Impact of physical ration form and wheat straw ratio on carcass traits and fat deposition of local lambs

Mohammed Mahmood Esmaeel1, Khalid Hassani. Sultan2, Waseem Khaled Ahmed3
1,2,3Department of Animal Production, College of Agriculture and Forestry, University of Mosul, Mosul, Iraq
Corresponding Authors Email : mahmed.23agp22@student.uomosul.edu.iq

Abstract :

The current study aimed to evaluate the effect of the physical form of the feed and the percentage of wheat straw on the carcass characteristics and fat deposition of Awassi lambs. Twenty four of Awassi lambs with an average age of 5-6 months (25.82 ± 0.10 kg) were used. This study lasted end of 84 days. Lambs were randomly assigned to four treatments (6 lambs each for group), lambs in the first and second treatments were fed crushed feed with 0.5% and 1% wheat straw content, respectively, while lambs in the third and fourth treatments were fed pelleted feed with 0.5% and 1% wheat wheat straw content respectively. The results showed a significant improvement in carcass measurements. two treatments of pelletized feed achieved a significant increase in the external and internal carcass length and the carcass width at the shoulders, while the 0.5% wheat straw treatment had a significant increase in the carcass length traits at the thighs and shoulders. The Feeding of lambs on pelleted feed significantly increased tummy weight, intestinal fat, and total carcass fat, while pelvic and kidney fat and intestinal fat significantly increased in both groups of lambs fed 0.5% wheat wheat straw. The study results showed no significant effects on edible and secondary nutrients or gastrointestinal weight. While a significant increase was recorded in the slaughter weight, hot carcass weight, dressing percentage, depth and area of the eye muscle, and Fat thickness in the carcasses fed on the pelletized feed, the results of the physical inventory recorded significant increase in the weight of the three ribs, muscle weight, bone weight, muscle-bone ratio, and muscle-to-fat ratio in the group of lambs fed on the pelletized feed, and an increase in the weight of fat in the crushed feed. In the physical inventory of wheat straw, we observed a significant increase in fat weight and fat percentage in lambs fed 1% wheat straw, and an increase in muscle weight, muscle percentage, and muscle-to-fat ratio in lambs fed 0.5% wheat straw. The results indicate that raising Awassi lambs on pelletized concentrate feed with 0.5% and 1% wheat straw resulted in improved carcass features and fat deposition.

Key words: Carcass, fat, lambs, pellet, ration.

Introduction

The Livestock contribute up to 30-40% of the global agricultural economy. Therefore, any decline in livestock populations means a loss of their genetic diversity and consequently loss of their contribution to human nutrition. Unfortunately, Livestock are rapidly losing their genetic resources (1). Small ruminant production has significant economic in iraq. The ruminants are particularly important in the region's dry areas where its constitute the essential agricultural production. At the same time rapid population growth has been a major factor in increasing demand for small ruminant production (2). The Awassi breed sheep are the most common sheep breed in the Middle East and mainly used for meat, milk, and wool production. It was a low-productivity breed and reach maturity later

