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Effect of slaughter age on carcass characteristics and meat quality of Barind lamb

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Abstract

The study was undertaken aiming to study the effect of age on carcass traits and meat quality of Barind sheep of Bangladesh. Ninety six male lambs were reared by 16 farmers at two upazila namely Paba and Godagari in Rajshahi district. Lambs were slaughtered at 6 (T_1), 9 (T_2) and 12 (T_3) month's age. Each farmer kept 6 lambs (Two lambs for each 3 age category). Four types dressing percentages were measured; DRSWIEO (on the basis of slaughter weight and hot carcass weight including edible offal), DRSWEXEO (on the basis of slaughter weight and hot carcass weight excluding edible offal), DREMIEO (On the basis of empty body weight and hot carcass weight including edible offal) and DREMIEO (On the basis of empty body weight and hot carcass weight excluding edible offal). All lambs received maternal milk and a supplementation of commercial concentrate @ of 1.5% of live weight up to slaughter and allowed to graze for 8 hours a day on natural grassland. The Redness (a) was more (18.80±0.06) in 12 month's lamb and Yellowness (b) was higher (10.17±0.06) in 6 month's lamb. Ultimate pH (pH_u) varied significantly among age groups and it was lowest (5.62±0.01) at 6 month and highest at 9 month. Drip loss (DL) was highest on young and lowest in aged lambs. Dry matter (DM) and Crude protein (CP) both were varied significantly ($p<0.05$) in age groups showing highest DM (27.64±0.06%) and CP (23.61±0.03%) in young (6 month of age) lambs for both attributes. Minerals (Ash) was highest (0.89±0.06%) in aged (12 month of age) group and lowest (0.78±0.01) in young (6 month of age) and it was differed significantly ($p<0.01$) among treatments. Cooking loss (CL) and Ether extract (EE) were not differed ($p>0.05$) among treatments. The panel of examiners was attracted more to the color of aged lambs (12 month of age) and acquiring number (4.43±0.03) was varied significantly ($p<0.01$) among ages. Flavor was varied significantly ($p<0.05$) among ages tended to secure more point for 9 month lambs. Overall acceptability was differed significantly ($p<.01$) among ages and meat of 9 month lamb showed highest (4.57±0.03) acceptance.

Introduction

Sheep are predominantly raised for meat production in Bangladesh. For humans, meat is the most essential source of animal protein. In Bangladesh 61.6 percent of total need of animal protein is from livestock. Sheep provided 1.15 percent of total meat in Bangladesh, with 12.02 thousand metric tons of meat produced annually (DLS, 2021). Sheep has a major share of the animal protein industry, although meat quality is affected by a variety of factors. Several factors, such as species, gender, growth rate and maturation, diet, genetic factors, disease status, medication and hormone use, rearing conditions, temperature, relative humidity, and general husbandry practices have direct and indirect effects on meat quality (Hashem et al., 2013; Hossain et al., 2021a and 2021b; Moniruzzaman et al., 2002; Rana et al., 2014; Baset et al., 2003; Sarkar et al., 2008; Sun et al., 2020), resulting in changes in meat consumption or marketing. Meat quality and price are affected by carcass weight. Market globalization has resulted in increased economic integration, but it has also enforced the necessity to meet quality standards in order to meet customer demands. To meet consumer demands and remain competitive in the global market, the meat industry and sheep producers must adhere to particular quality requirements. It is vital to understand the various elements that can influence the primary qualities of meat and carcass quality in this context. Age, sex (Horcada et al., 1998), (Barone et al., 2007), breed (Crouse et al., 1981) and feed type (Hopkins & Fogarty, 1998) have all been found to affect carcass weight, conformation, fat content, and pH, texture, instrumental color, and nutritional composition. The carcass composition and meat quality of rams and castrated rams (Dransfield et al., 1990), lambs goats (Zygoyiannis et al., 1999) are strongly influenced by slaughter age.

