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 1st December 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≤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.

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 1st December 2019 to 9th February 2020 (70 days) excluding 14 days as an adaptation period.
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 were 14.7% 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 diets (%)

<table>
<thead>
<tr>
<th>Compounds</th>
<th>Treatments</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black crushed barley</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Wheat bran</td>
<td>33.3</td>
<td>35</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Soybean meal</td>
<td>14.7</td>
<td>7.5</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>Corn gluten meal *</td>
<td>0</td>
<td>5.5</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Salts</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Vitamins and minerals</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

* 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

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

*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:

\[ Y_{ij} = \mu + T_i + e_{ij} \]

As:
- \( Y_{ij} \) = The view value of j for treated i.
- \( \mu \) = The general mean of the studied trait.
- \( T_i \) = The effect of treatment i, as i = 1 (first), 2 (second), and 3 (third).
- \( e_{ij} \) = Experimental error which assumes a normal and independent distribution with mean of zero and equal variance of \( \sigma^2 \).

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

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) 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)**

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

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).

**References**


تأثر استخدام ثلاثة مصادر مه إلى أزياء في الاداء الزراعي وبعض معايير الدم للحملان العواسية

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قسم الإنتاج الحيواني كلية الزراعة – جامعة تكريت

الخلاصة

أجريت هذه الدراسة في البيوت الحيوانيات التابعة لكلية الطب البيطري – جامعة تكريت، لمدة 70 يوماً سبقها 14 يوم فترة تمهيدية اعتباراً من تاريخ 01/12/2019 ولغاية 02/2020، سبقتها فترة تمهيدية 14 يوم، استعمل في هذه التجربة اثنا عشرة حملا محلياً بعمر 4-5 أشهر، وزن ابتدائي 23.5 ± 1.22 كغم، كونت ثلاثة علات تجريبية ووزعت عشواناً إلى ثلاثة مجموعات من الحمولان، المجموعة الأولى (مشرفة) غنت فول الصويا بنسبة تضمنت 7.5% %، والمجموعة الثانية غنت فول الصويا بنسبة 14.7% %، ومجموعة الثالثة كسبة كلوتين الذرة بنسبة 11% %، كل العلاجات التحريبيات أضيف لها نسب مختلفة من الشعر، ونهاية النقطة ونهاية الحفاضات ونهاية الغنيت. للفحص، علق مركز بنسبة 3% من الوزن الحي على أساس المادة الجافة بالإضافة إلى 200 غرام تين الشعر كلف خشين. أشارت نتائج هذه الدراسة انخفاضاً محسناً (P≤0.05) في الوزن النهائى ومعدل الزيادة الكلية ومعدل الزيادة الوزنية اليومية وكفاءة التحول الغذائي لمجموعة الثالثة (الضائعة 11% كلوتين الذرة) مقارنة مع اضافة فول الصويا، وفول الصويا وكلوتين الذرة مجتمعاً، ووكلوتين الذرة وفول الصويا، وفي كل من تركيز البيرسترين الكسلي، الألبومين، الكسلوبولين، الدهون الثلاثية، كولستيرول، بوريا، في مصل الدم وتركيز الكرياتين.