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Study of gene expression of Awassi and Crossed lambs fed on high or low degraded soybean meal

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A B S T R A C T

This study was conducted at the Animal Production Field/ College of Agriculture and Forestry / University of Mosul for the period from (1/2/2023) to (1/5/2023) 20 weaning age lambs were used (three months) lambs were divided into four groups (coefficients) The first group (T1) five Awassi lambs from Awassi parents weighed (24.82 ± 2.62) and the second (T2) five crossing lambs (Hamdani × Awassi) average weight (23.20 ± 2.43) The two groups were fed a diet containing high degraded soybean meal, while the third group (T3) was five Awassi lambs from Awassi parents with average weight (23.42± 2.53) and the fourth group (T4) five crossing lambs (Hamdani ×Awassi) average weight (24.33± 2.78) and the two groups were fed a diet containing low-degradation soybean meal. It was noted from the results of the study that the feed intake was close between the treatments and amounted to (1149.44) kg / day. Total gain in T4 increased (24.23) kg as compared to the first, second and third (18.22, 21.90, 19.52) kg respectively, this was reflected in increse of the final weight, (48.56) kg and the empty body (44.06) kg (P≤ 0.05) were achieved in T4 as compared other treatmants, salthough we find that the differences in the weight of the carcass did not reach the level of significant and the differences were highest in T4, followed by T2, T1 and T3, (22.41, 21.59, 21.55, 20.18) kg respectively. On the other hand, it is noted that dressing percentage 50% and the area rib eye 19.12cm^2 was better in the sighnificantly lambs in T1 fed on a highly degraded soybeam mal compared to the lambs T1, T3 and T4 (47.99, 47.60, 46.17)% (17.68, 17.68, 16.83 cm^2) respectively.

Introduction

One of the most important challenges facing the global economy is to provide food for the increasing numbers of people in light of the obstacles to which exposed many countries, in the Middle East, represented by the decline of agricultural land due to climate change, lack of rainfall and high temperatures, as well as the high prices of food in general, including food for agricultural animals, led to the reluctance of most breeders to breed animals due to low economic returns or repeated losses. Despite this, rapid and accelerated steps from specialists in the field of animal production have been taken to improve animal production and reduce production costs, it is noticeable in local Awassi lambs that their response to fattening by following modern feeding systems using low-degradation protein sources are few and limited to the first period of the fattening period when the growth is towards the sedimentation of muscle tissue in the body and then the differences fade when muscle building and fat sedimentation in the body are completed [1] [2]. Since the growth in lambs is affected by the genetic makeup that is inherited from parents [3] [4], and to improve the growth of animals and reach high weights when marketing, taking advantage of the speed of growth after weaning and the high efficiency of food conversion in lambs, breeding is usually resorted to with breeds with high weights to achieve this goal, taking advantage of the strength of the hybrid.

The Iraqi Hamdani sheep are one of the breeds that are characterized by their high weight and that they are one of the largest local breeds in size. Thus, it is possible to exploit this trait to mating with Awassi sheep to produce lambs characterized by rapid growth, the current study was proposed to study the possibility of taxing Hamdaniya and Awassi rams with Awassia ewes and the extent of gene expression of male newborns resulting when fed on a diet containing a low-degradation protein source.

Materials and methods

Experimental animals

he study was conducted in the fields of animal production / College of Agriculture and Forestry, University of Mosul using 20 lambs at the age of weaning (three months), the lambs were divided into four treatment, the first treatment (T1) five Awassi lambs from Awassi parents were fed a diet containing high degraded protein and the second treatment (T2) five crossing lambs resulting from ram Hamdani and Awassi ewe fed on the same diet as the first group The third treatment (T3) was five Awassi lambs from parents Awassi was fed a diet containing low-degrading protein and the fourth treatment (T4) five crossing lambs resulting from ram Hamdani and Awassi ewes fed on the same diet as the third group and the four groups were close in their average weight.