Consumers demand meat that is more lean, has less fat (the minimum amount of fat required to retain juiciness and flavor), and is of consistent quality. Changes in meat quality features have an impact on meat quality and consumer acceptance. Consumer preferences for a particular carcass weight vary by area and are influenced by local breed features, as well as traditional culinary and production methods. It is well known that lamb fat increases with weight, both in terms of carcass fat percentage and fat depths (Fourie et al., 1970) and that those lambs reaching a higher mature weight will be less fat at any given weight because they are at a lower proportion of their mature weight (Fourie et al., 1970; Kempster & Cuthbertson, 1977; Wood et al., 1980). However, the causes of fat differences between lambs of the same sex and weight are less obvious. A related unresolved subject of importance to lamb production is the extent to which meat quality attributes, particularly meat tenderness, shift up to the age of the animal, which is around 12 months. Some studies have reported significant tenderness declines (Devine et al., 1993; Jeremiah et al., 1998), while others have found no improvement or increased age-related tenderness (Devine et al., 1993;Jeremiah et al., 1998; Kirton et al., 1974). In light of the foregoing, the current study was conducted to determine the effect of age on carcass characteristics, wholesale lamb cuts, and to assess how physicochemical and sensor attributes affect meat quality in Barind sheep, which may influence consumer satisfaction and profit of the producer.

Materials and Methods

Animals and their management

The experiment to realize the suitable age of slaughtering of Barind sheep was conducted at Paba and Godgari Upazila under Rajshahi district of Bangladesh. Ninety six Barind region's new born male kids of 16 farmers (8 from each Upazila) were taken under this experiment.

Every farmer was assigned for rearing 6 lambs (aimed to 2 lambs were slaughtered at 6 month of age, 2 lambs at 9 month and 2 lambs at 12 month of age). All kids were reared under common protocol in view of feeding. Every kid was allowed 20 g concentrate/day from 2 weeks of age each in a weekly increment of 10 g/lamb/day until 8 weeks of age. Weaning was applied at 8 weeks and lambs of all 3 categories were allowed 1.5% concentrate mixture (18% CP, 12 MJ energy on DM basis) on the basis of their live weight up to slaughter. After 2 weeks of age kids were allowed to graze 8 hours every day.

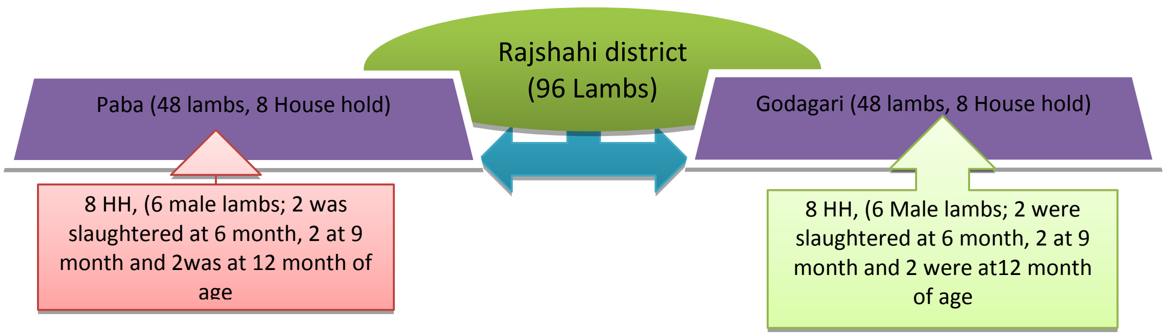

Fig. I. Distribution of experimental animal.

They were housed in well ventilated slated floor. Four sides of the tin roofed house were encircled with wire made net. All sheep were marked by ear-tagging. Before the start of the experiment, the sheep were dewormed against internal and external parasites at 1 month first with the injection of ivermectin as prescribed by the manufacturer and it was continued till to the end of the experiment giving 2 months interval. All lambs were vaccinated firstly for PPR disease at 2 months of age followed by booster dose at 6 months of age. Body weight changes of the kids were monitored fortnightly up to slaughtering and after taking weight fortnightly required amount of concentrate calculated and offered to the animal for next 15 days.

