.45 | 15.18 ± 0.75 | 14.96 ± 0.53 | 13.14 ± 0.10 | 17.00 ± 0.17 | n.s. | ** |
| **Child carcass wt. (kg)** | 14.39± 0.44 | 14.50± 0.74 | 14.27± 0.53 | 12.48± 0.09 | 16.29± 0.16 | n.s. | ** |
| **Dressing % (1)** | 43.33 ± 0.28 | 43.50 ± 0.24 | 43.17 ± 0.52 | 43.92 ± 0.32 | 42.75 ± 0.40 | n.s. | ** |
| **Dressing % (2)** | 47.28 ± 0.50 | 47.97 ± 0.46 | 46.59 ± 0.85 | 49.08 ± 0.19 | 45.47 ± 0.54 | ** | ** |
| **Shrinkage %** | 4.54 ± 0.12 | 4.47 ± 0.15 | 4.62 ± 0.19 | 4.95 ± 0.15 | 4.14 ± 0.06 | n.s. | ** |
| **Rib eye area ( $cm^2$ )** | 11.49 ± 0.34 | 11.47 ± 0.57 | 11.52 ± 0.41 | 10.23 ± 0.25 | 12.76 ± 0.28 | n.s. | ** |
| **Fat thickness (mm)** | 1.74 ± 0.24 | 1.49 ± 0.46 | 2.00 ± 0.12 | 0.92 ± 0.27 | 2.57 ± 0.14 | ** | ** |

(1) Based on slaughter weight
(2) Based on empty body weight
*P<0.05 ** p<0.01 n.s. = not significant

 

Table 3: The effect of breed and slaughter weight on commercial cuts:

| **Trait** | **Overall mean** | **Breed (B)** | | **Slaughter wt. (kg) (S)** | | **Significance** | |
|---|---|---|---|---|---|---|---|
| | | **Hamdani** | **Awassi** | **30** | **40** | **(B)** | **(S)** |
| **No.** | 20 | 10 | 10 | 10 | 10 | ___ | ___ |
| **Neck** | 6.49± 0.12 | 6.53± 0.16 | 6.44± 0.18 | 6.73± 0.09 | 6.24± 0.19 | n.s. | ** |
| **Flank** | 5.30± 0.16 | 5.03± 0.18 | 5.58± 0.24 | 4.69± 0.08 | 5.92± 0.15 | ** | ** |
| **Fore shank** | 6.67 ± 0.24 | 6.25 ± 0.30 | 7.09 ± 0.32 | 7.65 ± 0.14 | 5.69 ± 0.15 | ** | ** |
| **Breast** | 7.58± 0.14 | 7.16± 0.20 | 8.00± 0.09 | 7.40± 027 | 7.75± 0.09 | ** | ** |
| **Leg** | 29.33 ± 0.59 | 30.84 ± 0.40 | 27.82 ± 0.80 | 30.98± 0.20 | 27.68 ± 0.88 | ** | ** |
| **Shoulder** | 13.72 ± 0.22 | 13.42 ± 0.20 | 14.20 ± 0.35 | 13.37 ± 0.10 | 14.07 ± 0.42 | * | n.s. |
| **Loin** | 7.59 ± 0.18 | 7.46 ± 0.12 | 7.72 ± 0.34 | 6.98 ± 0.10 | 8.20 ± 0.21 | n.s. | ** |
| **Rack** | 9.60 ± 0.36 | 8.25 ± 0.10 | 10.95 ± 0.37 | 9.19 ± 0.26 | 10.02 ± 0.67 | ** | ** |
| **Fat tail** | 13.68 ± 0.45 | 15.20 ± 0.37 | 12.15 ± 0.45 | 12.95 ± 0.65 | 14.40 ± 0.56 | ** | * |

*P<0.05 ** p<0.01 n.s. = not significant

Table 4: The effect of breed and slaughter weight on physical dissection of half carcass of lambs:

| Trait | Overall mean | Breed (B) | | Slaughter wt. (kg) (S) | | Significance | |
|---|---|---|---|---|---|---|---|
| | | Hamdani | Awassi | 30 | 40 | (B) | **(S)** |
| No. | 20 | 10 | 10 | 10 | 10 | ___ | ___ |
| Carcass side wt. (kg) | 6.95± 0.22 | 7.12± 0.41 | 6.77± 0.18 | 6.15± 0.08 | 7.74± 0.26 | n.s. | ** |
| Lean % | 55.16± 0.76 | 53.41± 1.09 | 56.91± 0.77 | 54.58± 1.05 | 55.23± 1.12 | ** | n.s. |
| Fat % | 18.66 ± 0.61 | 17.80 ± 0.61 | 19.59 ± 1.01 | 17.17 ± 0.37 | 20.22 ± 0.98 | * | ** |
| Bone % | 26.15± 0.88 | 28.79± 0.97 | 23.50± 0.88 | 28.25± 0.95 | 24.04± 1.18 | ** | ** |
| Lean : Fat ratio | 3.01 ± 0.11 | 3.04 ± 0.16 | 2.98 ± 0.17 | 3.19 ± 0.11 | 2.83 ± 0.19 | n.s. | n.s. |
| Lean : Bone ratio | 2.17 ± 0.10 | 1.88 ± 0.10 | 2.45 ± 0.11 | 1.96 ± 0.10 | 2.38 ± 0.15 | * | * |

*P<0.05 ** p<0.01 n.s. = not significant

Table (5) Proportions of separable carcass tissues of cuts for Hamdani and Awassi lambs slaughtered at different weights (Mean ± S.E).

