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IMPACT OF OLIVE LEAVES SUPPLEMENTATION IN AWASSI RATION ON SOME PRODUCTIVE AND BIOCHEMICAL BLOOD TRAITS

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ABSTRACT

The research was conducted to assess the effects of supplementing olive leaves on growth parameters and serum blood biochemical characteristics of Awassi lambs. Twenty-four (6 lambs/group and 5-6 month aged) with average weight (25.85±0.13 Kg) were assigned randomly into four groups. In the first group: T1, lambs were fed only standard ration (control). In the second, third and fourth groups, T2, T3 and T4, lambs were fed standard ration supplemented with olive leaves (25,50 and 75 gm/kg ration daily). The study lasted for twelve weeks. BW, BWG at two weeks, and RMG were detected. Serum blood (CHO, TRI, GLU, ALB, GLO and TP), were also estimated. The results illustrated BW increased significantly (P≤0.5) in T2 at the 4th and 6th weeks, while all olive leaf treatments supersized substantially at the 12th weeks of the study. Also, in T2, T3, and T4 lambs, body weight gain increased significantly at 10th compared with control, while T4 lambs had higher BWG considerably at the 12th week of the study. A significant effect was noticed in RMG in T1 lambs in the 12th week. The supplementing of olive leaves caused a substantial decrease in GHO of T4 and TRI of all treated lambs' blood serum in 1st month of the study. The same results were gained in 3rd month of the study. Also, TP increased significantly (P≤0.5) in T3 and T4 treatments in 3rd month of the study. In general, adding olive leaves to the diet of fattened lambs improves growth performance and some blood biochemical parameters.

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INTRODUCTION

Agriculture, which is based on both plants and animals, is one of the main pillars around which each country's economy is constructed. Animal products are also the world's capital and the exploitation of the earth's wealth since they contain animal protein, which is essential for human health and safety and human activity, vigor, growth, and the development of the body and intelligence. Animal farming provides the majority of animal protein, one of the most essential elements for human nutrition, and accounts for 20–30% of the agricultural economy in the Arab world. (Al-Jorani *et al.*, 2020). It is clear that there are many diverse genetic impacts on complex features, necessitating thorough research in a variety of breeds and situations (Esen *et al.*, 2024). Breed, age and grazing pattern also affect the health status and vaccination of the herd (Alhayali *et al.*, 2024 and Huthawer and Al-saadi., 2024)

For the importance of this subject to both the producer and consumer, many authors try to use alternatives to concentrated feeds that are economically expensive with available feeds that are considered by-products of the human food industry (Hame and Allawi., 2023). Using non-traditional feed materials, such as inexpensive

agricultural leftovers, will lower production costs. Feeding residual olive oil is unusual (Taheri *et al*., 2012). Awassi sheep are considered the largest breed in these countries. (Haddad and Ala., 2009). Awassi sheep have a brood tail and are well suited to semi-arid environments. However, providing food in these areas represents a significant obstacle for sheep breeders. (Jaber *et al*., 2004). In the past, the primary source of nutrition was pastures for sheep. Due to the lack of rainfall, these pastures were affected and now do not meet the animal's nutritional needs, which led to thinking about alternative sources of traditional fodder to provide a large protein of animal feed, which caused the high cost of feeding (Obeidat., 2022).

Many authors studied the factors affecting Awassi lambs' fattening to improve meat production (Alzidan *et al*., 2022; Sultan and Abdul-Rahman., 2023). Rams' reproductive activity is also influenced by their immediate environment, including their diet (Abdullah *et al*., 2022). Olive leaves can be collected as an agricultural product from two sources: the first is the harvested fruits for the oil extract, which represents about 10% of the total weight of the harvested fruits, and the second is from pruning the olive tree, which is estimated at 25kg per olive tree each year. The production of olive leaves is estimated at 21 million tons annually in the world (Paiva Martins.,2009). Olive leaves are suitable for feeding ruminants and can be used directly (Tzamaloukas, Neofytou, and Simitzis.,2021). It has been observed that, in comparison to hand harvesting, automated harvesting—which has become more common as olive production has intensified—may enhance the number of leaves that reach the presses by up to ten times. (Abu-Rumman, Khadir, and Khadir, 2018).