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than others sheep. Nutrition affects seasonal variation of sheep reproductive performance (3).The Awassi sheep are ability to provide milk and meat in harsh tropical conditions. Awassi sheep breeds are very important because they meet a large part of people's food demand (3). Also, the Awassi possesses highly desirable characteristics regarding tolerance to nutritional fluctuations, resistance to diseases and parasites and tolerance to extreme temperatures (4). In addition, most residents of the region prefer the traditional local fat tail carcass. Therefore, the price of local breed meat is higher significant than that of imported meat or imported live animals. Growth, feed efficiency and carcass characteristics are known to be key factors influencing meat production in terms of quality and quantity. Adequate nutrition is a basic requirement for ruminants, and even minor changes in nutrition significantly impact normal physiological processes, as well as meat and milk production (5).The physical form of feed is an important factor affecting feed utilization efficiency in ruminants, as well as its palatability and intake, which are critical for animal growth and weight gain (6). Feeding strategies play a crucial role in determining the nutritional quality of animal products. The type and composition of an animal's diet directly influences the nutritional content of its derivative products, such as meat, milk, and eggs. Various feeding strategies including both traditional and modern methods, It depends on factors such as the balance of macronutrients, essential vitamins, and minerals, as well as the overall quality and safety of the product. Therefore, feeding high-quality, balanced forages for improving grazing practices and considering supplementary nutrients can result in animal products with improved nutritional properties (7). It is known that fattening animals are highly feed concentrated to achieve faster growth rates and reduce the fattening period, but these feeds cause some problems and diseases for animals. Generally, the crop residues such as wheat straw is to constitute a major component of livestock feed and provide an important source of fiber that is beneficial for the animal. I n developing countries. It was using in complete feeds at rates about from 15% to 70%, and this percentage depends on many factors, such as feed availability and others. In general, wheat straw contains a high percentage of fiber, which helps stabilize the rumen environment of fattening animals. Recent developments in feed processing and processing have indicated the possibility of successfully grinding wheat straw sources into pellets or modifying the physical form of the feed, thus eliminating problems related to handling, storage and transportation of wheat straw and increasing palatability by the animal (8.(

Materials and Methods:

.1Experimental Animals

This study was conducted in the Animal Production Department of the College of Agriculture and Forestry—University of Mosul. It continued for 84 days, in which 24 Awassi lambs, 5-6 months old and whose average weight was 25 kg, purchased from the local market. The lambs was distributed randomly into four groups of this study to impact of ration physical form and wheat straw ratio on carcass traits and fat deposition of Awassi lambs.

.2Mention your experiment design .

The lambs were assigned into four treatments, with six in each group. The first treatment was the given mash feed with 0.5 % wheat straw. The second treatment they were given mash feed with 1 % wheat straw. The third

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treatment given Pelleted feed either 0.5 % wheat straw . As for the fourth treatment were given Pelleted feed with 1 % wheat straw, and the lambs were subjected to the same environmental conditions, where they were raised in adjacent semi-open barns. The concentrated feed as pellet shape from Kosar company for forages industries.

.3Lambs feeding: Lambs were placed in a preparatory period that lasted ten days before starting the study to accustom the animals to the standard diet consisting of black barley, soybean meal, wheat bran, wheat straw, sodium bicarbonate, limestone, and table salt. Table 1 shows the proportions of these materials in the diet, as they were feed grouping on the concentrated feed. It was distributed randomly to the barns. The energy percentage reached 2803.33 kilocalories/kg. The dry matter percentage was 93.64%, and the crude protein percentage was 14.84%. The feed was provided in two meals, the first at seven in the morning and at four in the evening. Coarse feed was offered freely to all lambs, and drinking water and salt blocks were available throughout the study.

.4Veterinary care

The animals were examined and confirmed to be healthy before the study began. They were in good health and under veterinary supervision throughout the study. The lambs were given doses of internal parasites, and the dose was repeated two weeks later at a dose of 5 ml. The lambs were injected with a 2 ml dose of ivermectin subcutaneously, and the injection was repeated two weeks later. The animals were also vaccinated with a 2 ml dose of the American-made enterotoxemia vaccine against enterotoxemia, and the vaccination was repeated one month later.

Table (1): Components and chemical composition of the study's ration.

%	ration materials
21	Corn
39.5	Black barley
16	Soybean meal
20	Wheat bran
1	Premix
1	Limestone
0.5	Sodium bicarbonate
1	NaCl
100	Total

Kosar Company

Table (2): Laboratory and chemical analysis of the feed used in study.

Nutrient Name	Analysis according to dry matter*
Dry Matter(%).	87.99
Crude Protein(%).	18.22
Either Extract (%).	2.19
Fiber (%).	6.80
Ash(%).	6.28
Metabolic Energy (Kcal/Kg).	2803.88

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*The chemical composition was calculated according to Al-Khawaja et al. (9.(

.5Physical inventory of rib sections:

Physical inventory was carried out after separating the three rib pieces (9, 10 and 11) from the right middle of the carcass of four experimental animals, weighing them and freezing them at -20°C for physical inventory. The frozen pieces were thawed at room temperature using a sharp knife to carefully separate the fatty, bone and muscle tissues. The three tissues were weighed individually using a sensitive balance with a sensitivity of 5 grams. The percentage was then calculated. For the three tissues, relative to the weight of the three rib segments.