Concentrate feed

All sheep under experiment were allowed for grazing on natural pasture for eight hours daily in grazing system (T_1). The other (stall feeding) group (T_2) was offered green grass at a level of 15% of their live body weight. Both groups were allowed 1.5% concentrate of their live weight. The composition of the concentrate supplied from 4thweek of the age is presented in Table 1.

Table 1.The composition of the concentrates offered as supplementation to

Experimental lambs.

Ingredients (As fed)	Percentage
Crushed maize	20
Khasari bran	20
Soybean meal	26
Wheat bran	22
Rice polish	10
Vitamin mineral premix	0.5
DCP	0.5
Salt	1
CP	18
ME (MJ/kg DM)	12

The concentrate mixture was offered twice a day at 7:00-8:00 am and 4:00-6:00 pm into two equal halves before and after grazing respectively. Experimental sheep had free access to clean water**.**

Slaughtering of experimental animals

At the end of the trial, the animals of three age categories (6 month, 9 month and 12 month) were slaughtered and processed according to routine slaughter house procedures. Animals tended for slaughter were fasted for 12 hours with free access to water, weighed and slaughtered following Islamic rituals by serving the jugular vein, trachea and the esophagus. Feed was withheld overnight. The weights of fresh non-carcass organs and the hot carcass were immediately recorded.

Data collection

Following data from lambs of three categories (6 months, 9 months and 12 months) of different carcass traits, Physicochemical and sensory evaluation parameters were recorded. Longissimus dorsi muscle was used for physicochemical analysis and sensory evaluation. Collected data was coded after ending of data collection and then compiled, tabulated and analyzed through SPSS-v-23 computer package program.

Results

Effect of age on carcass traits of Barind lambs

Irrespective of sex, results of carcass traits on age of Barind lambs are shown in Table 2. There were 4 types of dressing percentage calculated; DRSWIEO, DRSWEXEO, DREMIEO and DREMIEO. Slaughter weight was highest of lamb of 12 months of age. Due to heavy carcass, Empty body weight, Hot carcass weight including edible offal and Hot carcass weight excluding edible offal were highest in aged lamb and the variation among treatments was highly significant (p.001). Showing insignificant ($p>0.05$) variation, dressing percentages were increased with the advancement of age. The DRSWIEO was 45.82±0.86, 46.71±0.67 and 47.38±1.17% on treatments T_1, T_2 and T_3 respectively. DRSWEXEO was 41.06±0.76, 42.17±1.63 and 42.49±1.08%, DREMIEO was 56.23±0.06, 57.32±0.83 and 58.15±1.44% and DREMIEO was 50.39±0.94, 51.75±0.77 and 52.14±1.33 on treatment T_1, T_2 and T_3 respectively. Consequent of heavy slaughter and hot carcass weight; hot carcass weight including edible offal (HCWIEO)**,** hot carcass weight excluding edible offal (HCWEXEO) the weight of different carcass parts varied significantly among the age of the lambs. Excluding Lung % ($p<0.05$) there was no any other proportionate of the carcass part varied significantly ($p>0.05$) among treatments.

Table 2. Effect of different slaughter age on carcass traits of Barind region's lamb