According to (Alomar *et al*. 2022), adding dried olive leaves to a 50:50 straw-concentrate mixture in place of 30 or 60% wheat straw and modifying the rations overall to be isocaloric and isonitrogenous had no discernible impact on the performance of rams. Therefore, olive leaves may be an essential ration source in large-scale animal production systems in arid regions. (Al-Masri *et al*. 2023), recorded that, feeding Awassi rams dried olive leaves, even at a 60% level, did not alter the rams' reproductive traits. As a result, the leaves could be utilized as a supplemental feed source for small ruminants. (Hussein *et al*., 2017), studied the effect of using olive tree pruning products in the rations of Awassi ewes on milk production, its components, the amount of feed consumed, and weight gain, using 24 Awassi ewes in the third and fourth season of milk production. The results showed that there were no significant differences between the olive leaves group (35% of the diet) in the consumed feed, and it was found that there was a substantial difference in the feeding costs for producing 1 kg of milk in favor of the olive treatment. In the (Alkhtib *et al*. 2021) study, the traditional fattening ration of a male Shami goat was replaced, resulting in a 19.8% and 20% decrease in feeding costs, respectively, with no adverse effects on the goat's health, growth performance, feed conversion ratio, or efficiency of nutrient use. Therefore, it can be suggested that olive tree leaves be used instead of the traditional Shami male goats. According to (Anter *et al*. 2011), olive leaf extract has the potential to both enhance human health and shield cells from oxidative damage induced by hydrogen peroxide without causing genotoxicity. According to (Sabry 2014), most people find olive leaves safe, non-toxic, and well-tolerated. No reports of toxicity or adverse events have been reported, and no medication interactions are currently recognized; olive leaves boost the effects of

blood pressure-lowering medications because of their properties. The objective of the current study is to find out whether olive leaves (25–50–75 g/kg diet) affect the biochemical and productive characteristics of Awassi lambs.

MATERIALS AND METHODS

Ethical Approve

The Scientific Ethical Committee accepted the research conducted at the University of Mosul/ College of Veterinary Medicine with letter number UM. VET. 2023.070.1/8/2023.

Study animals

This study was conducted in the Animal Production Department of the College of Agriculture and Forestry—University of Mosul. It continued for 90 days from 11/8/2023 until 2/6/2024, in which 24 Awassi lambs, 5-6 months old and whose average weight was 25, were used. 88 ± 0.68 were purchased from the local market. The lambs were randomly distributed into four treatments to study the effect of adding olive leaf powder to the diet on the productive and biochemical traits of Awassi lambs.

Study design

The lambs were assigned into four treatments, with six in each group. The first treatment was the control treatment; their average weight was 25.83 ± 2.19, and they were only given the standard diet. The second treatment had an average weight of 25.65 ± 1.15, and they were given the standard diet with the addition of 25 g/kg feed of dried olive leaves powder. The third treatment had an average weight of 25.91 ± 1.17. The standard diet was provided with 50 g/kg feed of dried olive leaves powder. As for the fourth treatment, its average weight was 25.83 ± 1.08. The standard diet was provided to them with 75 g/kg dried olive leaves feed, and the lambs were subjected to the same environmental conditions, where they were raised in adjacent semi-open barns.

Veterinary care

The animals were examined, and their safety was ensured before starting the study. They were healthy and subject to veterinary supervision throughout the study period. The lambs were dosed against internal parasites and re-dosed after two weeks with a 5 ml dose from Saudi Pharmaceutical Industries.

Lambs were injected with Ivermectin subcutaneously at a dose of 2 ml and re-injected after two weeks. Vaccinating animals with the Co-Baghdad vaccine against Enterotoxaemia at a dose of 2 ml subcutaneously with a vaccine produced by Saudi Pharmaceutical Industries and re-vaccinated a month later.

Lambs 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, hay, sodium bicarbonate, limestone, and table salt. Table 1 shows the proportions of these materials in the diet, as they were fed a group diet on the concentrated feed distributed randomly to the barns. The energy percentage reached 2487 kilocalories/kg. The dry matter percentage was 93.64%, and the crude protein percentage was 14.84%. The feed was provided at a rate of 3% of the live

body weight for each group. 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.