.6Statistical analyses:

Statistical analysis was conducted using a completely randomized design (CRD) and using a two-factor factorial experiment in this experiment within the ready-made statistical analysis program SAS (2002) to analyze the data according to the following mathematical model:

$Yijk = \mu + Pi + Sj + PSij + Eijk$

To test the significance of the differences between the means, Duncan's multiple range test was used (10.(

The SAS (11) software performed a one-way ANOVA analysis on the data, and the Duncan's multiple range test was used to assess if there were statistically significant differences between the means based on the significant F value (10.(

Results and Discussion:

.1Productive Performance :

Table No. (3) shows the results of the statistical analysis of the data on the effect of the physical form of the feed, the percentage of wheat straw, and the interaction between them on the carcass measurements. The external and internal carcass length and the width of the carcass at the shoulders increased significantly ($P\leq 0.05$) in the two groups of lambs fed on the pelletized feed, and their values reached (77.40, 66.15, and 28.20 cm) respectively. While there was a significant increase ($P\leq 0.05$) in the carcass measurements of the external and internal carcass length for the two groups of lambs fed on 0.5% wheat straw, and their lengths reached (76.35 and 66.30 cm) compared to the two groups of 1% wheat straw (75.15 and 64.40 cm), while a significant increase was recorded in the two characteristics of the carcass width at the shoulders and thighs in the carcasses of lambs fed on 1% wheat straw (27.35 and 27.00 cm) respectively compared to the two groups of 0.5% wheat straw, and their values reached (26.00 and 29.35 cm). The best interaction between the physical form of the feed and the wheat straw percentage was recorded in the third treatment for the two characteristics of the external and internal carcass length (77.60 and 67.10 cm), and the best carcass width was recorded at the thighs for the lamb group, which increased significantly in the second and fourth treatments (26.70 and 27.30 cm) compared to the first and third treatments (25.70 and 27.30 cm.(

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Table (3): The effect of the physical form of the feed, the percentage of wheat straw, and the interaction between them on the carcass measurements of Awassi lambs.

Chest depth of carcass (cm)	Show the carcass thighs (cm)	Carcass width at shoulders (cm)	Internal carcass length (cm)	External carcass length (cm)	Traits / Treatments
Effect of physical form of ration.					
29.10 a ± 0.22	26.20 a ± 0.24	25.55 b ± 0.29	64.55 b ± 041	74.10 b ± 0.38	**Mash**
29.95 a ± 0.39	26.80 a ± 0.28	28.20 a ± 0.35	66.15 a ± 0.37	77.40 a ± 0.27	**Pelleted**
Effect of wheat wheat straw level.					
29.35 a ± 0.34	26.00 b ± 0.18	26.40 b ± 0.49	66.30 a ± 0.36	76.35 a ± 0.44	**Wheat straw/ 0.5%**
29.70 a ± 0.34	27.00 a ± 0.26	27.35 a ± 0.55	64.40 b ± 0.36	75.15 b ± 0.74	**Wheat straw/ 1%**
Effect of interaction between physical form of ration and wheat straw level.					
29.20 a ± 0.33	25.70 c ± 0.25	25.20 b ± 0.18	65.50 b ± 0.35	75.10 b ± 0.33	**T1**
29.00 a ± 0.31	26.70 a ± 0.30	25.90 b ± 0.53	63.60 c ± 0.45	73.10 c ± 0.24	**T2**
29.50 a ± 0.63	26.30 bc ± 0.20	27.60 a ± 0.57	67.10 a ± 0.33	77.60 a ± 0.12	**T3**
30.40 a ± 0.56	27.30 a ± 0.25	28.80 a ± 0.20	65.20 b ± 0.43	77.20 a ± 0.43	**T4**

Different letters vertically indicate significant differences at the probability level of 0.05

T1: coarse grinding ration and 0.5% wheat straw, T2: coarse grinding ration and 1% wheat straw, T3: Pelleted ration and 0.5% wheat straw, T4: Mash ration and 1% wheat straw.

