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Research Article

Carcass characteristics of Awwasi lambs supplemented with Selenium and Vitamin D3

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Abstract

This research was conducted for 90 days by obtaining 16 Awassi lambs aged 4-5 months and weight of 19.56+0.17kg to investigate the effect of selenium and Vitamin D3 supplementation on their Carcass characteristics. Animals were divided randomly into four groups (4 animals per treatment) including treatment (1) as the control without additives, (2) supplemented with selenium, (3) supplemented with Vitamin D3 (4) supplemented with Selenium and Vitamin D3. Each animal was kept in an individual cage and fed depending on its weight gain measured every week. The results showed no significant differences between four treatments in the shoulders, rack, loin, and rib eye area. The results showed non-significant differences between four treatments in major cuts weight i.e. shoulders, rack, loin, and leg. The minor cuts weights viz. neck, breast, flank, and foreshank, had no significant differences between the four treatments. Also, the leg muscles, and fat carcass weights had no differences between the four treatments.

Keywords: *Pseudomonas aeruginosa*, Antibiotic resistance gene, Ruminant, DNA.

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Introduction

Meat and milk are important sources of animal protein for human nourishment. Awassi sheep are widespread in different parts of the Middle East (Tabba et al. 2006). It is important for sheep races to produce quality meats (Dkho et al. 1992; Alani et al. 2021). Efforts have been intensified to increase its quality by providing additives to its diets that positively affect its health and immunology (Ibraheem et al. 1991). Selenium is a rare nutrient in animal diet and its content depends on its presence in the soil (NRC 1994). Because of the high density of agricultural crops, animal feed needs supplements, including selenium, to ensure their health and performance (Sevikova et al. 2006).

Selenium is also an antioxidant, thyroid regulator, and immune system booster, reducing the risk of iron poisoning and improving the digestive system (Ramya et al. 2015; Darbandi et al. 2018). Vitamins play an important role in the life processes of animals. Vitamin D3 is a fat-soluble vitamin, it is important in maintaining a balance of calcium and phosphorus metabolism in the body, regulating the function of the immune system (Cutolo 2008). This work was conducted to investigate the effect of selenium and Vitamin D3 supplementation on their Carcass characteristics.

Materials and methods

This research was conducted in the animal farm department of Tikrit University from 31/8 to 9/12/2019 for 90 days. 16 Awassi lambs aged 4-5 months and a weight of 19.56±0.17kg were bought from local markets in Salah Al-Din Province. A typical diet was given to the lambs consisting of barley, wheat bran, soybeans, yellow corn, salts, and

Table 1. Experiment diet ingredients percentage.

diet ingredients	Percentage %
Barley	50
Wheat bran	28
Soybean	10
Corn	10
Mineral and vitamins	2

Table 2. Effect of selenium and Vit D3 and their mixture on some carcass characteristics (mean±SE).

	T1	T2	T3	T4
Hot carcass weight	13.28±0.72[a]	12.90±1.01[b]	13.67±0.16[a]	13.68±0.30[a]
Cold carcass weight	13.11±0.66[a]	12.85±1.00 [b]	13.33±0.63[a]	13.46± 0.29[a]
Empty body weight	26.896±0.54[a]	25.98±0.98[a]	26.82±1.87[a]	26.99±2.87[a]
Dressing percentage	50.22±0.89[a]	49.46±0.90[a]	49.70±0.23[a]	49.87±0.23[a]
Shrinkage	0.7±2.30[a]	0.7±0.32[a]	2.2±0.01[a]	1.4±0.23[a]

Table 3. Effect of selenium and Vit D3 and their mixture on Fat thickness and rib eye area (mean±SE).

	T1	T2	T3	T4
Fat thickness	1.31±0.23[a]	1.85±0.28[a]	2.67±0.59[a]	1.83±1.01[a]
Rib eye area	8.75±0.32[a]	8.125±0.62[a]	8.25±0.77[a]	8.87±0.96[a]

The absence of letters refers to no significant differences.

minerals. The barley was the most percentage of feed (Table 1).

Animals were divided randomly into four groups (4 animals per group), including (1) the control without additives, (2) supplemented with selenium, (3) supplemented with Vitamin D3, and (4) supplemented with selenium and Vitamin D3. Each animal was kept in an individual cage (1×1.5m²) and fed based on their weight gain that was measured every week. Every cage had a plate for feeding, a separate drinker, and a place to provide minerals and salts. Gelatinized capsules of selenium according to the dietary weight were provided for each animal. Vitamin D3 was used in liquid form at 5.5 IU/kg and selenium and vitamin D3 doses gave to the animal daily orally.