Studied productive characteristics

To determine the starting weights for the study, the lambs were weighed and then reweighed biweekly until the end of the survey to determine body weight (BW), body weight gain (BWG), and relative growth ratio (RGR). The animals were weighed using a scale with a sensitivity of 0.5 kg. The relative growth ratio was calculated according to the following equation:

$$\text{Relative growth ratio} = \frac{\text{Final BW} - \text{Initial BW}}{\text{Initial BW}} \times 100. \quad \text{(Gazal and Alsayegh, 1980)}$$

Table (1): Ingredients and chemical makeup of the ration utilized in the study.

ration materials	**%**
Black barley	65
Soybean meal	8
Wheat bran	20
hay	4
Urea	0.5
limestone	1
Sodium bicarbonate	1
NaCl	0.5
total	100

The chemical composition was calculated according to (Al-Khawaja *et al*. 1978).

Blood samples

Blood samples were drawn monthly from the lambs used in the study from the jugular vein. The blood samples were drawn in the morning and before providing feed and placed in regular plastic tubes that did not contain an anticoagulant. Then, using a centrifuge at 3500 rpm for 10 minutes to separate the blood serum, it was stored in 2-ml capacity sealed plastic tubes and placed in the freezer at a temperature of -20 Co; then cholesterol (CHO), triglycerides (TRI), glucose (GLU), albumin (ALB), globulin (GLO) and total proteins, were estimated. (Kridli *et al*., 2006).

Biochemical serum parameters

Serum glucose (Glu), total protein (TP), albumin (AL), globulin (GL)., triglycerides (TG) and cholesterol (CHOL) were all analyzed biochemically for the lipid profile, using commercial kits provided by Bio Lab, France access, the analysis was carried out according to standard procedures.

Statistical analysis

The SAS (2003) 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 (Torrie, Steele, 1984).

RESULTS AND DISCUSSION

Table (2) shows the effect of olive leaf supplementation (25, 50, and 75 g/kg ration) on the body weight of Awassi lambs in different weeks of the study. BW increased significantly (P≤0.05) in the second and fourth olive leaves treatments and recorded 32.00 and 31.16 kg, respectively, in the fourth week of the study compared to the control treatment (29.41) kg. In the fourth week, BW increased significantly in T2 and T4 (32.000 and 31.16 kg), compared with a control group (29.41 kg). In the sixth week of the study, T2 was supervised significantly (P≤0.05) (34.75 kg), compared to the control (33.33 kg), third, and fourth treatments, which amounted to 37.33 and 38.66 kg, respectively. It had a higher BW in the 8th week than the control (36.23 kg). The results obtained in the tenth and twelfth weeks regarding body weight achieved significant superiority (P≤0.05) for all olive leaf treatments, whose values were 41.50, 41.83, and 41.83 kg, respectively. They compared it to the control (37.83 kg) in the 10th week of the study. In the twelfth week, the significantly superior was to the second, third, and fourth olive leaves treatments in body weight, with over mean reaching 44.33, 44.58, and 45.75 kg, respectively. It starts from the second treatment compared to the control treatment (39.79) kg.

Table (2): Olive leaves treatments and its effects on body weight (kg) of Awassi lambs.

Traits / Treatments	Study weeks						
	Initial BW	2nd week	4th week	6th week	8th week	10th week	12th week
T^1	25.66 a ± 0.35	26.91 a ± 0.37	29.41 c ± 0.49	33.33 b ± 0.24	36.23 c ± 0.47	37.83 b ± 0.47	39.79 c ± 0.17
T^2	26.00 a ± 0.25	28.16 a ± 0.62	32.00 a ± 0.44	34.75 a ± 0.28	38.00 ab ± 0.44	41.50 a ± 0.56	44.33 b ± 0.12
T^3	25.91 a ± 0.20	26.66 a ± 0.27	30.50 bc ± 0.28	33.58 b ± 0.47	37.33 b ± 0.21	41.83 a ± 0.54	44.58 b ± 0.43
T^4	25.83 a ± 0.27	28.00 a ± 0.54	31.16 ab ± 0.33	34.33 ab ± 0.33	38.66 a ± 0.21	41.83 a ± 0.70	45.75 a ± 0.25

A significant difference is shown by different letters arranged vertically at (P≤0.05).
T^1: Control group, T^2: Olive leaves 25 gm/kg ration, T^3: Olive leaves 50 gm/kg ration, T^4: Olive leaves 75 gm/kg ration.