Table 4 shows the results of the statistical analysis of the effect of the physical form of the feed, the percentage of wheat straw, and the interaction between them on the fat of Awassi lamb carcasses. A significant increase (P≤ 0.05) was recorded in the weight of the rump, intestinal fat, and total carcass fat in the carcasses of lambs fed on pelletized feed, with values reaching 5.02 kg, 929.5 g, and 6.71 kg, respectively, compared to their weights in the carcasses of lambs fed on crushed feed (4.40 kg, 644.50 g, and 6.71 g), respectively. While heart fat increased significantly in the crushed feed group (78.00 g) compared to the pelleted feed group (66.50 g). Significantly higher (P≤ 0.05) pelvic fat and intestinal fat weights were recorded in lambs fed the 0.5% hay groups (769.00 and 887.00 g) compared to the 1% hay groups, reaching values of (211.00 - 687.00g). Meanwhile, heart fat increased significantly in the lambs fed the 1% wheat hay groups (82.00 g) compared to the 0.5% hay groups (62.50 g). The results of fat in the carcasses of Awassi lambs for the treatments also showed a significant increase in the fat of the pelvis, kidneys, intestines, and total carcass fat (283.00, 1027.00 g, and 6.58 kg), respectively. While the highest weight of the mechanism was recorded significantly in the

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lambs of the fourth group (fed feed with 1% wheat straw), and its value reached 5.28 kg compared to the first and second treatments (4.34 and 4.45 kg) and did not differ significantly from the third treatment (4.77 kg.(

Table (4): effect of the physical form of feed, the percentage of wheat straw, and the interaction between them on the carcass fat of Awassi lambs.

Total fat to carcass weight%	Total carcass fat (kg)	Round fat (gm)	Heart fat (gm)	Intestinal fat (g)	Pelvic and kidney fat (g)	Broad tail weight (kg)	Traits / Treatments
Effect of physical form of ration.							
21.91 a ± 0.64	5.73 b ± 0.14	394.00 a ± 29.91	78.00 a ± 2.90	644.50 b ± 40.34	225.00 a ± 13.20	4.40 b ± 0.14	**Mash**
23.50 a ± 0.73	6.71 a ± 0.19	434.00 a ± 36.04	66.50 b ± 7.03	929.50 a ± 43.00	225.00 a ± 11.71	5.02 a ± 0.16	**Pelleted**
Effect of wheat straw level.							
22.03 a ± 0.59	6.20 a ± 0.19	432.00 a ± 40.50	62.50 b ± 5.63	887.00 a ± 54.26	269.00 a ± 8.49	4.55 a ± 0.15	**Wheat straw/ 0.5%**
23.39 a ± 0.79	6.24 a ± 0.26	396.00 a ± 24.42	82.00 a ± 3.51	687.00 b ± 53.13	211.00 b ± 10.13	4.87 a ± 0.20	**Wheat straw/ 1%**
Effect of interaction between physical form of ration and wheat straw level.							
21.43 a ± 0.77	5.82 b ± 0.18	400.00 a ± 59.30	78.00 a ± 4.06	747.00 b ± 45.23	255.00ab ± 12.34	4.34 b ± 0.19	**T1**
22.40 a ± 1.07	5.62 b ± 0.22	388.00 a ± 22.16	78.00 a ± 4.63	542.00 c ± 5.14	195.00 c ± 13.50	4.45 b ± 0.22	**T2**
22.62 a ± 0.19	6.58 a ± 0.26	464.00 a ± 57.90	47.00 b ± 2.54	1027.00a ± 37.50	283.00 a ± 8.60	4.77ab ± 0.20	**T3**
24.38 a ± 1.09	6.83 a ± 0.31	404.00 a ± 46.48	86.00 a ± 5.09	832.00 b ± 46.51	227.00bc ± 12.30	5.28 a ± 0.23	**T4**

Different letters vertically indicate significant differences at the probability level of 0.05.

