



Effect of different flax diet concentrations on body weight gain and some of blood parameters of Awassi sheep

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Abstract

The study was conducted on 40 Awassi sheep through the year 2014 from the flock reared in Faculty of agriculture / Kufa University. Five treatments included levels of flax (0.0, 2, 4, 6 and 8) %. Body weight in three ages (live weight at 6month, at 9months and at 12 months) was evaluated using variance analyses. Results showed a significant effect ($p \leq 0.05$) of flax in live body weight the highest BW6, BW9 and BW12 were in the males group that fed with 8% flax it's about 35.22, 46.06 and 58.22 kg respectively compared with the same level of diet flax in female group it's about 30.81, 37.26 and 47.37 kg respectively.

Results showed no significant effect of flax and sex in blood parameters of Awassi sheep but there were theoretical differences. The highest total protein value was in male group that fed on 8% of flax its about 74.50 gm/L while the highest value of total lipids was found in the same group it's about 1.56 g/L. The highest value of urea was in male blood that fed on 6% of flax and the highest value of blood cholesterol was found in male group that fed on 8% of flax, it's about 11.28 and 2.51 respectively.

Key words: Awassi sheep, body weight, flax

المستخلص: ذية بمستويات مختلفة من بذور الكتان على وزن الجسم وبعض مقاييس الدم في الأغنام العواسية .

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الخلاصة

أجريت الدراسة على 40 رأساً من الأغنام العواسية خلال العام 2014 في حقول قسم الثروة الحيوانية – كلية الزراعة – جامعة الكوفة وتم استخدام خمسة علائق حاوية على مستويات مختلفة من بذور الكتان بنسبة (0, 2, 4, 6, 8) % وتم تسجيل الوزن الحي بعمر ستة أشهر وتسعة أشهر وسنة ولكلا الجنسين . أظهرت النتائج وجود تأثير معنوي للكتان في وزن الجسم إذ أعطت المعاملة الحاوية على 8% من بذور الكتان أعلى وزن جسم حي لدى الذكور وللمرحلة العمرية الثلاثة إذ بلغ (35 و 46,06 , 58 و 22) كغم على التوالي .

لم يكن هنالك تأثير معنوية لإضافة بذور الكتان بنسب مختلفة إلى علائق الأغنام العواسية ولجميع مقاييس الدم التي شملتها الدراسة الحالية وهي البروتين الكلي , الدهون الكلية , اليوريا و الكوليستيرول .
كلمات مفتاحية : الأغنام العواسية , بذور الكتان , الزيادة الوزنية

Introduction

Awassi is one of the dual-purpose, fat-tailed sheep breeds which can be accepted as a sheep-milk resource in south-west Asia (Iraq, Jordan, Palestine, Lebanon and Turkey). It also exists in Europe, Australia, New Zealand, and China. The breed is well adapted to harsh conditions and capable of producing and reproducing under these circumstances (1).

Flax (*Linum usitatissimum*) is an oilseed produced predominantly in the northern Great Plains and Canada (2). Traditionally, flax is crushed to produce linseed oil for industrial applications, and the resultant flaxseed (also called linseed) meal is used as a protein supplement in livestock feeds.

Similar to most grains and oilseeds, the composition of flax can vary based on variety, environmental factors and method of analysis (3). Limited data are available regarding proximate (nutritive) analysis of flax. Values most commonly used are 41 percent oil, 20 percent protein and 28 percent dietary fiber (2).

Maddock et al. (4) fed whole or processed (rolled or ground) flax, included at 8 percent of diet DM, and reported significant increases in gain and gain efficiency and no differences in DM intake when compared with a corn-based control diet. Goodrich et al. (5) reported that flax-fed cows produced milk higher in protein. (6) reported increased first-service conception rates (87.5 percent vs. 50.0 percent) in dairy cows fed 17 percent flax, compared with dairy cows fed other sources of fat.

The major aim of this study was to identify the effect of different levels

of Flax in sheep diet in body weight through different ages and use it as a guideline to improve the performance of these animals and increase the efficiency of body weight gain.

Materials and methods

Experimental animals and management: Data were made available by the department of animal resources, Faculty of agriculture, university of Kufa for the year 2014 on 40 Awassi breed ewes selected from the experimental flock reared under extensive conditions.

Flock is housed under semi-open sheep sheds and can be fed on the concentrated ration consuming about (500 – 600) gm / head / day, for the period from mating season to the last six weeks of pregnancy. Ration is normally containing 37% yellow corn, 40% wheat bran, 10% hulled barley, 5 – 10% soy bean meal, 1% NaCl and 1% CaCO₃. And green roughages such as Alfalfa and clover can be added throughout the season. Annual routinely operations on sheep are dipping and washing with chemicals in order to kill extra parasites so sheep will be ready to mating after hand wool shaving. Sires and dams will be recorded in breed records. Lambs are weighed directly after parturition and tagged with plastic tags. Lambs stay with their dams up to 90 days (weaning age). The health status of the flock must be under regular observations.

Flax ratios were added to the sheep diet as a (2, 4, 6 and 8) % and other treatment was a control (0% of flax).

Table 1. Nutrient content of Flax (DM basis) and amino acids (g/100 g protein).

DM (%)	94	Arginine	9.2
TDN (%)	110	Cystine	1.1
NEm (Mcal/kg)	2.82	Histidine	2.2
NEg (Mcal/kg)	1.96	Isoleucine	4.0
CP (%)	22.8	Leucine	5.8
Lipid (%)	35.0	Lysine	4.0
ADF (%)	8.0	Methionine	1.5
Ca (%)	0.26	Phenylalanine	4.6
P (%)	0.56	Threonine	3.6

(7)

Blood Samples (10 ml) were collected from all ewes at the same time from jugular vein from each animal. Every blood sample was put in common test tube with no anticoagulant and centrifuged at 3000 rpm to isolate the serum. Total protein, total lipids cholesterol and urea were determined by spectrophotometer using a commercial kits.