Animal diet

The diet that used in lambs feeding in the groups consisted of barley, maize, soybean meal and wheat bran as shown in Table (1), in the first and second treatments the lambs were fed on the diet containing the high degradable meal (soybean) while in the third and fourth treatments the diet contained low soybean meal formaldehyde [5] treatment was used in protection soybean meal degraded according to [6], the feed was provided in all treatments adlibitum of Free to feed the experiment as water and mineral salts were provided freely in front of animals.

Table (1) Diet Components and Chemical Analysis based of Dry Matter

Feed material%	Feed 1	Feed 2	chemical analysis	%
Barley	47.5	47.5	dry matter	92,95
corn	15	15	crude protein	15,21
bran	18	18	crude fiber	6,86
Highly hydrolyzed soybean meal	12	-	Ash	4.74
Low hydrolyzate soybean meal	-	12	Ether extract	1.67
hay	5	5	Metabolic energy kcal/kg	2438
Urea	0.5	0.5		
Salt	1	1		
limestone	1	1		

Chemical analysis of food compounds was performed in vitro and according to [7], energy was calculated according to [8].

Were fasted At the end of the fattening period of 90 days, the feed was cut off from the lambs for 12 hours and the weights were recorded to represent the final weight or weight at slaughter, the lambs were slaughtered in a local massacre (massacre the land of Saadoun) and the weights of the hot carcasses and the fat of the carcass were recorded (fat of the heart, intestine mesenteric , kidney, and pelvis), and the carcass was halved into two identical halves, and the ribs 9 - 10 - 11 were taken from the left half to conduct the physical separation, aye muscle area was measured Between the twelfth and thirteenth ribs according to [9]. The thickness of the subcutaneous fat above the twelfth rib was measured using an electronic measuring ruler (Vernia) and reported by [10].To calculate the dressing percentage, the body weight at slaughter was adopted as well as the weight of the empty body that was calculated after emptying the contents of the digestive system and subtracting them from the weight before slaughter. The physical separation of the ribs 9-10-11 was conducted by separating the fat, muscle and bone tissue from each other using a sharp

knife and each tissue was weighed dividing by the total weight of the ribs cut.

Statistical Analysis:

The data were analyzed statistically using the complete random design CRD for a factor experiment with two factors, the first is the type of gain (high or low decomposition) and the second factor is the type of lambs Awassia or crossing (from ram Hamdani). According to the following mathematical model, averages were also compared to determine significance using the Dunkin' polynomial test [11].

Yi j= μ + A i + B j+ AB ij + eij(k).

Yij(k) : the j viewing value of the transaction (diet) i.

μ: The general average of the experiment.

A i : Diet effect i. (type of earning)

Bj : effect of the father of the safed (Awassi, Hamdani)

(ABij) : effect of interference between parents and type of gain e i j : effect of experimental error.