| Trait | | Overall mean | Breed (B) | | Slaughter weight (kg) (S) | | Significance | |
|---|---|---|---|---|---|---|---|---|
| | | | Hamdani | Awassi | 30 | 40 | (B) | (S) |
| Leg | Lean % | 59.59 ±0.68 | 61.10±1.03 | 58.08±0.63 | 58.82±0.51 | 60.36±1.25 | * | n.s. |
| | Fat % | 16.68±0.83 | 13.77±0.83 | 19.60±0.64 | 15.16±1.13 | 18.21±1.08 | ** | ** |
| | Bone % | 23.71±0.77 | 25.11±1.38 | 22.30±0.40 | 26.00±1.08 | 21.41±0.42 | ** | ** |
| Breast | Lean % | 45.97 ±1.15 | 42.25± 0.68 | 49.69± 1.44 | 45.41 ±1.59 | 46.54± 1.73 | ** | n.s. |
| | Fat % | 30.47± 1.32 | 34.30 ±1.07 | 26.63 ±1.73 | 29.52 ±1.95 | 31.41 ±1.85 | ** | n.s. |
| | Bone % | 23.75± 0.68 | 23.84± 0.96 | 23.66 ±1.03 | 25.46 ±0.96 | 22.04± 0.64 | n.s. | ** |
| Neck | Lean % | 52.83±1.50 | 58.80±1.06 | 46.86±0.72 | 51.40±1.66 | 54.26±2.51 | ** | ** |
| | Fat % | 21.79±1.84 | 14.37±1.14 | 29.20±0.93 | 19.59±2.72 | 23.99±2.42 | ** | ** |
| | Bone % | 25.37±1.06 | 26.82±1.87 | 23.92±0.88 | 28.99±1.22 | 21.74±0.60 | ** | ** |
| Rack | Lean % | 46.90±1.30 | 49.05±1.99 | 44.76±1.50 | 46.32±1.26 | 47.49±2.35 | ** | n.s. |
| | Fat % | 27.21±1.14 | 23.95±0.77 | 30.48±1.59 | 24.75±0.95 | 29.67±1.80 | ** | ** |
| | Bone % | 25.88±1.07 | 27.16±2.07 | 24.61±0.46 | 29.08±1.43 | 22.68±0.72 | * | ** |

*P<0.05 ** p<0.01 n.s. = not significant

 

Table (5) Continued.

| Trait | | Overall mean | Breed (B) | | Slaughter weight (kg) (S) | | Significance | |
|---|---|---|---|---|---|---|---|---|
| | | | Hamdani | Awassi | 30 | 40 | (B) | (S) |
| Shoulder | Lean % | 52.33±0.55 | 52.07±0.64 | 52.59±0.92 | 50.61±0.44 | 54.04±0.65 | n.s. | ** |
| | Fat % | 27.80±0.68 | 25.63±0.86 | 29.97±0.42 | 27.37±1.19 | 28.22±0.71 | ** | n.s. |
| | Bone % | 19.86±0.79 | 22.28±0.92 | 17.43±0.71 | 22.00±0.93 | 17.72±0.88 | ** | ** |
| Loin | Lean % | 54.66± 0.57 | 55.02±0.93 | 54.31± 0.71 | 53.22± 0.73 | 56.11± 0.63 | n.s. | ** |
| | Fat % | 22.34 ±0.37 | 21.39±0.39 | 23.29± 0.49 | 21.78± 0.54 | 22.91± 0.47 | ** | n.s. |
| | Bone % | 22.98 ±0.59 | 23.57±0.94 | 22.39 ±0.74 | 24.99± 0.53 | 20.97 ±0.57 | n.s. | ** |
| For shank | Lean % | 59.29 ±1.41 | 54.24± 1.32 | 64.34± 0.98 | 60.15± 0.96 | 58.43 ±2.69 | ** | n.s. |
| | Fat % | 13.14± 1.13 | 15.14± 2.08 | 11.14± 0.44 | 9.69± 0.39 | 16.59± 1.61 | ** | ** |
| | Bone % | 27.60 ±1.03 | 30.60± 0.93 | 24.60± 1.26 | 30.23± 1.12 | 24.97 ±1.30 | ** | ** |
| Flank | Lean % | 62.69± 0.77 | 65.39± 0.73 | 60.00± 0.61 | 63.93± 1.09 | 61.46 ±0.99 | ** | ** |
| | Fat % | 37.30± 0.77 | 34.61± 0.73 | 39.99± 0.61 | 36.07± 1.09 | 38.54 ±0.99 | ** | ** |

*P<0.05 ** p<0.01 n.s. = not significant

Table 6: Effect of breed and slaughter weight on fat partitioning expressed as a percent of body weight:

| Trait | Overall mean | Breed (B) | | Slaughter wt. (kg) (S) | | Significance | |
|---|---|---|---|---|---|---|---|
| | | Hamdani | Awassi | 30 | 40 | (B) | (S) |
| No. | 20 | 10 | 10 | 10 | 10 | ____ | _____ |
| Total fat(kg) | 5.06± 0.25 | 5.32± 0.37 | 4.81± 0.32 | 4.07± 0.10 | 6.06± 0.18 | ** | ** |
| Carcass fat % | 51.72± 1.22 | 47.90± 1.51 | 55.55± 0.87 | 52.06± 2.13 | 51.39± 2.13 | ** | n.s. |
| Non carcass fat% | 2.63± 0.18 | 2.04± 0.22 | 3.21± 0. 15 | 2.24± 0.28 | 3.02± 0.18 | ** | ** |
| Fat tail % | 45.63± 0.12 | 50.05± 1.44 | 41.22± 0.85 | 45.69± 1.57 | 45.57± 2.15 | ** | n.s. |

*P<0.05 ** p<0.01 n.s. = not significant