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EFFECT OF USING THREE SOURCE OF NITROGEN ON PRODUCTIVE PERFORMANCE and SOME BLOOD PARAMETERS OF AWASSI LAMBS

ABSTRACT

The study was carried out at the farm located at the Animal Production Farm, College of Veterinary Medicine - University of Tikrit, For the period from 1stDesember 2019 to 9th February 2020 (70 days) excluding 14 days as an adaptation period. The aim of this study find source of nitrogen alternative soybean meal for fattening Awassi lambs. Twelve Awassi lambs were used, aged from 4-5 months, with an average starting body weight of 23.5 ± 1.12 kg. Three formulation diets were randomly allocated to three groups of animals. Group one (T1 control) 14.7% soybean meal, Group two(T2) 7.5% soybean meal with 5.5% corn gluten meal and the third group 11% corn gluten meal.). All the experiment diets were supplemented with 1% salts and 1% vitamins and minerals with different levels of barley and wheat bran. Lambs were fed concentrate feed at 3% of live body weight on a dry matter basis with 200 grams of roughage (straw) day/lamb. The results of this study indicated that the addition of 11% corn gluten meal (T3) significantly ($p \leq 0.05$) higher in final weight, average daily gain, total weight and feed conversion efficiency compared to the addition of soybean alone or mixture soybeans with corn gluten meal. The results also showed that there were no significant differences in total protein concentration, albumin and globulin concentration, triglyceride concentration, cholesterol and urea concentrations in serum, and creatinine concentration.

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INTRODUCTION

Sheep considered one of the main sources of meat production in Iraq, the lamb's meat is palatable and favorable among Iraqi people more than other red meat-products. (Amen, 2014). As a result of the high prices of Soybean meal researchers were searched for alternatives to Soybean meal, corn gluten meal was founded to be the alternatives feed staff which recently used in Iraq especially in poultry diets. As these byproducts are characterized by being good sources of protein and energy, as well as vitamins dissolved in water in addition to mineral elements (Wang et al., 2007). It is also considered a good source of crude protein which contains 60-65% leads to reduce the addition of other protein materials to the diet and thus reduces the costs of feed (Shingoethe et al., 2009; Ji et al., 2012). Protein in the diets were the important sources for increasing the production of meat and milk. In this study, part or all of the corn gluten meal replaced the soybean meal in order to study the performance of the lamb's final weight, daily weight gain and feed conversion ratio, as well as the effect on some blood parameter.

Material and Methods

This study was conducted in the animal house of the College Veterinary Medicine - Tikrit University, for the period from 1stDesember 2019 to 9th February 2020 (70 days) excluding 14 days

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as an adaptation period to study the effect of using three sources of nitrogen on the productive performance of the Awassi lambs. This experiment was carried out using 12 Awassi lambs, aged between 4-5 months, with an average weight of 23.59 ± 1.12 Kg. They were distributed into three groups according to lamb's weight and each group included 4 lambs and the treatments were distributed randomly among the groups. The lambs were numbered with plastic numbers by ear and animals were housed in semi-open barns divided into individual cages of 1.5 x 1.5 square meters. They were equipped with feeders and drinkers, and salt blocks have been added in the cages. the feed provided to the animal was 3% of the live body weight on the basis of dry matter and served on two meals, the first at eight o'clock in the morning and the second at one o'clock in the afternoon with 200 grams of roughage (straw) day/lamb, the animals were weighed weekly and the amount of feed provided to them was adjusted with the change in the weights of the animals. As for the remaining feed, it was collected every morning, if present, to calculate the amount of feed intake. Clean water was created continuously, all lambs were fed experimental diets gradually for a period of 14 days for the purpose of acclimatization, after which the amount of feed intake was fixed, three experimental diets were used in this experiment, the first nitrogen source were14.7% soybean meal, the second diet a mixture of 7.5% soybean meal and 5.5% corn gluten meal and the third diet 11% corn gluten meal.

Table (1)Percentages of the components of experimental deats (%)

Treatments compounds	T1	T2	T3
Black crushed barley	50	50	50
Wheat bran	33.3	35	37
Soybean meal	14.7	7.5	/
Corn gluten meal *	0	5.5	11
Salts	1	1	1
Vitamins and minerals	1	1	1

* P.N: Crude protein for Corn gluten meal= 60%, metabolizable energy 15.69 MJ\kg

Experimental Diets Chemical Composition

It was calculated according to the chemical analysis tables of Iraqi fodder materials according to Al-Khawaja, et al (1978). As for the corn gluten meal, its nutrient contents were calculated by the manufacturer.