Parameters	Ages				Significance level
	6 month (T_1) n=21	9 month (T_2) n=33	12 month (T_3) n=23	**Overall N=77**	
Slaughter wt. (kg)	10.51±0.29	13.41±0.40	14.46±0.71	12.93±0.31	**
Empty wt. (kg)	8.52±0.24	10.85±0.32	11.65±0.59	10.45±0.25	**
HCWIEO	4.84±0.18	6.25±0.23	6.97±0.47	6.08±0.18	**
HCWEXEO	4.33±0.17	5.65±0.22	6.25±0.43	5.47±0.17	**
DRSWIEO (%)	45.82±0.86	46.71±0.67	47.38±1.17	46.67±0.48	NS
DRSWEXEO (%)	41.06±0.76	42.17±0.63	42.49±1.08	41.96±0.44	NS
DREMIEO (%)	56.23±0.06	57.32±0.83	58.15±1.44	57.27±0.59	NS
DREMEXEO (%)	50.39±0.94	51.75±0.77	52.14±1.33	51.50±0.54	NS
Blood (kg)	0.44±.04	0.62±0.04	0.63±0.08	0.58±0.03	*
Blood%	4.06±0.39	4.78±0.29	4.74±0.62	4.57±0.22	NS
Head (kg)	0.87±0.02	1.06±0.04	1.12±0.08	1.02±0.03	**
Head%	8.29±0.15	7.86±0.14	7.76±0.16	7.94±0.09	NS
Skin (kg)	0.94±.03	1.18±0.03	1.20±0.05	1.12±0.03	**
Skin%	8.97±0.35	8.84±0.22	8.14±0.32	8.67±0.17	NS
Pluck (kg)	0.48±0.02	0.56±0.02	0.65±0.03	0.56±0.01	**
Pluck%	4.54±0.12	4.16±0.11	4.43±0.15	4.35±0.08	NS
Heart (kg)	0.05±00	0.06±00	0.07±0.01	0.06±00	**
Heart%	0.50±0.02	0.46±0.01	0.49±0.03	0.48±0.01	NS
Lung (kg)	0.15±0.01	0.17±0.01	0.20±0.01	0.17±00	**
Lungs%	1.44±0.06	1.27±0.03	1.29±0.06	1.33±0.03	*
Liver (kg)	0.26±0.01	0.31±0.01	0.35±0.02	0.31±0.01	**
Liver%	2.48±0.08	2.26±0.07	2.37±0.12	2.35±0.05	NS
Spleen (kg)	0.03±00	0.04±00	0.05±00	0.04±00	**
Spleen%	0.31±0.02	0.30±0.02	0.31±0.02	0.31±0.01	NS
Kidney (kg)	0.05±00	0.07±00	0.09±0.01	0.07±00	**
Kidney%	0.47±0.05	0.50±0.03	0.58±0.03	0.52±0.02	NS
Shoulder (kg)	0.87±0.03	1.15±0.05	1.25±0.11	1.10±0.04	**
Shoulder%	8.30±0.15	8.34±0.17	8.14±0.30	8.27±0.11	NS
Leg (kg)	1.52±0.06	2.05±09	2.17±0.17	1.94±0.07	**
Leg%	14.54±0.30	14.76±0.31	14.23±0.47	14.54±0.20	NS
Loin (kg)	0.34±0.02	0.48±0.02	0.55±0.05	0.46±0.02	**
Loin%	3.30±0.14	3.47±0.14	3.66±0.20	3.48±0.09	NS
Neck (kg)	0.49±0.02	0.66±0.04	0.73±0.08	0.63±0.03	**
Neck%	4.69±0.08	4.77±0.14	4.78±0.23	4.75±0.09	NS
Rack (kg)	1.02±0.06	1.37±0.07	1.53±0.15	1.32±0.06	**
Rack%	9.83±0.53	9.78±0.25	9.87±0.46	9.82±0.23	NS
Digestive tract (kg)	3.01±0.11	3.94±0.14	4.35±0.23	3.81±0.11	**
Digestive tract%	28.37±0.75	28.81±0.43	28.96±0.66	28.73±0.34	NS

**p<.01, *p<0.05, NS= Non-significant

Effect of age on physicochemical characteristics and sensory evaluation

Results of physicochemical and sensory analysis of lamb meat of different age are interpreted in Table 3.