T1: Mash ration and 0.5% wheat straw, T2: Mash ration and 1% wheat straw, T3: Pelleted ration and 0.5% wheat straw, T4: Mash ration and 1% wheat straw.

Table (5) shows the results of the statistical analysis of the data on the edible parts of Awassi lamb carcasses, including the effect of the physical form of the feed and the percentage of wheat straw. No significant effect observed for the physical form of the feed and the percentage of wheat straw in the feed on the edible parts of the carcass. No effects were recorded for the four treatments in all edible parts of the carcass, except for a significant increase ($P \leq 0.05$) in the carcasses of the third treatment (fed pellet feed and 0.5% wheat straw percentage) (350.00 g). Compared to the first and second treatments (264 and 258

g), it did not differ significantly from the fourth treatment (283.00 g.(

Table (5): The effect of the physical form of the feed, the percentage of wheat straw, and the interaction between them on the edible parts of the carcass of Awassi lambs.

Testicular weight (g)	Kidney weight (g)	Lung weight (g)	Heart weight (g)	Spleen weight (g)	Liver weight (g)	Traits / Treatments
Effect of physical form of ration.						
261.00 a ± 14.95	119.50 a ± 4.96	675.00 a ± 28.66	175.50 a ± 4.91	90.00 a ± 4.53	894.5 a ± 27.64	**Mash**
316.50 a ± 23.41	132.50 a ± 4.03	727.00 a ± 29.43	190.50 a ± 7.20	82.50 a ± 3.43	993.00 a ± 48.19	**Pelleted**
Effect of wheat wheat straw level.						
307.00 a ± 25.74	126.00 a ± 3.92	719.00 a ± 27.67	186.50 a ± 6.58	82.50 a ± 3.59	955.50 a ± 45.17	**Wheat straw/ 0.5%**
270.50 a ±14.36	126.00 a ± 5.90	683.00 a ± 31.62	179.50 a ± 6.51	90.00 a ± 4.40	932.00 a ± 39.42	**Wheat straw/ 1%**
Effect of interaction between physical form of ration and wheat straw level.						
264.00 b ± 29.63	123.00 a ± 5.14	704.00 a ± 27.85	182.00 a ± 4.63	85.00 a ± 4.74	921.00 a ± 44.59	**T1**
258.00 b ± 11.13	116.00 a ± 8.86	646.00 a ± 50.00	169.00 a ± 8.12	95.00 a ± 7.58	868.00 a ±33.15	**T2**
350.00 a ± 34.35	129.00 a ± 6.20	734.00 a ± 50.08	191.00 a ± 12.78	80.00 a ± 5.70	990.00 a ± 81.24	**T3**
283.00ab ± 26.95	136.00 a ± 5.33	720.00 a ± 36.26	190.00 a ± 8.36	95.00 a ± 4.18	996.00 a ± 62.03	**T4**

Different letters vertically indicate significant differences at the probability level of 0.05

T1: coarse grinding ration and 0.5% wheat straw, T2: coarse grinding ration and 1% wheat straw, T3: Pelleted ration and 0.5% wheat straw, T4: Mash ration and 1% wheat straw .

Table (6) shows the effect of the physical form of the feed, the percentage of wheat straw, and the interaction between them on the secondary parts of the carcass and the digestive system, as no significant differences were recorded for the feed in the crushed and pellet form and the percentage of wheat straw of 0.5 and 1% in the weights of the secondary parts of the carcass and the weight of the empty and filled digestive system.

Table No. (7) shows the results of the effect of the physical form of the feed, the percentage of wheat straw, and the interaction between them on the percentage of dressing, measurements of the tomentum muscle, and the thickness of subcutaneous fat. It was shown that there was a significant superiority in favor of the two groups of lambs fed on the pelletized feed in the weight at slaughter, the hot carcass weight, the percentage of dressing, the depth of the tomentum muscle, the area of the tomentum muscle, and the thickness of subcutaneous fat. Their values reached 52.20, 28.56 kg, 54.71%, 33.50 mm, 17.04 cm2, and 11.33 mm when compared to the two treatments .