Results and discussion

Table (2) shows that low-degradation feeding did not lead to a significant changes in the final weight in Awassi lambs, T3 42.95 kg compared to the T1 43.05 kg, but it led to a weight gain of 3.40 kg compared to the crossing lambs, and the weights reached 48.56 and 45.10 kg in T4 and T2 respectively. Also, the cross lambs in T4 fed with low-degraded soybean meal gain significantly ($P \leq 0.05$) compared to Awassi lambs in T1 and T3 total and daily weight gain did not differ significantly between Awassi lambs fed with high degraded SBM gain 18.22 kg and 202.50 g / day compared to that low degraded SBM it was 19.54 kg and 216. 94 g/day. While the feeding low degraded SBM gain feed had a significant effect ($P \leq 0.05$) in the T4, 24.23 kg and 269.25 g / day compared to the T2 it was 21.90 kg and 243.33 g / day, as well as significant increase ($P \leq 0.05$) in T4 as compared the crossing lambs in the total and daily weight gain compared to T3. The observed differences in weight gain and weights are due to differences in the efficiency of food utilization, as the reduction in the degree of degradability of SBM the gain led to an improvement in the efficiency of food utilization 4,836 kg feed/kg weight increase compared to 5,323 kg feed / kg weight increase in Awassi lambs and 4,032 kg feed / kg weight increase compared to 4.146 kg feed / kg weight increase in crossing lambs, and the crossing lambs were superior in food utilization efficiency compared to Awassi lambs. These results were consistent with some studies conducted using undegradable protein and its effect on growth weight and body weight, including [12] who indicated significant differences in body weight and weight gain when used for low-degradable protein-containing diets compared to the group of lambs fed with a diet containing highly hydrolyzed protein. and [13] Noting significant differences in body weight and weight gain in local sheep when using highly degradable and low-degradable protein (formaldehyde coefficient), Lambs who ate the diet containing low-hydrolyzed protein outperformed with a body weight of 47.35 kg compared to control (43.23 kg). Contrary to what was found [14], they noticed that there were no significant differences when using diets that differ in their content in the degree of protein degradation in the studied traits. And [15] when studying goats when feeding on a diet containing ordinary barley or low-degradable barley (formaldehyde coefficient) as the weights of goats did not differ during the study period as well as weight gain. [16] They stated that the nutrition on diets containing soybean meal different in the degree of its decomposition led to unnoticeable differences in the body weight of goats, and [17] when studying the performance of Awassi lambs when feeding on a diet containing ordinary barley and low-degradation barley (formaldehyde coefficient) there were no significant differences in weight and total and daily weight gain.

Table (2) Effect of (Type of Lambs) and Degree of Soybean Meal Decomposition on Lambs Weights

Characteristics	High degradable SBM		Low degradable SBM	
	Awassi T1	Crossed T2	Awassi T3	Crossed T4
Initial weight kg	24.82± 2.62 a	23.20± 2.43 a	23.42± 2.53 a	24.33± 2.78 a
Final weight kg	43.05±1 .69 b	45.10±1 .44 ab	42.95± 1.58 b	48.56± 1.77 a
Feed consumption g/day	1149.44	1149.44	1149.44	1149.44
weight gain kg	18.22± 1.01 c	21.90± 1.13 b	19.52± 1.62 c	24.23± 1.67 a
Daily weight gain kg	202.50± 11.27 c	243.33± 12,62b	216.94± 18.02 c	269.25± 18.61 a
Feed efficacy, kg feed/kg weight gain	5.323	4.146	4.836	4.032

Means within column for treatment with different superscripts differ significantly($p<.0.05$).

On the other hand, some studies conducted types of animals and their effects on growth weight and body weight, these results were consistent with [18], as it was stated that Romanov lambs cross with Edilbai were significantly higher than Romanov lambs pure in body weight, weight gain and food utilization efficiency and [19] who stated that there is superiority in the daily weight gain of Romanov cross lambs compared to purebred Romanov lambs. [20] noted that Romanov lambs crosss with Edilbai significantly improved body weight compared to purebred Romanov lambs. The reason why crossing lambs outperform purebred lambs in terms of

increase in body weight is due to the influence of the heterosis.