Carcass weight: After slaughtering, the offal was separated and after 30min the carcasses were weighed as hot carcass weight. Then, the carcasses were taken into the refrigerator, hung and kept at 4°C for 24 hours. The next day the carcasses were weighed as cold carcass weight. The shrinkage was calculated as the following equation:

$$\text{Shrinkage\%} = ((\text{hot carcass weight} - \text{cold carcass weight}) / \text{hot carcass weight}) \times 100$$

Empty body weight was calculated by subtracting the content of the digestive system from the live body weight. The dressing percentage was calculated based on cold body weight to empty body weight using the following equation:

$$\text{Dressing percentage} = (\text{Cold carcass weight} / \text{Empty body weight}) \times 100$$

An electric saw was used to cut the carcass, first, the tail fat was cut and weighed, then the neck was separated and weighed, and the carcasses were split into symmetrical halves of right and left. We took the right part and split it into a forehead and posterior quarter from the 12 and 13 ribs area and cut the quarters into 4 major pieces (leg, rack, loin, and shoulders) and 4 minor cuts (neck, foreshank, breast, and flank) (Bowman et al. 1968; Abdulateef et al. 2021). The rib-eye area was drawn between 12 and 13 ribs using a tracing paper and took three readings per sample using the Plano meter to calculate the average. Fat thickness was measured using a Vernia.

For physical dissection, the weights of each part were measured. The physical dissection of the leg was performed with a sharp knife and scalpel to separate the lean and fat from the bone. It weights ratio was taken by an electronic balance.

Table 4. Effect of selenium and Vit D3 and their mixture on Major cuts weight (mean±SE).

	T1	T2	T3	T4
Shoulders	36.55±1.001	114.10±0.941	46.17±0.972	38.28±1.093
Rack	34.39±0.543	33.16±0.495	24.58±0.474	25.30±0.509
Loin	81.80±0.593	17.15±0.551	102.35±0.626	120.67±0.599
leg	193.16±2.014	210.08±1.959	88.08±0.934	60.05±1.982

The absence of letters refers to no significant differences.

Table 5. Effect of selenium and Vit D3 and their mixture on Minor cuts weight (mean±SE).

	T1	T2	T3	T4
Neck	67.05±0.619[a]	47.09±0.532	22.46±0.542	29.27±0.574
Breast	61.61±0.722[a]	93.61±0.669	34.59±0.712	27.20±0.739
Flank	43.12±0.264[a]	25.22±0.221	45.83±0.258	23.23±0.207
Fore shank	24.05±0.560	28.11±0.508	53.82±0.555	33.20±0.551

The absence of letters refers to no significant differences.

Table 6. Effect of selenium and Vit D3 and their mixture on physical dissection (mean±SE).

	T1	T2	T3	T4
Leg	193.16±2.014	210.08±1.959	88.08±1.934	60.05±1.982
Lean	109.53±1.303	115.75±1.093	63.69±1.227	25.52±1.221
Fat	53.16±3.227	68.63±3.797	25.55±3.137	37.02±3.042
Bone	37.57±3.525	49.52±3.872	40.49±3.685	27.74±4.030

The absence of letters refers to no significant differences.

Statistical analysis: The statistical analysis was done using the complete random design (CRD) to study the effect of parameters on different characteristics in SAS (2001). The significant differences between the average were compared using the Duncan test (Duncan 1955) using the following linear additive model:

$$Yij = \mu + Ti + eij$$

Where: Yij = observation of additives, μ = overall mean effect, Tj = effect of treatment, and eij = independent normally distributed random error term zero mean and variance δ^2.

Results and Discussion

The results showed significant differences in hot carcass weight of treatments 3 and 4 than others. The rest traits showed no significant differences in cold carcass weight, empty body weight, dressing percentage, and shrinkage. The results of fat thickness and rib eye area are shown in Table 3, showing significant differences in fat thickness in treatment 3 than the others. Vitamin D3 is a fat-soluble vitamin; it is important in maintaining a balance of calcium and phosphorus metabolism in the body, regulating the function of the immune system (Cutolo 2008). The difference in the rib eye area was not significant, which explains the insignificant value in the loin cut.

The results showed non-significant differences between four treatments in major cuts weight i.e. shoulders, rack, loin, and leg (Table 4). Regarding minor cuts weight**,** Table 5 shows the results of the minor cuts viz. neck, breast, flank, and foreshank, which had no significant differences between the four treatments i.e. adding selenium and vitamin D3 did not affect the major and minor cuts. Also, the physical dissection parts had no significant differences between the treatments. The leg, lean, fat weight, and bone weight values in four treatments are shown in Table 6.

In the leg muscle dissection, Table 7 shows the values that are not significant in leg muscles between four treatments. The biceps femora are the biggest muscle and the semimembranosus and rectus femora.