Table (2) the chemical of the experimental diets composition

N.E treatments	Dry matter g / kg	Organic matter g / kg	Crude protein g / kg	Ether extract g / kg	Crude fiber g / kg	Ash g / kg	Nitrogen-Free Extract* g / kg	metabolizable energy ** MJ / Kg
T3	914.4	907.5	159.2	46.0	97	6.9	605.3	12.29
T2	903.6	896.67	160.4	42.2	89.7	6.93	604.37	12.14
T3	910.4	904.27	160.6	41.6	91.7	6.13	610.37	12.22
CGM	904	893	600	30.9	17	11	245.1	15.69

*Nitrogen-Free Extract (NFE)= OM –(CP+CF+EE)
** metabolizable energy was calculated according to (Maaf, 1975)
ME (MJ/Kg DM) = 0.012*CP+ 0.031*EE+0.005*CF+0.014*NFE

BLOOD TESTING

In the last week of the experiment, blood samples were taken after the animals were fasted for 12 hours, according to Jain et al., (1986). Then the samples were placed in a test tube (10 ml). Then the blood serum Samples was separated using a centrifuge at a speed of 4000 rpm for 10

minutes the blood serum was kept in a capacity of 6 cm in sealed packages and kept at- 20 ° C until the analyzes were carried out. Blood samples were analyzed using ready-made (kit) fitted from a company Biolabo French and reading the samples with a spectrophotometer to estimate the total Protein, Urea, Cholesterol and Triglyceride.

Statistical analysis

The statistical analysis was performed using Complete Randomize Design (CRD) in one direction. As for the significance of differences between the parameters, the Duncan's multiple range test (Duncan, 1955) was used, and the ready-made statistical analysis program SAS (2001) was used. To analyze the data according to the following mathematical model: -

Yij = μ + Ti + eij

As:

Yij = The view value of j for treated i.

μ = The general mean of the studied trait.

Ti = The effect of treatment i, as i = 1 (first), 2 (second), and 3 (third).

Eij = = Experimental error which assumes a normal and independent distribution with mean of zero and equal variance of σ2 e.

Results and discussion

Productive performance:

The results of the statistical analysis in Table (3) indicated that there were no significant differences (P<0.05) between the different treatments in the initial weight, which was limited between (22.66 - 24.83 kg). Data presented in table (3) showed that average final body weight, total weight and average daily weight significantly(P<0.05) improved for animal fed treatment contained 11%corn gluten mail as nitrogen source compared to the treatment soybean mail 14.7% and soybean mail 5.5% with 7.5% corn gluten mail.

Table (3) The effect of different nitrogen sources on the productive performance of the Awassi lambs (mean ± standard error)

Treated	Initial weight (Kg)	Final weight (Kg)	total weight (Kg)	Average daily weight gain (g / day)	Food intake (g / day)	FCR kg DM feed /kg weight gain
T1 SBM 14.7%	22.66 1.31 ±	35.3 b 1.27 ±	12.68b 0.46 ±	181b 6.57 ±	949.53b 41.70 ±	5.26ab 0.32 ±
T2 SBM 7.5%+ CGM 5.5%	23.28 ±0.47	34.25 b ±0.49	10.96 c ±0.45	156 c 6.70 ±	942.01b 14.11 ±	6.40a 0.27 ±
T3 CGM 11%	24.83 ±0.50	39.89 a ±0.34	15.06 a ±0.35	215 a 5.06 ±	1059.72a ±12.82	4.93b 0.15 ±
	NS	NS	*	*	*	*

The vertically different letters indicate significant differences with a probability level (0.05≥ P), NS= no significant difference. - soybean meal =SBM, corn gluten meal = CGM

The reason for the improvement in the daily weight gain and the final weight rate for the third treatment(11% corn gluten meal) were may be due to a significant improvement in the amount of digested nutrients in digestibility trail and consumption of a greater amount of crude protein, ether extract, and crude fiber(Al-Azawie and Shujaa ,2021) , Also due to a the resistance of corn gluten protein to digestion in the rumen and may be the reason for the improved in the third treatment (NRC,1985) .Also table (3) showed that the rates of feed consumed for lambs fed corn gluten meal (1059.73 g / day) increased significantly (P<0.05) compared to the first treatment (949.55g/day) and second treatment (942.06 g /day). The reason may be due to the third treatment contained corn gluten substance (CGM), which led to an increase in the lamb's appetite for that diet. The third treatment also outperformed significantly (P≥ 0.05) in the Feed conversion ratio, as it reached 4.93

kg feed / kg weight gain compared to the first and second treatments, 5.26 - 6.40 kg feed / kg weight gain respectively.The results of this study disagree with Capote (2013) and Al-Baldwin (2018), as they emphasized that the use of different protein sources was not lead to significant difference in Feed conversion ratio, Al-Baldawi (2018 was explained the reason that the animals had reached maturity). Al-Jubouri (2018), his results agreed with the results of this study, as well as with Al-Nasiri (2018). It is noticed through the results in Table (3) that the improvement in the performance of the lambs in the third treatment may be due to the diet containing the corn gluten meal, which is characterized by the high amount of protein crossing into the small intestine, reaching 55%, while the proportion of protein crossing into the intestine in the Soybean meal reached 22%, and this led to an increase in the efficiency of protein utilization, such as corn gluten, compared to soybean NRC (1985).