The results in Table (3) indicate that the weight of the empty body was close between the treatments of Awassi lambs T1 39.97 kg and T3 39.69 kg, as well as the differences did not reach the level of significance in the crossing lambs T2 41.67 kg T4 44.06 kg, but an increase in the empty weight was recorded in favor of the crossing lambs compared to the Awassia and the increase was significant (P≤ 0.05) when comparing the crossing lambs (T4) compared to Awassi lambs in (T1) and Awassi in (T3). This effect may be due to the difference in the final weights of the pre-slaughter. Also, the factors under study did not have a significant effect on the weight of the carcass, as it was close between the four treatments and amounted to 21.55, 21.59, 20.18 and 22.41 kg, as well as in the percentage of dressing percentage acceding to the empty body weight, it was 53.78, 51.93, 51.01 and 50.96%, respectively, but the percentage of dressing attributed to th percentage acceding to weight before slaughter was significantly low (P ≤ 0.05) in the Awassi lambs in T3 47.60% as T1 50.00%, Also, in the crossing lambs, the in T2 and T4 decreased, but did not reach the level of morale 47.99 and 46.17% respectively , as well as we find that the Awassi lambs were the best in the percentage of dressing percentage compared to the crossing lambs. The results of some studies conducted on nutrition have indicated on low degradable protein, including [17], where they reported no significant differences in carcass weight and net percentage when fed diets that differed in content from the degree of protein degradation. [21] indicated that there were no significant differences when studying it on Rahmani sheep, which were fed on the diet of the control of untreated soybean meal and the first diet 50% protected soybean meal + 50% soybean meal unprotected and the second diet was 100% heat-protected soybean meal, as the percentage of total netting was (47.52, 47.55, 46.82) % for the three transactions respectively. The dressing percentage based on weight amounted to (61.55, 62.34, 61.64)% for the three transactions respectively, and these results were contrary to what [22] found in their study on Kacang goats using three types of diets, the first diet contained highly degraded protein, the second diet contained 50% untreated soybeans and 50% formaldehyde treatment and the third diet contained 100% formaldehyde traded , and the researchers noted that the animals that fed the first diet were gave a higher carcass weight than the goats fed on and other diets amounted to (11.6, 9.5 and 10.1) kg respectively, as well as the same effect on the percentage of refinement (46.2, 43.8 and 43.8%). [23] When they studied on Javanese thin-tailed lambs for the effect of three diets, the first contained high degradable soybean meal, the second diet 10% protected soybean meal and the third diet 20% protected soybean meal treated with formaldehyde and [24], as they noticed significant differences in carcass weight when feeding on protected protein for experimental animals. [18] also found that Romanov lambs cross with Edilbai were significantly higher than Romanov lambs pure in carcass weight and dress Percentage.

The results also indicate in Table (3) that the eye muscle area did not differ significantly between the treatments, but tended to decrease with low-degradation SBM as well as in crossing lambs compared to awassi lambs and were 19.12, 17.68, 17.68 and 16.82 cm2. Also, the thickness of the subcutaneous fat tended to decrease in the Awassi and cvoss lambs feed low degradable SBM, but it was the highest in the crossing lambs compared to the awassi lambs, especially in the (T2), where the highest value was recorded and the values reached 6.45, 10.63, 5.74 and 6.41 mm respectively. The total fat weight did not differ significantly in the Awassi lambs that ate the high or low decomposition gain and was 4,210 and 3,840 kg respectively, otherwise the effect of the gain was significant (P ≤ 0.05) in the crossing lambs The weight of fat increased when fed with low-degradation cream and recorded a higher value of 4,918 kg compared to high-degradation gain 4,150 kg. These results were similar to what he found [17] they indicated that there were no significant differences in the aye muscle area of Awassi lambs when fed three diets, the first contained a difference in their content of non-hydrolyzed protein. And agreed with [10] as they pointed out that there are significant differences in the thickness of fat when they studied feeding Awassi lambs with (soybean meal), sunflower and cotton seeds) treated with formaldehyde, the thickness of the fat decreased when compared with untreated diets, and contrary to what he referred to and [21] when studying Rahmani lambs for the effect of three diets, the first contained high degraded soybean meal, and the second diet contained 50% unprotected soybean meal and 50% unprotected soybean meal Soybeans protected and the third diet contained 100% heat-protected soybean meal They pointed out that the second diet (50% unprotected and 50% protected) significantly outperformed the third treatment and the treatment of control in the percentage of fat either the percentage of muscle has decreased the second and third treatment of control.

Table (3) Effect of type of lambs and soybean meal degradablelity on some carcass characteristics.