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Crushed fodder, which reached values of 49.36 and 26.23 kg 53.12% and 33.50 mm and 17.04 cm2 9.16 mm respectively. While the 0.5% wheat straw treatments recorded significant superiority (P≤ 0.05) in the characteristics of weight at slaughter, hot carcass weight, dressing percentage and eye muscle depth, which reached values of 51.45 and 28.15 kg, 54.70% and 33.66 mm respectively compared to the 1% wheat straw groups (50.11 and 26.64 kg and 53.13% and 29.33 mm). The thickness of subcutaneous fat increased significantly in the two 1% wheat straw treatments (11.50 mm) compared to the two 0.5% groups (9.00 mm). As for the results of the interaction treatments, the third treatment showed a significant superiority (P≤ 0.05) in the characteristics of hot carcass weight, dressing percentage, muscle depth, and muscle area, and their values reached 29.11%, 55.63 mm, 35.33, and 17.66 cm2 compared to the first, second, and fourth treatments 27.20 kg, 53.78%, 32.00 mm, 15.08 cm2, 25.26 kg, 52.47%, 27.00 mm, 15.33 cm2, 28.01 kg, 53.79%, 31.66 mm, and 16.41 cm2, while it was significantly superior The third and fourth treatments were significantly superior in slaughter weight (52.33 and 52.08 kg) compared to the first and second treatments (50.58 and 48.15 kg). The fourth group lambs recorded a significant superiority (P≤ 0.05) in the subcutaneous fat thickness trait, which reached (12.66 mm) compared to the first, second and third treatments (8.00, 10.33 and 10.00 mm.(

Table (6 The effect of the physical form of the feed, level of wheat straw, and the interaction between them on the secondary parts of the carcass and the digestive system of Awassi lambs.

Empty digestive system weight (kg)	Weight of the digestive system filled (kg)	Skin weight (kg)	Leg weight (kg)	Head weight (kg)	Traits / Treatments
Effect of physical form of ration.					
1.92 a ± 0.11	5.08 a ± 0.35	6.23 a ± 0.19	1060.50 a ± 34.29	2.74 a ± 0.09	**Mash**
2.02 a ± 0.11	5.16 a ±0.26	6.62 a ± 0.13	1089.00 a ± 37.07	2.84 a ± 0.07	**Pelleted**
Effect of wheat wheat straw level.					
1.94 a ± 0.13	5.33 a ± 0.23	6.40 a ± 0.16	1095.50 a ± 33.99	2.83 a ± 0.07	**Wheat straw/ 0.5%**
2.00 a ±0.09	4.91 a ± 0.35	6.45 a ± 0.19	1054.00 a ± 36.66	2.75 a ± 0.09	**Wheat straw/ 1%**
Effect of interaction between physical form of ration and wheat straw level.					
1.86 a ± 0.15	5.29 a ± 0.36	6.29 a ± 0.27	1094.00 a ±16.38	2.81 a ±0.08	**T1**

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1.97 a ± 0.17	4.88 a ± 0.63	6.16 a ± 0.29	1027.00 a ± 66.79	2.66 a ± 0.17	**T2**
2.02 a ± 0.22	5.37 a ± 0.32	6.50 a ± 0.20	1097.00 a ± 70.22	2.84 a ±0.13	**T3**
2.03 a ± 0.10	4.95 a ± 0.42	6.73 a ± 0.18	1081.00 a ± 34.97	2.84 a ± 0.08	**T4**

Different letters vertically indicate significant differences at the probability level 1: Mash ration and 0.5% wheat straw, 2: coarse grinding ration and 1% wheat straw, 3: Pelleted ration and 0.5% wheat straw, 4: coarse grinding ration and 1% wheat straw.