Blood chemical parameters

The results in Table (4) indicated that there were no significant differences (P>0.05) between the treatments in Total protein, Albumin concentration, Globulin, Triglyceride, Blood Urea and Creatinine but a mathematical increase in the protein concentration in general, especially the second and third treatment (1.38 ± 10.00 , 0.30 ± 9.05 g / 100 dl), which contained soybean meal and corn gluten meal compared to the first treatment (0.13 ± 8.57 g / dl blood) and that the increase in total protein concentration is due to the improvement in nitrogen absorption and the improvement and increase of the crude protein digestibility factor (Yousef and Zaki, 2001). The study agreed with Al-Nasiri (2018); Hussein (2018). The results in Table (4) also showed lowered in blood urea concentration with added 11% corn gluten meal though no significant difference (P>0.05) but may by the reason for the decrease due to an improvement in nitrogen absorption and an increase in the digestibility of crude protein (CP) (Yousef and Zaki, 2001), where the results agreed with Al-Mallah (2012); Nasser et al. (2014); Al-Nasiri (2018) and Al-Baldawi (2018) and disagree with both Hussein (2018) and Shahwaz (2019).

Table (4) the effect of different nitrogen sources on blood biochemical characteristics (mean ± standard error)

Treated	Total protein g / dl	Albumin g / dl	Globulin g / dl	Triglyceride mg/ dl	Cholesterole mg/ dl	Urea mg/ dl	Creatinine µmol / L
T1 SBM 14.7%	8.57 0.13 ±	3.57 0.22 ±	4.99 0.32 ±	16.70 1.09 ±	85.37 4.6 ±	52.25 1.79 ±	0.439 0.02 ±
T2 SBM 7.5% + CGM 5.5%	10.00 1.38 ±	3.34 0.05 ±	6.57 1.40 ±	19.72 3.50±	70.50 9.91±	56.17 3.17±	0.473 0.11±
T3 CGM 11%	9.05 0.30±	3.08 0.16±	5.96 0.41±	19.60 0.42±	87.82 8.42±	48.00 3.29±	0.400 0.02±

SBM= soybean meal, CGM = Corn gluten meal

CONCLUSION

It was concluded that fatting lamb given diet with 11% corn gluten meal improved performance of Awassi lamb (live body weight, Feed conversion ratio).

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تأثير استخدام ثلاثة مصادر من النايتروجين في الاداء الانتاجي وبعض معايير الدم للحملان العواسية

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قسم الإنتاج الحيواني كلية الزراعة – جامعة تكريت

الخلاصة

أجريت هذه الدراسة في البيت الحيواني التابع لكلية الطب البيطري - جامعة تكريت ، لمدة 70 يوماً سبقتها 14 يوم فترة تمهيديه اعتبارا من تاريخ 01 /12/ 2019 ولغاية9/ 2/ 2020 سبقتها فترة تمهيدية 14 يوم , استعمل في هذه التجربة اثنا عشرة حملاً محلياً بعمر 4 – 5 أشهر وبوزن ابتدائي 23.5 1.12± كغم .كونت ثلاثة علائق تجريبية ووزعت عشوائيا الى ثلاثة مجاميع من الحيوانات ,المجموعة الاولى (سيطرة) غذيت فول الصويا بنسبة تضمنت 14.7% والمجموعة الثانية غذيت 7.5 % كسبة فول الصويا مع 5.5% كلوتين الذرة والمجموعة الثالثة كسبة كلوتين الذرة بنسبة 11%.كل العلائق التجريبية اضيف لها نسب مختلفة من الشعير ونخالة الحنطة وملح الطعام وفيتامينات ومعادن. غذيت الحملان علف مركز بنسبة 3 % من الوزن الحي على اساس المادة الجافة بالإضافة الى 200 غرام تبن الشعير كعلف خشن. أشارت نتائج هذه الدراسة ارتفاعا معنويا (P≤0.05) في الوزن النهائي ومعدل الزيادة الكلية ومعدل الزيادة الوزنية اليومية وكفاءة التحويل الغذائي للمجموعة الثالثة (اضافة 11% كلوتين الذرة) مقارنة مع اضافة فول الصويا منفردا وفول الصويا وكلوتين الذرة مجتمعا. واشارت النتائج كذلك الى عدم وجود فروقات معنوية في كل من تركيز البــــروتين الكــــلي , الألبــــوميـن, الكـــــلوبيولين , الدهون الثلاثية , كولسترول , يوريا في مصل الدم وتركيز الكرياتانين .