Table 3. Effect of age on physicochemical characteristics and sensory evaluation in meat

Parameters	Age				Significance level
	6 month (T_1) n=21	9 month (T_2) n=33	12 month (T_3) n=23	Overall n=77	
L(Lightness)	49.93±0.20	49.39±0.10	49.16±0.10	49.46±0.16	NS
a (Redness)	16.61±0.07	17.16±0.09	18.80±0.04	17.50±0.12	**
b (Yellowness)	10.17±0.06	7.08±0.17	9.72±0.08	8.71±0.20	**
Ultimate pH	5.62±0.01	5.91±0.02	5.91±0.02	5.83±0.03	**
CPH	5.91±0.02	6.09±0.01	6.034±0.02	6.02±0.02	NS
Drip loss	2.52±0.07	2.09±0.04	1.63±0.06	2.07±0.08	**
Cooking loss	28.93±0.63	30.80±0.64	32.78±0.33	30.89±0.56	NS
DM	27.64±0.06	27.17±0.10	26.75±0.09	27.17±0.09	*
CP	23.61±0.03	23.48±0.04	23.15±0.04	23.42±0.04	*
EE	3.81±0.01	3.77±0.02	3.78±0.03	3.78±0.02	NS
Ash	0.78±0.01	0.86±00	0.89±00	0.84±0.01	**

**p<.01, *p<0.05, NS= Non-significant

The meat of young (6 months) lamb was insignificantly (p>0.05) lightest. The recorded redness (a) and yellowness (b) differed high significantly (p<.01) among treatments. The redness (a)was more (18.80±0.04in 12 months lamb and yellowness (b) was higher (10.17±0.06)in 6 months lamb than any other two. pHu varied significantly among age groups and it was lowest (5.62±0.01)in treatment T_1 and highest in T_2. DL was differed significantly (p<.01) in the treatments presenting highest result on T_1 (2.52±0.07) and lowest in T_3 (1.63±0.06). DM and CP both were varied significantly (p<0.05) in age groups showing highest (DM=27.64±0.06 and CP=23.61±0.03) result in young (6 month of age) lambs for both attributes. Minerals (Ash) was highest (.89±.06) in aged (12 month of age) group and lowest (0.78±0.01) in young (6 month of age) and it was differed significantly (p<.01) among treatments. Cooking pH (CpH), CL and Ether extract (EE) were not differed (p>0.05) among treatments.

Effect of age on Sensory evaluation of lamb meat

Result of sensory analysis of lamb meat at different ages is shown in Table 4. The panel of examiners was attracted more to the color of aged lambs (12 month of age) and acquiring number (4.43±.24) was varied significantly (p<.01) among ages. Flavor was varied significantly (p<0.05) among ages tended to secure more point for 9 months lambs. Overall acceptability was differed significantly (p<.01) among ages and meat of 9 months lamb showed highest (4.57±.23) acceptance. There were no significant (p>0.05) variation noticed in tenderness and juiciness among different age groups.

Table 4. Sensory evaluation of lambs of different ages

Parameters	Age				Significance level
	6 month (T_1) n=21	9 month (T_2) n=33	12 month (T_3) n=23	6 month (T_1) n=21	
Color	3.94±0.03	4.05±0.02	4.43±0.03	4.13±0.04	**
Flavor	3.40±0.01	4.46±0.05	4.37±0.04	4.30±0.04	*
Tenderness	4.30±0.05	4.26±0.03	4.06±0.01	4.21±0.03	NS
Juiciness	4.19±0.04	4.41±0.05	4.01±0.01	4.23±0.04	NS
Overall acceptability	4.11±0.02	4.57±0.03	4.44±0.02	4.40±0.03	**