The effects of olive leaves on BWG are reported in Table 3. The BWG increased significantly (P≤0.05) in T2 and T3 treatments, 3.83 and 3.83 kg in computation with control (2.5 kg). However, compared to the control treatment, which had a weight gain of 1.60 kg, the BWG in the second, third, and fourth olive treatments increased significantly (P≤0.05). They recorded 3.50, 4.50, and 3.16 kg, respectively, compared to the control (1.60 kg). The study's results also showed an increase in BWG at the end of the study of T4 (3.91 kg), compared with T1, T2, and T4 treatments, which recorded 1.95, 2.83, and 2.75 kg, respectively.

The olive leaves addition to the diet caused a significant increase (P≤0.05) Table (4) in RGR of all olive leaves treatments in the 4th week of the study and recorded 13.81, 14.40, and 11.44, compared with control (9.29).

Table (3): Olive leaves treatments and its effects on body weight gain (kg) of Awassi lambs.

Traits / Treatments	Study weeks					
	2nd week	4th week	6th week	8th week	10th week	12th week
T^1	1.25 ab ± 0.28	2.50 b ± 0.31	3.91 a ± 0.47	2.90 b ± 0.44	1.60 b ± 0.20	1.95 b ± 0.39
T^2	2.16 a ± 0.42	3.83 a ± 0.57	2.75 a ± 0.33	3.25 ab ± 0.33	3.50 a ± 0.56	2.83 ab ± 0.49
T^3	0.75 b ± 0.17	3.83 a ± 0.24	3.08 a ± 0.49	3.75 ab ± 0.52	4.50 a ± 0.61	2.75 ab ± 0.66
T^4	2.16 a ± 0.45	3.16 ab ± 0.42	3.16 a ± 0.21	4.33 a ± 0.21	3.16 a ± 0.60	3.91 a ± 0.67

A significant difference is shown by different letters arranged vertically at (P≤0.05).
T^1: Control group, T^2: Olive leaves 25 gm/kg ration, T^3: Olive leaves 50 gm/kg ration, T^4: Olive leaves 75 gm/kg ration.

In the 8th week, RGR supersized significantly in T2 and T4 (11.27 and 12.65), in corporation with T1 and T2 (8.71 and 9.35). Meanwhile, T2 and T3 had higher RGRs of 9.25 and 12.07 in the 10th week of the study. All olive leaves treatments recorded a significant increase in RGR at the end of study (9.50, 6.65 and 6.91), compared with control (5.24). The results obtained in our research related to production traits are inconsistent with the results of AL-Ghuraibawi (2022), who stated that the rate of weight growth has significantly increased when using silage containing 25 or 50% of olive twigs and leaves in Awassi lambs ration. Obeidat, & Thomas, (2023), not confirming our findings, they stated that the growth performance of developing Awassi lambs was unaffected by the addition of olive leaves to their diet at 0 or 150 g/kg.

Table (4): Olive leaves treatments and its effects on relative growth ratio (kg) of Awassi lambs.

Traits / Treatments	Study weeks					
	2nd week	4th week	6th week	8th week	10th week	12th week
T^1	4.90 ab ± 1.13	9.29 c ± 1.17	13.44 a ± 1.79	8.71 b ± 1.36	4.42 b ± 0.56	5.24 c ± 1.13
T^2	8.28 a ± 1.58	13.81 a ± 2.33	4.66 b ± 1.17	9.35 b ± 0.97	9.25 a ± 1.53	6.91 b ± 1.24
T^3	2.89 b ± 0.65	14.40 a ± 1.00	10.14 ab ± 1.64	11.27 a ± 1.68	12.07 a ± 1.69	6.65 b ± 1.63
T^4	8.38 a ± 1.77	11.44 b ± 1.66	10.17 ab ± 0.71	12.65 a ± 0.72	8.17 b ± 1.53	9.50 a ± 1.76

A significant difference is shown by different letters arranged vertically at (P≤0.05).
T^1: Control group, T^2: Olive leaves 25 gm/kg ration, T^3: Olive leaves 50 gm/kg ration, T^4: Olive leaves 75 gm/kg ration.