Statistical analysis: The statistical analysis was carried out using SAS program 2009 (8). (Statistical Analysis System) .Latin Square Design (5×5), with five treatments included levels of Flax (0.0, 2, 4, 6 and 8) %. Body weight in three ages (live weight at 6 month, live weight at 9months and live weight at 12 months) were evaluated using variance analyses. Means were compared using L.S.D test at a significance level of P = 0.05 according to the following model:

$$Y_{ijk} = \mu + T_i + B_j + e_{ijk}$$

Where:

μ : is an overall means .

T_i : Effect of diets contains flax (0, 2, 4, 6 and 8) %.

B_j : Effect of sex (male and female).

e_{ijk} : is a random error.

Results and Discussion:

Results represented in table 2 showed a significant effect ($p \leq 0.05$) of flax and sex in live body weight of Awassi sheep compared with control. The highest body weight at six months , body weight at nine months and body weight at twelve months were in the males group that fed with 8% flax its about 35.22 , 46.06 and 58.22 kg respectively compared with the same level of diet flax in female group its about 30.81 , 37.26 and 47.37 kg respectively .The results of this study came similar with the results of (9) and (10) who refer that the use of flax can be used effectively as a protein source for beef cattle at all stages of life. It is very palatable with a high protein and energy content and can be used as the sole protein supplement. Similarly, whole fat flaxseed can be used in beef rations as a source of protein, energy and omega-3 fatty acids.

Table (2) effect of Flax ratio on body weight gain.

Factors		Traits Means ± SE		
Sex	% flax	BW6	BW9	BW12
	0	25.11±3.12	38.09±2.66	44.44±3.16
	2	29.70± 3.72	42.17±4.77	45.90±4.12

Male	4	33.05±4.09	45.32±4.19	49.16±4.23
	6	34.47 ±3.86	46.10±5.73	56.35±4.23
	8	35.22±5.20	46.07±5.88	58.22±4.81
Female	0	23.09±3.31	32.18±5.70	40.67±5.30
	2	27.14±3.45	32.55±3.11	43.90±6.20
	4	27.88±4.37	34.20±3.99	45.15±5.67
	6	29.66±4.15	36.19±4.61	47.29±5.76
	8	30.81±5.57	37.26±4.97	47.37±5.69
L.S.D (0.05)		3.08	4.13	4.85

And BW12: live body weight at 12 months BW9: live body weight at 9months, BW6: lives body weight at 6 month.

Many studies referred that the seed of flax should be ground to increase nutrient availability but due to the potential for oxidation of the polyunsaturated fatty acids the product should not be stored in the ground form for more than two the seed prior to feeding increases the by-pass value of the protein. Gonthier et al. (11) examined the effects of heat treating flaxseed prior to feeding.

Results represented in table 3 showed no significant effect of flax and sex in blood parameters of Awassi sheep but there were theoretical differences. The highest total protein value was in male group that fed on 8% of flax its about 74.50 gm/L while the highest value of total lipids was found in the same group it's about 1.56 g/L. The highest value of urea was in male blood that fed on 6% of flax and the highest value of blood cholesterol was found in male group that fed on 8% of flax, it's about 11.28 and 2.51 respectively.

Table (3) effect of Flax ratio on some of blood parameters.

Factors		Blood parameters			
Sex	% flax	Total protein gm/L	Total lipids g/L	Urea mmol/L	Cholesterol (mmol/L)
Male	0	73.10±5.76	1.18±0.09	10.93±2.23	1.17±0.06
	2	73.40±4.14	1.26±0.04	11.20±1.98	1.77±0.08
	4	72.99±6.43	1.47±0.09	11.21±3.07	2.16±0.07
	6	73.71±4.87	1.39±0.01	11.28±2.15	2.20±0.11
	8	74.50±6.15	1.56±0.12	11.11±1.88	2.51±0.10
Female	0	71.88±5.54	1.17±0.05	10.36±2.50	1.31±0.19
	2	72.29±5.66	1.20±0.15	10.87±3.07	1.78±0.18
	4	73.12±3.17	1.19±0.08	10.29±1.66	1.88±0.09
	6	73.26±3.62	1.23±0.01	11.03±1.31	1.67±0.13
	8	74.00±6.20	1.27±0.09	10.82±2.40	1.30±0.19
L.S.D (0.05)		2.17	1.93	2.25	1.33

Numerous studies have demonstrated the use flaxseed in finisher rations without affecting animal performance. Romans et al. (12) fed finishing hogs 0, 5, 10, and 15% ground flaxseed to hogs for 25 days prior to slaughter.

Inclusion of the flaxseed in the diet had no effect on animal performance. In a follow-up study Romans et al. (13) fed 15% flax for 28 days prior to slaughter and once again did not observe any impact on animal performance. (14)

fed rations with 0, 5 or 10% whole flaxseed and did not observe any impact on animal performance. Thacker et al. (15) fed a 50/50 blend of peas and flax that had been processed through an extruder and observed equal performance up to 18% inclusion in the diet; however, at 24% they started to observe a depression in weight gain. Solvent-extracted flax meal can also be fed to finishing hogs; however, it is not commonly used due to the low energy content.(16).

It can be concluded that the uses of flax in sheep diets lead to improve body weight gain in different ages and the increase in weight that affected by many factors such as sex in addition to the environmental factors.

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