Table 7. Effect of selenium and Vit D3 and their mixture on leg muscle dissection (mean±SE).

	T1	T2	T3	T4
ST	92.25 ± 5.77	90.50±5.5	96.50±4.73	102.25±1.10
BF	163.75 ± 18.27	149.25±15.10	162.25±3.14	173.75±6.45
RF	68.25±6.43	56.0±6.04	60.75±1.10	65±2.34
SM	148.50±11	140.0±11	172.50±21.62	151.50±7.12

The absence of letters refers to no significant differences. BF =biceps femora, SM = semimembranosus, RF = rectus femora.

Table 8. Effect of selenium and Vit D3 and their mixture on fat carcass (mean±SE).

	T1	T2	T3	T4
Kidney and pelvic fat	17.38±0.108	18.00±0.129	15.49±0.1	22.13±0.11
Cardio fat	31.22±0.55	6.02±0.29	4.79±0.17	5.06±0.21
Tail fat	156.19±1.473	196.70±1.443	178.59±1.694	21.36±1.289
Caul fat	45.46±0.2	23.47±0.178	21.90±0.148	55.52±0.173
Total fat	65.12±2.33	23.54±2.04	35.02±2.11	21.12 ±1.773

The absence of letters refers to no significant differences.

Regarding fat carcass**,** Table 8 shows the results of the fat carcass of the animals that were not observed any significant differences between the four treatments in terms of kidney and pelvic, cardio, tail, caul, and total fats. Minerals and vitamins are additives that are essential for animal growth, reproduction, and health. Some of them help in enzyme production and metabolic activities in the reared animals (Hassan 2001; Al-Maathedy et al. 2020). However, in our study, they did not affect the studied characters.

References

Abdulateef, S.M.; Atalla, O.K.M.; L-Ani, Q.A.; Mohammed, T.H.T.; Abdulateef, F.M. & Abdulmajeed, O.M. 2021. Impact of the electric shock on the embryonic development and physiological traits in chick's embryo. Indian Journal of Animal Sciences 90(11): 1541–1545.

Alani, O.G.N.; Abdul-Rahaman, Y.T. & Mohammed, T.T. 2021. Effect of Vêo® Premium and Vitamin C Supplementation on Lipid Profile before and during pregnancy in some local Iraqi ewes during heat stress. Iraqi Journal of Science 2122-2130.

Al-Maathedy, M.H.; Mohammed, Th.T. & Al-Asha'ab, M.H. 2020. The effect of vitamin e supplementation and different levels of dried tomato pomace on common carp diets (*Cyprinus carpio* l.) on productive performance. Biochemical and Cellular Archives 20(2): 5371-5377.

Cutolo, M. 2008. Vitamin D or hormone D deficiency in autoimmune rheumatic diseases, including undifferentiated connective tissue disease. Arthritis Research and Therapy 10(6): 1-2.

Darbandi, M.; Darbandi, S.; Agarwal, A.; Sengupta, P.; Durairajanayagam, D.; Henkel, R. & Sadeghi, M.R. 2018. Reactive oxygen species and male reproductive hormones. Reproductive Biology and Endocrinology 16: 87-101.

Dkho, M.N. & Eliea, J. 1992. Sheep and goat production. ALhekma press. Baghdad University.

Duncan, D.B. 1955. Multiple range and multiple F test. Biometrics 11: 1- 42.

Hassan, M.J. 2001. Effect of Vitamin E on reproductive performance of Awassi sheep. A thesis of Agriculture College. Baghdad University.

Ibraheem, S.A. & AL dulaimi, M.M. 1991. Organic and biochemistry. Ministry of higher education and scientific research. Baghdad University. 102 p.

NRC. 1994. *National Research Council Nutrient Requirements of Poultry*. 9th ed. National Academy Press, Washington, D.C., U.S.A.

Ramya, S.; Shanmugasundaram, T. &

balagurunathan, R. 2015. Biomedical potential of actinobacterially synthesized selenium nanoparticles with special reference to anti-biofilm, anti-oxidant, wound healing, cytotoxic and anti-viral activities. Journal of Trace Elements in Medicine and Biology 32: 30-39.

SAS. 2012. SAS/STAT Users Guide for Personal Computers. Release. 9:1. SAS Institute Inc., Cary, N.C., U.S.A.

Sevcikova, S.; Skrivan, M.; Dlouha, G. & Koucky, M. 2006. The effect of selenium source on the performance and meat quality of broiler chickens. Journal of Animal Science 51(10): 449-457.

Tabbaa, M.J.; Kridli, R.T.; Amashe, M.G. & Barakeh, F.S. 2006. Factors affecting scrotal circumference and semen characteristics of Awassi rams. Jordan Journal of Agricultural Sciences 2: 243-250.