**p<.01; *p<0.05, NS= Non-significant

Discussion

Carcass weight and dressing%

Slaughter weight was highest at 12 month of age lamb. The result was disagreed with the findings of (Cifuni et al., 1999). They stated that carcass yield decreased at a higher slaughter ages. On the other hand the present result was consistent with the observation of Solomon et al., (1980) who reported higher dressing percentages and quality grades in older lambs. Solomon et al., (1980) and (Cifuni et al., 1999) in their study observed that younger lambs were not functional as ruminants whereas older lambs were, thus reducing their carcass yield. D'alessandro & Martemucci (2013) observed that the carcass weight of the lambs was affected by the slaughter age only in the spring (P < 0.01). They also mention that the carcass weight of the lambs was heavier in the spring in comparison with the winter (P < 0.01). Despite the differences found in the carcass weights, the dressing percentages were not affected (P > 0.05) by the slaughter season or the slaughter age of the lambs which was inconsistent with this findings. Skapetas et al., (2006) observed highest dressing percentage at the slaughter age of 45 days, with a decrease at 60 days and a further increase at 75 and 90 days of age. These findings were attributed to the highest growth rate of lambs at 45 days of age, which decreases at 60 day due to the weaning stress that usually decreases the weight gains. The observation of them was completely disagreed with present observation. Vergar et al., (1999) showed that dressing percentage in the medium weight group was higher (p < 0.01) than in the light group. Santos-Silva & Portugal (2001) observed that the effect of hot carcass weight (HCW) was significant for all carcass traits. All variables showed linear relationships with HCW. The result was completely supported by present research. Cifuni et al., (1999) observed that first grade wholesale cuts (rack, loin and leg) were not significantly (p>0.05) affected by age at slaughter and percentage of second grade cuts; shoulder and neck decreased with the advancement of age. The findings of the present study were completely consistent for first grade cuts and inconsistent for second grade cuts. He also mentioned that shoulder was greater (p<0.01) in young animals but the observation was differed with present result where shoulder did not differed (p>0.05) among groups. (D'alessandro & Martemucci (2013) observed that in winter aged (60 days) lambs had higher percentages of neck (P < 0.05), shoulder (P < 0.01) and loin (P < 0.01) in comparison with young lambs (45 days of age). The slaughter age markedly had influenced the carcass proportion of the commercial cuts of lambs slaughtered in the winter; in fact, compared to lambs of 45 days of age, those of 60 days had higher percentages of neck (P < 0.05), shoulder (P < 0.01) and loin (P < 0.01). In their study in the spring, the differences due to the slaughter age were observed for the proportions of shoulder and leg, which were greater (P < 0.01) in 60-day and 45-day lambs, respectively.

Physicochemical character

Abdullah & Qudsieh (2009) mentioned that the pH was declined with the advancement of age and it was 5.61, 5.53 and 5.34 after 24 h in ram lambs slaughtered at 20, 30 and 40 kg respectively. Their result was inconsistent with the preset observation of pH 5.62±0.01, 5.91±0.02 and 5.91±0.02 in lambs slaughtered at 10.51±0.29, 13.41±0.40 and 14.46±0.71 kg, respectively. Smulders et al., (1992) determined a range of pH decline from seven upon slaughter to reach approximately 5.3–5.8 in sheep. Lighter carcasses had higher initial pH (pH measured 2 h after slaughter) and pHu (after 24 h) compared to carcasses of heavier weights but present findings completely disagreed with it giving higher value for aged sheep. (Vergar et al., (1999) and Martínez-Cerezo et al., (2005) reported that slaughter weight had no effect on pH measured after 24 h, yet their results showed a decline (P>0.05) in pH as slaughter weight increased between 20 and 30 kg. Tschirhart-Hoelscher et al., (2006) mentioned that aging had no effect on pH measured after thawing in all muscles. Our results were reverse to that finding. The pH value 24 h after slaughter was similar to that of other Portuguese lamb breeds. The observation of all those researchers was agreed with our study. Santos et al., (2007) stated that muscle colour is extremely important in suckling lambs' production whose carcasses should be pale/pink. In their study, the lightness values (45.6–47.4) for all the groups are indicative of extremely pale meat. But in our study the lightness of 3 age categories was 49.93±0.20, 49.39±0.10 and 49.39±0.10. Insignificantly meat of young lamb was lighter.