Table (7): Effect of the physical form of the ration and wheat straw and its interaction between them on the dressing percentage, measurements of the ocular muscle and the thickness of the subcutaneous fat of Awassi lambs.

Fatty fish under the skin(mm)	**Area of the eye muscle (cm2)**	**Depth of the eye muscle (mm)**	**Clearance ratio %**	**Hot carcass weight (kg)**	**Weight at slaughter (kg)**	**Traits / Treatments**
Effect of physical form of ration.						
9.16 b ± 0.55	15.20 b ± 0.21	29.50 b ±1.12	53.12 b ± 0.54	26.23 b ± 0.47	49.36 b ± 0.55	**Mash**
11.33 a ± 0.61	17.04 a ±0.30	33.50 a ±0.84	54.71 a ± 0.44	28.56 a ± 0.25	52.20 a ± 0.10	**Pelleted**
Effect of wheat wheat straw level.						
9.00 b 0.48±	16.37 a 0.59±	33.66 a 0.76±	54.70 a 0.61±	28.15 a 0.46±	51.45 a 0.40±	**Wheat straw/ 0.5%**
11.50 a ±0.54	15.87 a ±0.30	29.33 b ±1.06	53.13 b ±0.33	26.64 b ±0.61	50.11 b ±0.88	**Wheat straw/ 1%**
Effect of interaction between physical form of ration and wheat straw level.						
8.00 c ±0.28	15.08 c ±0.30	32.00 b ±0.14	53.78 b ±0.96	27.20 b ±0.38	50.58 b ±0.22	**T1**
10.33 b ±0.33	15.33 c ±0.36	27.00 c ±0.28	52.47 b ±0.31	25.26 d ±0.14	48.15 c ±0.07	**T2**
10.00 b ± 0.28	17.66 a ±0.16	35.33 a ±0.33	55.63 a ±0.31	29.11 a ±0.14	52.33 a ±0.08	**T3**
12.66 a ± 0.16	16.41 b ±0.22	31.66 b ±0.33	53.79 b ±0.17	28.01 b ±0.04	52.08 a ±0.16	**T4**

Different letters vertically indicate significant differences at the probability level P≤0.05 T1: coarse grinding ration and 0.5% wheat straw, T2: Mash ration and 1% wheat straw, T3: Pelleted ration and 0.5% wheat straw, T4: coarse grinding ration and 1% wheat straw.

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The results of statistical analysis (8) of the physical inventory results of the ribs (9-10-11) show that there is a significant superiority in the weight of the three ribs, muscle weight, bone percentage and muscle/fat ratio of lamb carcasses fed on pellet feed, with values reaching 592.33, 266.83 and 136.00 g, 22.95% and 1.41 respectively. Compared to the two groups of crushed feed, with values reaching 576.50, 247.00 and 116.50 g, 2020% and 1.16 respectively. While the fat weight and fat percentage in the three ribs of the two groups of crushed feed (213.00 and 36.94) increased significantly compared to the two groups of pelleted feed (189.50 and 32.00). The results show that there is a significant increase in the muscle weight, muscle percentage and muscle/fat ratio in the two groups of lambs fed 0.5% wheat straw, which reached values of 261.16 g, 44.84% and 1.36 respectively compared to the lambs fed 1% wheat straw. (252.66, 43.08 and 1.21), in the results of the interaction between the physical form of the feed and the percentage of fat, it is clear that there is a significant superiority in the weight of the three ribs for the third and fourth treatments, and its values reached 594.66 and 590.00 g compared to the first treatment (570.33 g) and did not differ significantly from the second treatment (582.66 g). While the fat weight increased significantly, and its values reached 223.00 in the second treatment compared to the first, third and fourth treatments (203.00, 181.33 and 197.6 g) and increased significantly Muscle weight in the third and fourth treatments (268.33 and 265.33 g) was higher than the first and second treatments (254.00 and 240.00 g). A significant increase in bone weight was evident in the third treatment (145.00 g) compared to the first, second and fourth treatments (113.33, 119.66 and 127.00 g) respectively. The second treatment recorded a significant increase in fat in the second treatment (38.27%) compared to the first, third and fourth treatments (35.60, 30.50 and 33.50%). The muscle percentage increased significantly in the first, third and fourth treatments (44.54, 45.14 and 44.97%) compared to the second treatment (41.19%). A significant increase was recorded in the bone percentage and the muscle/fat ratio in the third treatment (24.38 and 1.48%) compared to the first, second and fourth treatments (19.87, 20.54, 21.52, 1.25, 1.07 and 1.34). The muscle/bone ratio increased significantly in the first, second and fourth treatments, reaching values of 2.24, 2.00 and 2.10 compared to the second treatment (1.85), respectively.

