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Effect Of Protein Ratio In Fattening Diet On Performance Production And Some Biochemical Characteristics Of Blood In Awassi Lambs

ABSTRACT

This study was conducted in the animal field of the College of Agriculture University of Tikrit for a period of 70days precession this period 14 day as adaptation starting from 8/10/2020 to 16/12/2020. Sixteen Awassi lambs were used, aged 5-6 months, with an average weight of 26.2 ± 0.3 kg. The experimental treatments were, first, the control 98% barley (farmer diet), the second 88% barley + 5% soybean meal+ 5% vegetable fat and the third 83% barley + 10% Soybean meal+ 5% fat and the fourth 78% barley + 15% soybeans+ 5% fat with addition to 1% salts and 1% vitamins and minerals for all treatment. The lambs were fed concentrate feed at 3% of live weight on a dry matter basis with 100 grams/day/lamb straw. The results showed that second, third and fourth treatments significantly (P≤0.05) improved final weight, average daily weight gain and feed conversion ratio compared to the first treatment, the third and fourth treatments (P≤0.05) increased in the daily weight gain, final weight and feed conversion efficiency compared to the second treatment. Significant (P≤0.05) differences were also found in some biochemical characteristics of blood, as increased in percentage of Triglycerides, blood urea and albumin in fourth treatment of lambs compared to ether experimental treatment, while no significant differences were found between experiment groups in proportion of glucose, creatinine, total protein, and the enzyme AST and ALT. note that all blood measurements of the experiment lambs were within normal limits.

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INTRODUCTION

Sheep considered one of the main sources of meat production in Iraq, which reached 7722375 in 2010 and contribute about 30,930 tons red meat per year, which palatable and desirable compared to other types of red meat (FAO, 2012), and it is an important source for farmers income, due to the low maintenance and feeding costs compared to livestock (Khoshnaw, 2009). The traditional production system for fattening lamb include feeding barley grain only Such feeding resulting with low growth rates and longer to reached marketing weight without supplementation (Santra, 2000 and Bahtti, 2013). Therefore, many studies have tended to find ways to increase meat production by using scientific feeding methods to reach the optimum animal requirements to improve growth and weight gain with short period time (Taher et al. 1987). Lacks in nutrition, especially energy and protein, led to a decrease in sheep's performance, Oliveira et al (2009) and Ebrahimi et al (2007) confirmed an improvement in the feed conversion ratio and shorter period to reach a slaughter weight with an increase in protein and energy levels. Therefore, some studies have focused to added nitrogen sources to barley to improve the efficiency of animal utilization (Qasim et al. 1993),one of the nitrogen sources used on a large scale were soybeans (Rodrigues et al. 2013),

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wich the best source of plant protein in the diet due to its amino acid content (Al-Yaseen and Hassan, 2010). Some vegetable oils or fats are added to increase the digestible energy used for growth (Renaudeau et al. 2012).In this study, an attempt was made to find a technique for developing lambs fattening diets for sheeper in the northern region (Rabata) by adding different levels of soybean mail (0%, 5% , 10% and 15%) to improved productive and physiological performance of Awassi lambs.

Material and Methods

This study was conducted in the animal field - Department of Animal Production - College of Agriculture - University of Tikrit, for a period of (70) days , from 8/10/2020 to 16/12/2020. Sixteen Awassi lambs were used in this experiment aged 5-6 months with an average starting weight of 26.2 ± 0.3 kg. The lambs were distributed into four groups according to weight and the treatments were distributed among the four groups randomly. The experimental treatments were the first treatment , control ration was 98% barley(farmer diet) , the second 88% barley+ 5% soybean + 5% vegetable fat and the third 83% barley + 10% soybean + 5% vegetable fat and the fourth 78% barley + 15% soybean + 5% vegetable fat in addition to 1% salts and 1% vitamins and minerals. The lambs were fed concentrate feed at a ratio of 3% of live weight on the basis of dry matter, feed introduced in two time 8 in the morning and 4 in the evening, as well as the remaining feed were weighed daily in order to calculate the amount of feed consumed. The lambs were weighed weekly before feeding in the morning, using the electronic scale until the end of the experiment to calculate the weights of the animals, and the amount of feed provided was adjusted according to the new lambs weight. The lambs were housed in semi-open pens divided into individual cages 1.5 x 1.5 square meters containing bucket for feed and water. The four meal components showed at Table (1) and the chemical analysis of the four meal used in the experiment was also performed as shown in Table (2) according to the A.O.A.C. (2002). The lambs were examined by the veterinarian to ensure that they were healthy and free of diseases, also subjected to veterinary care for the duration of the experiment.

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

Treated / Meal material	First diet	Second diet	Third diet	Fourth diet
Black crushed barley	98	88	83	78
Soybean meal	0	5	10	15
Vegetable fat	0	5	5	5
Salts	1	1	1	1
Vitamins and minerals	1	1	1	1
Total	100	100	100	100

Collecting and analyzing of blood samples

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 with a capacity of 10 ml. Then the blood was separated using a centrifuge at a speed of 4000 rpm for 10 minutes and 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, Glucose, triglycerides, Urea, creatinine, albumin AST and ALT.

