

EFFECT OF WOOL SHEARING AND DIET SUPPLEMENTING WITH CURCUMIN ON SOME PRODUCTIVE AND BLOOD BIOCHEMICAL TRAITS OF AWASSI LAMBS

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ABSTRACT

The study was done to evaluate the impacts of either shearing or supplementing of 200 mg/Kg of *Curcuma longa* or their combination, on productive and some serum blood biochemical traits of Awassi lambs. Twenty four (6 lambs/group), 5-6 month old with average trail weight (29.57 Kg) were assigned randomly into four groups. The first group: T¹ lambs were fed only control diet (control). The second group: T² lambs were shared and fed also the control group diet. The third group: T³ lambs were fed control diet supplemented with *Curcuma longa*, 200 mg / kg diet . The fourth group: T⁴ shared and fed also the control group diet and supplemented with *Curcuma longa*, 200 mg / kg diet. The experiment lasted for three months. Final body weight, average daily gain and relative mean growing were detected. Serum blood glucose, total proteins, albumin, globulin, cholesterol, triglycerides, and liver enzymes AST and ALT were also analyzed. The results showed that final body weight, body weight gain, serum total protein and globulin significantly ($P \leq 0.05$) increased, when lambs supplemented with *Curcuma longa* (T³) and shared and supplemented (T⁴) compared with other groups. Also, the results showed a significant ($P \leq 0.05$) increasing in serum triglyceride and decreasing in AST when lamb shared and supplemented with *Curcuma longa*. While ALT increased significantly in T⁴. No significant differences were presented between groups in relative mean growing, glucose, albumin, and cholesterol at 12th week of study.

Keywords: Shearing, *Curcuma longa*, blood parameters, Awassi lambs.

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INTRODUCTION

Small ruminant have a unique niche for farmers, because sheep require small investments, and short production cycles, great environmental adaptability and faster growth rates as compared with large ruminants, also provide good protein sources and income for most farmers (Tibbo *et al.*, 2006). Sheep are the main source of meat production in Iraq, they are considered one of the most important animals for breeders. They are the most suitable animals for Iraq's arid and semiarid Climate, in addition. Sheep are the source of live hood for rural people and for their short production cycle (Hashem *et al.*, 2013) and increased demand for sheep meat

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(Alkass and Juma ., 2005), because of their palatability acceptance by the consumer therefor, It requires increasing their numbers through increasing the rates of reproduction and growth to reach better marketing weight and desired meat recipes (Dickerson *et al.*, 1972). Awassi lambs considered an important breed in Iraq, This breed is characterized by its good production of meat quantity and quality (Rashid *et al.*, 1987). Thermal stress effects on animals production when temperatures rise and heat load leads to affect the biological functions which leads to reduce feed consumption of the animals (Schoenlank., 2010). Because of the effect of wool on sheep and the high temperatures that surrounding animals, many studies had done to revealed the effects of shearing wool on productive traits of sheep (Mahrose *et al.*, 2014). The use of Medical plants as addition to the animals rations leads to improve productive and reproductive performance, because natural plants contain active substances that improve the environmental condition of the Gut. Medical plants also increase the useful microorganisms of the animal, improve growth, and increase the efficiency of feed conversion and carcass Characteristics (Hassan. 2009). *Curcuma longa* is a medical plant (medical herb) as it is used in the medical field as an antifungal (Wuthi-udomler *et al.*, 2000), anti-bacterial and infections effectively (Fang *et al.*, 2003), *Curcuma longa* contains vitamins, fibers and coloring matter that gives the tallow color to turmeric. Turmeric contains 6.3% protein, 5.1% fat and 69.4% carbohydrate (Arora *et al.*, 1987) and (Bakhru *et al.*, 1997). Adding Curcumin to the ration (100 or 200 mg/ kg of ration leads to increase the body weight of lambs (Victor *et al.*, 2019). The study aimed to investigate the effects of shearing and adding *Curcuma longa* to the ration In Awassi lambs performance traits and biochemical parameters.