(Abbas 2016) observed phenolic compounds (Europeans) in olive tree waste (Apak *et al*., 2007). These compounds inhibit the breakdown of protein in the rumen, cross into the stomach and intestines, and transport it there as amino acids. They also break down sources of carbohydrates for fermentation and increase the digestibility

factor of certain nutrients. One of these reasons may be the animal's final weight supporter. Za'za (2008) observed that when Awassi lambs were fed three distinct kinds of fodder, their performance improved as the hay ratio dropped and the ultimate weight gain rate with silage was significantly raised. According to Eltayef (2017), olive leaves may increase enzymatic activity by improving the GOT activation process, which is crucial for bodily organs, including the pancreas and liver, to increase the rate in grams per day. Lambs fed olive tree waste, leaves, and twigs in addition to yeast or urea in a different study by (Fayde *et al*., 2009) showed a significant rise in weight gain rate. The experiment's findings indicated that when lambs were fed three levels of silage (olive waste) in place of barley grains (10, 20, or 30% on a dry matter basis), their average daily weight gain increased (Thair *et al*., 2012). However, Ibraham (2015) reported that the final weight in kg and daily weight in g/day, as well as feed conversion efficiency, were significantly higher when progressive proportions of olive and acacia leaf residue (0:100, 0:100, 35:65, and 65:35), were used. (Alkhtib *et al*., 2021) reported in their study on Shami goats that olive leaves have no significant effect (replacement 37.7%) on average daily gain or feed conversion ratio. Goat health was unaffected by this replacement, but feeding costs were 20% lower.

Table (5) shows the effect of adding olive leaves (25,50 and 75 g/kg ration) to the standard diet on the biochemical blood characteristics of Awassi lambs one month after the beginning of the study, T4 recorded a lower level of CHO (65.40 mg/dl) significantly (P≤0.05) as compared with T2 (68.59 dl), there was no significant difference compared with control and T3 groups (66.72 and 66.31 mg/dl). A significant decrease in TG concentration in all olive leaf treatments amounted to 23.71, 25.39, and 25.09 mg/dl, respectively, compared with control (30.74 mg/dl). Adding olive leaves to the ratio increased significantly (P≤0.05) GLU level and averaged 46.50, 48.01, and 50.85 mg/dl, compared with the control 43.29 mg/dl. On the other hand, TP increased significantly in T3 and T4 (6.99 and 6.82 gm/dl) compared with control and T2 (6.47 and 6.34 gm/dl), respectively.

Table (5): Olive leaves treatments and its effects on biochemical traits of Awassi blood serum at first month of study.

Traits / Treatments	Cholesterol mg/dl	Triglycerides mg/dl	Glucose mg/dl	Albumin gm/dl	Globulin gm/dl	Total protein gm/dl
T^1	66.72 ab ± 1.04	30.74 a ± 1.14	43.29 d ± 0.63	4.36 a ± 0.21	2.26 ab ± 0.24	6.47 b ± 0.11
T^2	68.59 a ± 0.32	23.71 b ± 1.45	46.50 c ± 0.17	4.21 a ± 0.16	2.13 b ± 0.19	6.34 b ± 0.09
T^3	66.31 ab ± 0.90	25.39 b ± 1.65	48.01 b ± 0.38	4.11 a ± 0.16	2.88 a ± 0.22	6.99 a ± 0.09
T^4	65.40 b ± 0.75	25.09 b ± 1.76	50.85 a ± 0.33	4.36 a ± 0.26	2.45 ab ± 0.26	6.82 a ± 0.11

A significant difference is shown by different letters arranged vertically at (P≤0.05).

T^1: Control group, T^2: Olive leaves 25 gm/kg ration, T^3: Olive leaves 50 gm/kg ration, T^4: Olive leaves 75 gm/kg ration.