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: -

$Yij = \mu + Ti + eij$

As:
Yij = The view value of j for treated i.
μ = The general average 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.

Table (2) the chemical analysis of the diets used in the experiment (g / kg)

Nutritional elements / diets	Dry matter	Organic matter	Crude protein	Crude fiber	Ether extract	Nitrogen-Free Extract*	Ash	energy Metabolized ** MJ / Kg
First diet	960.8	952.96	116.62	72.52	26.46	737.36	47.04	12.90
Second diet	960.5	953.46	127.22	68.67	76.71	680.86	46.54	13.57
Third diet	958.2	951.56	143.77	68.52	78.31	660.96	48.44	13.49
Fourth diet	955.9	949.66	160.32	68.37	79.91	641.06	50.34	13.41

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

Results and discussion

Productive performance:

Starting weight and final weight:

The results (Table 3) indicated no significant differences in average starting weight: 26.45, 26, 26.35 and 26.22) kg respectively, but significant differences (P<0.05) were found between treatments in average final weight of Awassi lambs, where significantly (P≤0.05) exceeded treatments second, third and fourth (39.57, 43.15, 43.43) kg respectively over control (36.30) kg. although there were no significant differences in amount of feed consumed (dry matter).

Table (3): The effect of treatments on productive of lambs (kg)

Variables	**Mean ± standard error**				
	First meal	**Second meal**	**Third meal**	**Fourth meal**	**P-value**
Initial weight	26.45 0.37±	26.00 0.29±	26.35 0.34±	26.22 0.19±	NS
Finish weight	36.30 0.96±c	39.57 2.20±b	43.15 2.33±a	43.43 02.49±a	*
Total weight gain	9.85 1.06±c	13.57 2.31±b	16.80 2.17±a	17.21 1.38±a	*
Average daily gain	0.141 0.04±c	0.193 0.05±b	0.240 0.04±a	0.245 0.07±a	*
Dry matter intake	0.878 0.07±	0.939 0.33±	0.999 0.11±	0.969 0.07±	NS
Feed: gain ratio	6.22 0.33±c	4.87 0.26± b	4.16 0.39±a	3.96 0.22±a	*
Averages with different letters within a class are significantly different * (P≤0.05) NS: Not significant.					

This indicates that adding an amount of soybeans and 5% of fat led to the provision of a good amount of protein necessary for the growth of micro-organisms in the rumen. High production of

microbial protein, which give part of the animal's needs, and this was reflected in the performance of the lambs. Added fats helped to provide the necessary energy to give support with the increase in protein to obtain the highest benefit from the provided diet and this corresponds to what Found, Mahmoud, (2013), Muruz, et al (2017) and Abbasi et al (2014).

Average daily gain(ADG) and total weight(TW):

It was observed (Table 3) that significant differences (P≤0.05) between the treatments in the daily gain for Awassi lambs, where significantly (P≤0.05) exceeded the treatments second, third and fourth (0.193, 0.240 and 0.245) kg /day /lamb respectively, over (control) (0.141) kg/day/lamb, the reason for this improvement may be due to the addition of food additives represented by soybean meal ratios, and this confirms that barley is low in protein content and this had the effect of improving the performance of the lambs. This is consistent with Muruz et al. (2017). The third and fourth treatments also significantly outperformed second treatment (P≤0.05). This superiority is due to the fact that 5% of soybean meal in second treatment is not adequate with nutritional needs when compared with (10%) and fourth (15%) treatments. While fourth treatment (15%) did not significantly exceed third treatment (10%) soybean meal, reason may be explained by the fact that increasing the soybean meal or protein more than the actual need of the animal does not necessarily lead to an increase in daily weight gain rate. While the results of this study did not agree with Dutta et al. (2009), which found significant differences with the weight gain of 5-month-old Barbary lambs that were fed different levels of protein. This advantage was observed with total increase which amounted to (9.85, 13.57, 16.80 and 17.21) kg for the first, second, third and fourth treatments, respectively.

Dry matter intake and Feed: Gain ratio:

There were no significant differences between treatments in feed that 0.878, 0.939, 0.999 ± 0.11and 0.969) respectively, and the reason for the non-significant differences between treatments may be to determine the percentage of feed (3%) which provided for lambs. While significantly superior (P≤0.05) in the Feed: gain ratio were showed (table 3) for second, third and fourth that 4.87, 4.16 and 3.96 respectively, with control 6.22. The third and fourth treatments were also significantly superior (P≤0.05) in the efficiency of food conversion over second treatment, this mean that 5% soybean meal was not suitable for protein supplementation with barley to be sufficient for requirement for fattening of lambs, and this is consistent with Abbasi, et al. (2014) and Muruz, et al. (2017) and Mahmoud, (2013). But this study differed with Lv et al. (2020), who mentioned that lambs fed diets containing different levels of protein (11.8 and 15.7%) did not have any significant changes in the dry matter intake, weight gain and food conversion efficiency.