MATERIALS AND METHODS

This study was carried out in Animal production field , College of Agriculture and Forestry, University of Mosul at the period 3/10/2019 to 2/1/2020 , to study the effects of shearing, and adding *Curcuma longa* in performance and blood parameters of Awassi lambs. A total of 24 Awassi male lambs (5-6 months old), which were healthy and with almost similar initial body weight (29.57 Kg). All lambs were fed 1.25 kg/lamb/day on the experimental diet which consists of 70% barley, 17% wheat bran, 7% soybean meal, 4% wheat straw and 1% urea as presented in Table 1. Lambs were randomly divided into four equal groups (6 per each). The first group (T¹) fed standard ration with no supplementation or sharing and considered as control, lambs in second group (T²) were shared at the beginning of experiment. Animals in third group (T³) their diet supplemented with 200 mg/kg Curcumin, while in forth group (T⁴) were shared and the diet supplemented 200 mg/kg Curcumin and drinking water was available all times. Lambs were weighed before the morning feeding at the beginning and at 12th week of the study. Final body gain (BG) for the lambs was calculated by subtracting initial from final BW and then dividing by the duration of study. The relative mean growing was calculated by using the following formula:

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

Blood samples were collected from the jugular vein of each animal at the 3rd month of study. Samples were centrifuged at 3000 rpm for 15 min, and then frozen at - 20 °C until subsequent analysis. Biochemical analyses included serum glucose (Glu), total protein (TP), albumin (AL) and globulin (GL). For lipid profile, cholesterol (CHOL), and Triglyceride (TG). For liver function alanine aminotransferase (ALT), aspartate aminotransferase (AST), were examined. The analysis were conducted by standard methods using commercial kits supplied from Bio lab, France access.

Table (1): Component and chemical composition of ration.

Ingredients of DM	%
Barley	70
Wheat bran	17
Soybean meal	7
wheat straw	4
Urea	1
Common Salt	0.5
CaCo3	0.5
chemical analysis	
Cp %	13.96
Ca %	0.39
P %	0.31
ME (Kcal /Kg)	2624
Protein and metabolizable energy were calculated based on dry matter (Al-Khwaja <i>et al.</i> , 1978).	

Statistical analysis:

Shearing and Curcumin data were analyzed by Statistical Analysis using the (CRD) design by Anonymous (SAS. 2003), according to the following model:

$$Y_{ijk} = \mu + F_i + e_{ijK}$$

Standard errors, differences within means were calculated by Duncan test (Steel and Torrie., 1984).

RESULTS AND DICUSSION

Table (2) showed the results of the statistical analysis of the study data which revealed a significant ($P \leq 0.05$) increase in final BW in 3rd and 4th groups at 12th week (45.21 and 44.70 kg) respectively, as compared with other groups. Results of BG revealed a significant increase ($P \leq 0.05$) in 3rd and 4th groups (15.63 and 15.30 kg) respectively as compared with other groups. Relative mean growing, increased in 3rd group (11.33), but not arrived to significantly.

The results obtained in this study revealed a significant increase in BW in 4th group lambs of the effect of shearing are in agreement with the results of Mohammed *et al.*, (2015) in the effect of shearing, whose improved BW significantly after three months after shearing, and results of the study of Mclean *et al.* (2015), which leads to significant BG of shearing lambs compared with unsheared lambs, also results are with agreement with the results of Jake *et al.* (2006) in a study on male and female lambs of (Hampshire and Columbia), while Sultan (2016) not reported any effect of shearing on BW in his study on 20 Awassi rams, the increase of BW appeared in group of shearing and grazing in his study. Nursing lambs reared on concentrate containing *Curcuma longa* showed higher BG and WG in accordance to what was record by Victor *et al.* (2019) in study on 64 Lacaunc lambs fed ration with 100 and 200 mg/kg ration, as compared with control group.

Table (2): Effect of shearing and *Curcuma longa* on some productive traits of Awassi lambs.(Means \pm SE).