Abdullah & Qudsieh (2009) informed that cooking loss percentage decreased (P < 0.01) with increasing SW. Heavier carcasses had lower cooking loss percentage and it was consistent to the present findings. Davis et al., (1975) reported that aging reduced cooking losses. Their observation was inconsistent with the present findings. Abdullah & Qudsieh (2009) mentioned that color coordinates measured were influenced by SW. Lightness (L) decreased (P < 0.001) with increased SW in all muscles. Horcada et al., (1996) also supported them. Our result was consistent but variation was not significant (p>0.05). Yellowness (b) was neither affected by SW nor aging time in all muscles with values being comparable in all muscles and at all slaughter weights. In our observation highest and lowest yellowness was in 6 months and 9 months lamb respectively. Hue angle, which determines and define the exact color, was affected (P < 0.05) by SW in Semimembranosus, Biceps femoris and Longissimus muscles and decreased as brightness decreased indicating that brighter meat had more pinkish color and darker meat had more brownish tone. In our study increased (p<.001) redness with age was observed. This measurement was also consistent with present findings. According to the observation of (Horcada et al., 1996) colour parameters were similar in both sexes, although females had a slightly lighter meat and slightly lower a* values than males, but the differences were not significant that was also supported by our findings. Renerre (1986) suggested that the meat from females could be darker than that from males due to their greater precociousness and fatness but at these weights and ages this was not evident, which agrees with (Dransfield et al., 1990; Wood et al., 1980) and our findings.

Esenbuga and Mete, (2001) and Macit et al., (2003) resulted in a decrease in moisture (%) and an increase in ether extract percentage in the lean meat of carcasses with the increase of SW. Abdullah & Qudsieh (2009) observed that ash (%) was affected (P > 0.05) neither by SW nor AT in any of the investigated muscles. The results of them were inconsistent with us because in our observation DM was decreased and ash was increased with the advancement of age. According to the observation of (D'Alessandro et al., 2013) there were no significant (P > 0.05) differences for moisture, crude protein, fat and ash of LL in relation to the slaughter seasons and ages of lambs. Their results were consistent for fat (EE) but disagreed for moisture, CP and ash. In our observation moisture and ash decreased and CP increased in aged lambs.

Effect on sensory evaluation

In the observation of (Abdullah & Qudsieh, 2009) juiciness and tenderness, was not affected (P > 0.05) by increasing SW except in the Semi membranosus muscle (P < 0.01). Expressed juice values were lower for muscles from lambs slaughtered at 40 kg compared to lighter weights and their results were agreed with our findings. Results obtained by (Abdullah & Qudsieh, 2009) are in agreement with (Bruwer et al., 1987) and (Vergar et al., 1999). Kemp et al., (1976) and (Hawkins et al., 1985) observed significant progressive loss of expressed juice at aged 12 months lambs. Some authors reported that expressed juice is not affected by weight or age (Solomon et al., 1980) while other studies suggest that higher weight is accompanied by lower or higher (Aziz et al., 1993) expressed juice depending on the breed, sex, intramuscular fat content, slaughter method and chilling conditions. Santos-Silva & Portugal (2001) mentioned juiciness was slightly higher for heavier carcasses (P < 0.01). According to (Rousset-Akrim et al., 1997) observation ram lambs slaughtered at seven months of age compared to lambs slaughtered at three months of age had stronger 'sheep' and 'animal' flavor attributes was similar to present findings. Vergara et al., (1999) and Chrystall et al., (1980) found that the effect of age on tenderness of lamb was relatively small, but (Reid et al., 1993) found correlations (around v 0.38) between tenderness and collagen solubility and that this declines significantly with increasing age. On the other hand (Hawkins et al., 1985) suggested that meat hardness can remain stable or even decrease as slaughter age increases due to the infiltration of fat and tenderness were not affected by weight. In (Vergara et al., 1999) study the difference in fatness between light and medium weight groups did not lead to differences in SF. The result of present study was consistent with (Reid et al., 1993) and disagreed with (Chrystall et al., 1980; Farias, 2013; Hawkins et al., 1985) and found no differences due to sex in lambs of the Lacha Spanish breed slaughtered at three different weights and those results were consistent with the present findings.

Conclusion

From the study it may be concluded that slaughter weight was highest of lamb of 12 months of age and flavor was better at 9 months lambs. Overall acceptability was differed significantly among ages and meat of 9 months lamb showed highest acceptance.

Conflicts of interest

The author declared that there is no conflicts interest.

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