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Table (8): The effect of the physical form of the feed, the ercentage of wheat wheat straw, and the interaction between them on the physical inventory traits of the three ribs of Awassi lambs.

Muscle/bone ratio	Muscle/fat ratio	Bone ratio	Muscle ratio	Fat percentage	Bone weight	Muscle weight	Fat weight	Weight of the three sides	Traits / Treatments
Effect of physical form of ration.									
2.12 a ± 0.07	1.16 b ± 0.04	20.20 b ± 0.48	42.86 b ± 0.76	36.94 a ± 0.71	116.50 b ± 2.96	247.00 b ± 3.27	213.00 a ± 4.83	576.50 b ± 3.99	**Mash**
1.97 a ± 0.07	1.41 a ± 0.03	22.95 a ± 0.83	45.05 a ± 0.39	32.00 b ± 0.74	136.00 a ± 5.10	266.83 a ± 0.87	189.50 b ± 4.08	592.33 a ± 4.27	**Pelleted**
Effect of wheat wheat straw level.									
2.04 a ± 0.09	1.36 a ± 0.05	22.13 a ± 1.06	44.84 a ± 0.41	33.05 b ± 1.23	129.16 a 7.34±	261.16 a 3.36±	192.16 b 5.42±	582.50 a 7.18±	**Wheat straw/ 0.5%**
2.05 a ±0.05	1.21b ±0.06	21.03 a ± 0.65	43.08 b ±0.86	35.89 a ±1.08	123.33 a 3.93±	252.66 b 5.68±	210.33 a 5.73±	586.33 a 2.49±	**Wheat straw/ 1%**
Effect of interaction between physical form of ration and wheat straw level.									
2.24 a ± 0.08	c1.25 ± 0.03	19.87 b 0.61±	44.54 a 0.37±	35.60 b 0.78±	113.33 b 3.48±	254.00 b 2.08±	203.00 b 3.78±	570.33 b 6.35±	**T1**
2.01 ab 0.08±	1.07 d ± 0.00	20.54 b 0.83±	41.19 b 0.11±	38.27 a 0.34±	119.66 b 4.66±	240.00 c 0.57±	223.00 a 1.52±	582.66 ab 1.20±	**T2**
1.85 b 0.03±	1.48 a ± 0.03	24.38 a 0.48±	45.14 b 0.78±	30.50 d 0.69±	145.00 a 2.64±	268.33 a 0.88±	181.33 c 3.99±	594.66 a 8.35±	**T3**
2.10 ab 0.09±	1.34 b ± 0.01	21.52 b 1.10±	44.97 b 0.38±	33.50 c 0.16±	127.00 b 6.50±	265.33 a 0.88±	197.66 b 1.20±	590.00 a 4.04±	**T4**

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Different letters vertically indicate significant differences at the probability level P≤0.05.
T1: Mash ration + 0.5% wheat straw, T2: Mash ration + 1% wheat straw, T3: Pelleted ration + 0.5% wheat straw, T4: Mash ration + 1% wheat straw

CONCLUSIONS

Carcass measurements, including external and internal carcass length and shoulder width, increased significantly in lambs fed the pelletized feed. Total carcass fat also increased in lambs fed the pelletized feed, while the best percentage was recorded in the three ribs.

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CONFLICT OF INTERESET

The work's authors declare that there are no conflicts of interest associated with its publication.

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