Treatments Traits	T ¹	T ²	T ³	T ⁴
Initial body weight (kg)	29.75a \pm 0.25	29.55a \pm 0.39	29.58a \pm 0.35	29.40a \pm 0.49
Final body weight (kg)	42.16 b \pm 0.71	42.37 b \pm 0.12	45.21 a \pm 0.17	44.70 a \pm 0.37
Body weight gain (kg)	12.41 b \pm 0.84	12.82 b \pm 0.37	15.63 a \pm 0.37	15.30 a 0.76 \pm
Relative mean growing %	8.53 a \pm 2.02	8.25 a \pm 1.18	11.33 a \pm 1.74	8.53 a \pm 1.31

T¹: Control group, T² lambs sheared, T³ lambs received 200 mg *Curcuma longa*/kg ration and T⁴ lambs sheared and 200 mg *Curcuma longa* /kg ration.

Different letter in same row differ at (P \leq 0.05) significantly.

Results also with agreement with Habeeb and El-Tarabany (2012) in there study on Zaraibi does (4 – 5 month aged). According to these authors, a ration containing 2g/kg *Curcuma longa* increased BW and BG in all months of study. Positive effect of *Curcuma longa* to the ration also found higher weight gain was record in the study of Maria et al (2016) in lambs reared on standard diet containing 25, 100, and 200 gm/kg *Curcuma longa*. Fahmida *et al.*, (2016) demonstrated that Curcumin powder at level 0.2 and 0.6% of body weight increased BW and BG in Black Beugel goats as compared with control also Cervantes Valencia *et al.* (2016) demonstrated that *Curcuma longa* enhanced body immunity by increasing IgG, IgM and IgA in blood plasma. Also (Zhiyang Jiang *et al.*, 2019) recorded that *Curcuma longa* increase the activity and absorption of digestive Cannel enzymes including trypsin, lipase and ck. The highest average WG and BG by adding *Curcuma long* to ration may be belonged to the effect of *Curcuma longa* increased total antioxidant capacity and reduced lipid peroxidation (Jaguezeski *et al.*, 2019), also researchers recorded the ability of *Curcuma longa* to kill parasites and improve performance of lambs Fahmida *et al.*, (2016).

Results of biochemical blood parameters (Table 3) at 12th week of study revealed a significant ($P \leq 0.05$) increase in TP and GLU in 3th and 4th groups as compared with other groups. No significant differences were presented between groups in glucose, albumin, and Globulin/Albumin at 12th week of study.

Table (4) showed the results of some lipid profile and liver enzyme traits, which illustrated that, there are a significant ($P \leq 0.05$) increase in TG and significant decrease in AST concentration in treated groups, as compared with control, also ALT concentration decreased significantly in T⁴ as compared with other treatments.

The results of blood parameters that obtained in this study are with agreement with the results of Habeeb *et al.*, (2009); El-Gohary *et al.*, (2012) and Habeeb and El-Tarabany (2012), whom recorded an increase in TP by adding curcuma longa to ration. Antonise *et al.* (2018) demonstrated a significant increase in TG and

Table (3): Effect of shearing and *Curcuma longa* on some serum blood biochemical traits of Awassi lambs.(Means \pm SE).

Treatments Traits	T1	T2	T3	T4
Glucose mg/100 ml	73.37 a ± 1.83	70.87 a ± 2.02	67.50 a ± 3.73	74.25 a ± 3.21
Total protein gm/100ml	6.47 b 0.09 \pm	6.45 b ± 0.11	6.80 a ± 0.03	6.76 a ± 0.04
Albumin gm/100ml	2.77 a ± 0.14	2.75 a ± 0.08	2.67 a ± 0.04	2.67 a ± 0.08
Globulin gm/100ml	3.68 b ± 0.10	3.70 b ± 0.08	4.12 a ± 0.04	4.09 a ± 0.04
Globulin/Albumin	1.34 a ± 0.09	1.35 a ± 0.05	1.54 a ± 0.04	1.53 a ± 0.06

T¹: Control group, T² lambs sheared, T³ lambs received 200 mg Curcuma longa/kg ration and T⁴ lambs sheared and 200 mg Curcuma longa /kg ration.

Different letter in same row differ at ($P \leq 0.05$) significantly.

Table (4): Effect of shearing and *Curcuma longa* on some lipid profile and liver function enzymes traits of Awassi lambs blood serum.(Means \pm SE).