Biochemical characteristics of blood:

Table (4) shows that there were no significant differences in the percentage of glucose in blood of the four treatments, but there were significant differences (P≤0.05) in concentration of triglycerides, as fourth treatment significantly exceeded (85.0) mg / dl over third treatment (68.5) Mg / dl, and the reason may be due to higher energy and protein nutrients in fourth diet than nutritional needs of the lambs, this is consistent with what was found by Vosooghi-Poostindoz et al. (2014). The fourth group also significantly outperformed (P≤0.05) in ratio of blood urea concentration to the first group (control), and the reason may be due to an increase in amount of protein in the diet and an increase in percentage of digested protein. There were also significant differences in blood albumin, as fourth group significantly outperformed (2.785) g / dl over the first and second treatments (2.340 and 2.260) g / dl, respectively, and it was noticed (Table 4) that there were no significant differences, in creatinine and total blood protein, in AST, and in blood ALT levels, this is in agreement with Saro, et al. (2020).

Table (4) The effect of protein ratios on blood biochemical characteristics

Variables	Mean ± standard error				
	First meal	Second meal	Third meal	Fourth meal	P-value
Glucose Mg / dl	78.0 6.72±	85.5 4.71±	78.5 2.95±	79.2 3.68±	NS
Triglycerides Mg / dl	82.0 1.08±ab	75.0 6.79±ab	68.5 3.17±b	85.0 4.88±a	*
Urea Mg / dl	43.0 1.08±b	49.50 2.90±ab	48.50 3.30±ab	53.2 0.85±a	*
Creatinine Mg / dl	0.535 0.01±	0.645 0.04±	0.575 0.05±	0.562 0.02±	NS
Total protein Gm / dl	4.81 0.05±	4.92 0.06±	4.91 0.08±	4.97 0.12±	NS
albums Gm / dl	2.340 0.15±b	2.260 0.05±b	2.522 0.07±ab	2.785 0.20±a	*
AST IU / liter	96.25 6.94±	84.25 7.16±	99.25 0.85±	96.0 11.51±	NS
ALT IU / liter	15.70 1.14±	16.0 2.27±	15.65 0.94±	13.0 0.81±	NS

Averages with different letters within a class are significantly different * (P≤0.05)
NS: Not significant.

Conclusion

It was concluded that fatting lamb given barely with 10% soybean improved performance of Awassi lamb (live body weight, feed efficiency and It did not affect biochemical properties). Although barely with 15% soybean improved performance of Awassi lamb but precipitation significant fat.

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تــأثير نسب البروتين في علائق التسمين على الأداء الإنتاجي وبعض صفات الدم الكيموحيوية للحملان العواسية

فارس صباح عواد مخلف الدليمي طاهر عبد اللطيف شجاع ميسلون وائل ابراهيم

كلية الزراعة / جامعة تكريت

الكلمات المفتاحية:
نسبة البروتين, تسمين الحملان, كيمياء الدم, الحملان العواسي

الخلاصة

أجريت هذه الدراسة في الحقل الحيواني - قسم الإنتاج الحيواني - كلية الزراعة - جامعة تكريت, استمرت الدراسة لمدة (70) يوماً اعتبارا من تاريخ 2020/10/8 ولغاية 2020/12/16. استعمل في هذه التجربة ستة عشرَ حملاً عواسياً بعمر يتراوح 5-6 أشهر وبمعدل وزن ابتدائي 26.2 ± 0.3 كغم. وزعت الحملان إلى أربعة مجاميع حسب الوزن ووزعت المعاملات على المجاميع الاربعة عشوائياً وكانت المعاملات التجريبية, الاولى عليقة السيطرة 98% شعير والثانية 88% شعير+5% فول الصويا + 5% دهن نباتي والثالثة 83% شعير +10% فول الصويا + 5% دهن نباتي والرابعة 78% شعير+15% فول الصويا +5% دهن نباتي بالإضافة الى 1% املاح و1% فيتامينات ومعادن. غذيت الحملان علف مركز بنسبة 3% من الوزن الحي على اساس المادة الجافة مع 100 غم تبن الشعير يوم/حمل. أظهرت نتائج التحليل الاحصائي عدم وجود فروقات في معدل الوزن الابتدائي بينما تفوقت المعاملات الثانية والثالثة والرابعة معنوياً ($P\leq0.05$)على المعاملة الاولى في الوزن النهائي ومعدل الزيادة الوزنية اليومية وكفاءة التحويل الغذائي , كما تفوقت المعاملات الثالثة والرابعة ($P\leq0.05$)على المعاملة الثانية في معدل الزيادة اليومية والوزن النهائي وكفاءة التحويل الغذائي ولم يلاحظ فروقات معنوية في كمية العلف المستهلك. كما وجدت فروقات معنوية في بعض صفات الدم الكيموحيوية إذ وجد زيادة معنوية ($P\leq0.05$)في نسبة الكليسريدات واليوريا والالبومين في المعاملة الرابعة مقارنة لبقية معاملات التجربة بينما لم تظهر أي فروقات معنوية بين مجاميع التجربة في نسبة الكلوكوز الكرياتنين والبروتين الكلي وانزيمي AST و ALT, علما ان كل قياسات الدم لحملان التجربة كانت ضمن الحدود الطبيعية.