Table (6) shows the effect of adding olive leaves (25-50-75 g/kg ration) to the diet on the biochemical blood traits of Awassi lambs at the end of the second month of the study, as the CHO level decreased significantly (P≤0.05) in blood serum of T2, T3 and T4 lambs, and averaged 67.83, 71.5 and 69.16 mg/dl respectively in comparison with control (85.12 mg/dl). Also, TRI concentration decreased in olive leaf treatments and averaged 38.38, 38.80, and 38.01 mg/dl, respectively, compared with the control (43.80 mg/dl). While all olive treatments were significantly superior in the level of Glu, as its values were 64.65, 62.75, and 62.78 mg/dl, compared to the control (52.97 mg/dl).

Table (6): Olive leaves treatments and its effects on biochemical traits of Awassi blood serum at second month of study.

Traits / Treatments	Cholesterol mg/dl	Triglycerides mg/dl	Glucose mg/dl	Albumin gm/dl	Globulin gm/dl	Total protein gm/dl
T^1	85.12 a ± 0.60	43.80 a ± 0.64	52.97 b ± 0.77	3.79 a ± 0.08	2.66 a ± 0.11	6.45 a ± 0.13
T^2	67.83 b ± 2.27	38.38 b ± 0.56	64.65 a ± 0.26	3.52 b ± 0.11	2.72 a ± 0.32	6.25 a ± 0.33
T^3	71.50 b ± 1.91	38.80 b ± 0.22	62.75 a ± 0.76	3.47 b ± 0.11	2.83 a ± 0.11	6.31 a ± 0.09
T^4	69.16 b ± 1.24	38.01 b ± 0.36	62.78 a ± 0.77	3.63 ab ± 0.07	3.20 a ± 0.09	6.83 a ± 0.05

A significant difference is shown by different letters arranged vertically at (P≤0.05).
T^1: Control group, T^2: Olive leaves 25 gm/kg ration, T^3: Olive leaves 50 gm/kg ration, T^4: Olive leaves 75 gm/kg ration.

The biochemical parameters at the end of the study in Table (7) show that CHO and TRI decreased significantly (P≤0.05) in olive leaves treatments and recorded values of CHO 61.15, 62.56, and 64.31 mg/dl for T2, T3, and T3 respectively compared with control (74.98 mg/dl).

Table (7): Olive leaves treatments and its effects on biochemical traits of Awassi blood serum at third month of study.

Traits / Treatments	Cholesterol mg/dl	Triglycerides mg/dl	Glucose mg/dl	Albumin gm/dl	Globulin gm/dl	Total protein gm/dl
T^1	74.98 a ± 0.28	46.95 a ± 0.16	67.58 b ± 1.03	4.36 a ± .21	2.26 a ± 0.24	6.47 b ± 0.11
T^2	61.15 d ± 0.15	42.18 b ± 0.15	64.71 c ± 0.67	4.07 a ± 0.13	2.27 a ± 0.14	6.34 b ± 0.09
T^3	62.56 c ± 0.28	42.46 b ± 0.32	68.29 b ± 0.57	4.11 a ± 0.16	2.88 a ± 0.22	6.99 a ± 0.09
T^4	64.31 b ± 0.24	34.23 c ± 0.12	71.42 a ± 0.93	4.49 a ± 0.17	2.33 a ± 0.20	6.82 a ± 0.11

A significant difference is shown by different letters arranged vertically at (P≤0.05).
T^1: Control group, T^2: Olive leaves 25 gm/kg ration, T^3: Olive leaves 50 gm/kg ration, T^4: Olive leaves 75 gm/kg ration.

TRI values were 42.18, 42.46, and 34.23 mg/dl, respectively, compared with the control (46.95 mg/dl). Total protein achieved higher significant values in T3 and T4, with over mean reaching 6.99 and 6.82 gm/dl, respectively.