Treatments Traits	T1	T2	T3	T4
Cholesterol mg/ 100 ml	56.35 a ± 8.47	47.15 a ± 8.26	34.50 a ± 5.47	46.00 a ± 9.57
Triglycerides mg/100 ml	24.78 b ± 1.54	32.68 a ± 1.31	33.64 a 0.52 \pm	35.86 a ± 0.79
AST unit/ ml	126.65 a ± 1.18	109.67 b ± 0.73	114.00 b ± 3.99	110.12 b ± 2.78
ALT unit/ ml	15.30 a ± 1.78	12.50 ab ± 0.86	11.95 ab ± 0.60	11.34 b ± 0.20

T¹: Control group, T² lambs sheared, T³ lambs received 200 mg Curcuma longa/kg ration and T⁴ lambs sheared and 200 mg Curcuma longa /kg ration.

Different letter in same row differ at ($P \leq 0.05$) significantly.

decrease in AST in his study on Lacaune sheep received ration containing the curcumin (60 mg/animal/day). The improvement of TP and GLU in blood serum of lambs reared on ration contained Curcumin may be belong to sulphur material, which stimulate lymphocytes cells division, which associated with globulin immunity (El-shabrawy., 1980). Curcumin also have a positive impact on immune (Galli *et al.*, 2018). A ration containing Curcumin decreased AST levels in blood serum lambs, may belong to the ability of Curcuma longa to stimulate liver cells secretion of pancreas (Corleto and Delle, 2003).

In conclusion, shearing and Curcumin supplementation lead to increase body weights and gain, and improved immunity by increasing TP, GLU and decreasing ALT and ALT of Awassi lambs,

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تأثير جز الصوف واضافة الكركم *Curcuma longa* الى العليقة في بعض الصفات الانتاجية والكيموحيوية للحملان العواسية

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الخلاصة

اجريت الدراسة لتقدير تأثيرات جز الصوف او اضافة 200 ملغم/كغم من الكركم (*Curcuma longa*) ، او الاثنين معا في الصفات الانتاجية وبعض صفات الدم الكيموحيوية للحملان العواسية، اذ استخدم 24 حملا (6 حمل/مجموعة) بعمر 5-6 شهر بمتوسط وزن 29.57 كغم ، قسمت عشوائيا الى اربعة مجاميع. المجموعة الاولى: غذيت على العليقة القياسية وعدت كمجموعة سيطرة. المجموعة الثانية : تم جز صوفها وغذيت ايضا على العليقة القياسية. المجموعة الثالثة: غذيت على العليقة القياسية مضافا اليها 200 ملغم /كغم كركم، بينما غذيت المجموعة الرابعة على العليقة القياسية مضافا اليها 200 ملغم/كغم الكركم وتم جز صوفها، ولمدة 90 يوما. تم تسجيل الاوزان الابتدائية والنهائية والزيادة الوزنية النهائية ومعدل النمو النسبي، كما تم تقدير تركيز الكلوكوز والبروتين الكلي والالبومين والكلوبيولين والكلوستيروول والكليسيوريدات الثلاثية وانزيمي الكبد (ALT و AST) في مصل دم الحملان. تبين من النتائج ، وجود زيادة معنوية ($P \leq 0.05$) في وزن الجسم النهائي والزيادة الوزنية النهائية والبروتين الكلي والكلوبيولين في المعاملتين الثالثة (الكركم) والرابعة (الجز والكركم)، مقارنة بباقي المعاملات، كما تبين من النتائج وجود ارتفاعا معنويا ($P \leq 0.05$) في تركيز الكليسيوريدات الثلاثية، وانخفاضا معنويا لتركيز انزيم AST في المعاملات الثلاثة مقارنة بمجموعة السيطرة، في حين انخفض معنويا تركيز انزيم ALT في معاملة الجز والكركم مقارنة بباقي المعاملات. لم تسجل تأثيرات معنوية في المعدل النسبي للنمو وتركيز الكلوكوز والالبومين والكلوستيروول في الاسبوع الثاني عشر من الدراسة.

الكلمات الدالة: الجز، الكركم، الصفات الكيموحيوية، الحملان العواسية.

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