Characteristics	High degradable SBM		Low degradable SBM	
	Awassi T1	Crosses T2	Awassi T3	Crosses T4
Empty body weight kg	39.97 b ± 0.86	41.67 ab ± 1.22	39.69 b ±0.75	44.06 a ± 2.08
Carcass weight: kg	21.55 ± 0.66	21.59 ± 1.92	20.18 ± 0.56	22.41 ± 1.01
Dressing percentage according empty BW. %	53.78 ± 1.01	51.93 ± 0.48	51.01 ± 1.56	50.96 ± 1.48
Dressing percentage according slaughter W.	50.00 a ± 0.93	47.99 ab ± 0.47	47.60 b ± 1.21	46.17 b ± 1.27
Rib eye area cm^2	19.12 ± 1.12	17.68 ± 0.77	17.68 ± 0.85	16.83 ± 0.83
Thickness of subcutaneous fat mm	6.45 b ± 1.10	10.63 a ± 1.51	5.74 b ± 0.46	6.41 b ± 2.05
Total fat weight kg	4.210 b ± 0.15	4.150 b ± 0.19	3.840 b ± 0.18	4.918 a ± 0.20

Means within column for treatment with different superscripts differ significantly($P \leq .0.05$).

The results of the physical separation of 9-10-11 in Table (4) showed that the percentage of fat decreased significantly ($P \leq 0.05$) when feeding with low-degradation SBM, whether in Awassi lambs, in T4 25.94% compared to T3 33.06%, or in striking lambs, as it was 27.39% compared to 33.06%, and on the contrary, the percentage of muscle was significantly high ($P \leq 0.05$) when feeding with low-degradation SBM, in Awassi lambs, in T3 it was 50.90% compared to the high-degradation SBM in T1 43.99% or In the crossed lambs, T4 46.66% compared to 44.15% in (T2). and these results differed with what found in the study of [17] that there were no significant differences in the percentage of fat and muscle between the experimental coefficients, where the percentage of fat (34.30, 37.04 and 32.30) % and the percentage of muscle (44.39, 43.01 and 45.12) % for the first, second and third transactions.

While no significant differences were recorded in the percentage of bones between the coefficients, as they were 25.62, 22.78, 23.14 and 26.16% respectively. These results were consistent with what he found [16] as they stated that there were no significant differences in the percentage of bone (21.30, 19.98, 22.55) % respectively. [25] indicated when they studied thin-tailed Javanese lambs for the effect of three diets, the first containing high degradable soybean meal, the second diet 10% protected soybean meal and the third diet 20% protected soybean meal treated with formaldehyde to no significant differences in bone ratio amounting to (16.17, 16.16 and 16.08)% for the three treatments respectively

Table (4) Effect of Type of Lambs and soybean meal degradablelity on Physical separation of 9-10-11 ribs.

Characteristics	High degradable SBM		Low degradable SBM	
	Awassi T1	Crosses T2	Awassi T3	Crosses T4
Fat percentage%	30.42 b ± 1.84	33.06 a ± 1.18	25.94 c ± 1.09	27.39 c ± 1.47
Muscle percentage%	43.99 c ± 1.18	44.15 c ± 1.03	50.90 a ± 1.12	46.44 b 1.93
Bone percentage%	25.62 ± 1.25	22.78 ± 1.28	23.14 ± 1.29	26.16 ± 0.69

Means within column for treatment with different superscripts differ significantly($p<.0.05$).

Conclusion:

The study of gene expression of Awassi and (Awassi × hamdani) lambs fed with protected soybean meal, for improves animal growth and having high weight when marketing. The results of this study showed that the crossed lambs fed on a Low degradable SBM are superior in the weight and total gain increase that other treatments , and thus reflected on the final weight amounted to (48.56) kg, and that the percentage of dressing Percentage and the eye muscle area was higher in the first treatment of Awassi lambs fed on high degradable SBM diets than the other experimented treatments.

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