Oleuropein, oleuropein aglycone, and hydroxytyrosol, rich in olive leaves, have been shown to have a hypocholesterolemic effect on serum CHO and TRI levels. They also can enhance antioxidant enzyme activity, slowing down the lipid peroxidation process (Jemai *et al*., 2008); these effects could be responsible for the significant decrease in CHO and TRI concentration we observed throughout the research. (Japon-lugan *et al*, 2006), reported that olive leaves have a high content of phenolic compounds. Also, (Salah *et al*., 2012), determined that poly phenols represented about 33-46% of the rural phenolic compounds of olive leaves. (Papoutsi *et al*. 2005) reported that other plant leaves, such as Oak leaves, contain active polyphenols such as Ellagic acid and Gallic acids. (Jafari *et al*., 2018), showed that feeding does at late pregnancy Oak reduce glycerides serum levels. Also, in lactating black goats fed with Oak, serum globin protein was elevated significantly compared to control (Hidayet and Mustafa., 2020). The significant increase in total protein in our study may belong to phenolic compounds in olive leaves (Abbas., 2016), and these compounds inhibit the breakdown of protein in the rumen, cross into the stomach and intestines, and transport it there as amino acids (Apak *et al*., 2007).

CONCLUSIONS

The results indicated that the growth performance and certain blood biochemical features of developing Awassi lambs were enhanced by supplementing their diets with olive leaves at 25, 50, or 75 g/kg. Therefore, additional studies are required to evaluate the effects of involving olive leaves in diets with varying amounts and compositions. The results of this study will help livestock producers overcome obstacles related to feed availability and reduce production costs; thus, it may also increase the producers' profit margin. Many studies must be done on ewes and its milk production.

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CONFLICT OF INTERESET

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

أثر إضافة أوراق الزيتون الى علائق الحملان العواسية على الصفات الإنتاجية والكيموحيوية للدم

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قسم الإنتاج الحيواني / كلية الزراعة والغابات / جامعة الموصل / الموصل / العراق [1،2]

الخلاصة

أجري هذا البحث لتقييم تأثير إضافة أوراق الزيتون على مؤشرات النمو والصفات البيوحيوية لدم الحملان العواسية. تم تقسيم أربعة وعشرون حملا (6/مجموعة)، بعمر 5–6 أشهر وبمتوسط وزن 25.85±0.13 كغم عشوائياً إلى أربع مجموعات. المجموعة الأولى: T1، تم تغذية الحملان على العليقة القياسية فقط (السيطرة). المجموعات الثانية والثالثة والرابعة: T2، T3 وT4، غذيت على عليقة قياسية مضاف إليها مسحوق أوراق الزيتون (25 و50 و75غم/كغم علف يومياً). واستمرت الدراسة لمدة اثني عشر أسبوعا. تم وزن الجسم كل أسبوعين كل أسبوعين لا يجاد معدل الزيادة الوزنية ومعدل النمو النسبي. تم أيضًا تقدير الكيموحيوية لمصل الدم (الكوليستيرول والكليسيريدات الثلاثية والكلوكوز والالبومين والكلوبيولين والبروتين الكلي) في مصل الدم. تبين من النتائج وجود زيادة معنوية($P\leq0.05$) لوزن الجسم في المعاملة الثانية في الأسبوعين الرابع والسادس، في حين حققت جميع معاملات أوراق الزيتون ارتفاعا معنويا في وزن الجسم في الأسبوع الثاني عشر من الدراسة. كما ارتفع معدل الزيادة الوزنية ومعدل النمو النسبي معنويا في حملان مجاميع T2 وT3 وT4 في الشهر العاشر من الدراسة مقارنةً بمجموعة السيطرة، وسجلت حملان المجموعة الرابعة ارتفاعا معنويا للزيادة الوزنية في الأسبوع الثاني عشر من الدراسة.. أدت إضافة أوراق الزيتون إلى انخفاضا معنويا في تركيز الكوليستيرول لـ T4 والكليسيريدات الثلاثية لجميع معاملات ورق الزيتون في مصل دم الحملان في الشهر الأول من الدراسة. وتم تسجيل نفس النتائج في الشهر الثالث من الدراسة مع وجود ارتفاعا معنويا في تركيز البروتين الكلي في مصل دم حملان مجموعتي ورق الزيتون الثالثة والرابعة. بشكل عام، أدى اضافة ورق الزيتون الى علائق الحملان المسمنة الى تحسن أداء النمو وبعض الصفات الكيموحيوية للدم.

الكلمات المفتاحية: الحملان العواسية، الكوليستيرول، صورة الدم، أداء النمو.

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