ISSN 2664-4010 (Print) & ISSN 2664-6730 (Online)
South Asian Research Journal of Agriculture and Fisheries
Abbreviated Key Title: South Asian Res J Agri Fish

| Volume-6 | Issue-3 | May-Jun -2024 | **DOI: 10.36346/sarjaf.2024.v06i03.005**

Original Research Article

The Impact of Treating Yellow Corn byproducts by Urea on Blood Chemistry Parameters of Awasi Lambs

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Article History
Received: 11.05.2024
Accepted: 19.06.2024
Published: 21.06.2024

Abstract: Using of non-protein, nitrogen (NPN) compounds on as alternative. to high-cost protein source, to demonstrate the replacement of pure Yellow corn byproducts with urea added at a rate of 7.17% to the ready-made basic material, for an incubation period of 30 days and its use in basic ratios of 0,10, 22,30 and 39. % replace wheat bran in overweight comments Awassi has succeeded in overcoming difficulties. The results showed that conditioning with urea right a significant increase ($p \leq 0.05$) in total protein. Conditioning also a significant increase in the level of urea. The level of masterol triglyceride with the levels of substitution with yellow corn byproducts could not be compared with the control and low substitution levels.

Keywords: Corn byproducts, urea, lambs, blood qualities.

INTRODUCTION

In ruminants, digestion of fiber by bacteria requires ammonia for microbial protein synthesis (NRC, 2001). Protein is provided from the true protein diet or by providing ammonia (Can *et al.*, 2005). Urea is usually added to feed rations as a non-protein source that is rapidly hydrolyzed to ammonia (NH3-N) in the rumen. It is known that ruminants utilize urea through microbiosis activity by using fiber in roughage as an energy source. These advantages are in terms of livestock and economic production. It leads to improvement in methods of feeding urea to increase its use in the production of healthy meat and milk. Many studies have utilized various methods to enhance the poor nutritional quality of these substances, including physical and chemical treatments like urea or ammonia treatment (Hassan *et al.*, 2008), as well as biological treatments (Cardoso *et al.*, 2015). This is impacting the functioning of microorganisms in the rumen, which is responsible for creating microbial proteins, a crucial component of the host animal's requirements in the small intestine. Biological treatments disrupt the bond between lignin and cellulose, boosting the availability of cellulose for easier digestion by ruminants (Davis, 1979). Numerous methods can be utilized to address the challenges related to fodder, with one option being the utilization of feed additives to enhance nutrient absorption. Therefore, decreasing the amount of pollution in the environment due to animal waste.

Urea is seen as a cost-effective non-protein nitrogen (NPN) option for lamb feed when compared to more expensive protein-source feeds (Colmenero and Broderick, 2006). The use of urea compounds in ruminant feed has been practiced for a long time (Kertz, 2010). The slow release of nitrogen compounds in the rumen is mainly due to their ability to gradually release ammonia after feeding, which helps in lowering peak ammonia levels in the rumen (Pinos- Rodriguez *et al.*, 2010). The slow release of urea reduces its utilization by rumen microorganisms and leads to greater absorption from the rumen wall (Taylor-Edwards *et al.*, 2009). The utilization of urea offers numerous benefits like convenient transportation, decreased utilization risks, improved feed efficiency, enhanced nutrient digestibility, enhanced blood biochemistry, and enhanced productivity in ruminant animals (Muralidharan *et al.*, 2011).

In view of the shortage of natural pastures and the high price of concentrated feed, and the accompanying increase in the production cost of red meat and its products as a result of the high prices of the primary components of concentrated feed, such as bran commonly used in feeding ruminants,

The current study aims to evaluate the effect of replacing wheat bran by Yellow corn byproducts treated with urea on the blood characteristics of Awassi lambs.

MATERIALS AND METHODS

The study was conducted using 40 Awassi lambs, 4-5 months old. The animals were randomly divided into five treatments. Concentrated feed was provided at a rate of 3% of live weight based on dry matter. Before taking data, the lambs entered a preparatory period of two weeks before the start of the experiment. Blood samples were drawn from the jugular vein in the first week of the experiment and at the end of the experiment after a period of three months period, Blood and biochemical tests were performed, with four replicates for each treatment.

Yellow corn byproducts, is a by-product of the process of degrading yellow corn during the grain separation process. chemical treatment was carried out by adding urea to prepare 3.3% nitrogen (7.17% urea) on a dry matter basis (Tawfiq, 2004) at a temperature of approximately 30°C and a humidity of 60% on a dry matter basis, for an incubation period of 30 days, after which the byproducts were dried, and laboratory analysis was also performed. In Tables 1 and 2, according to the A. O. A. C (2005) method, the experimental coefficients were as follows:
T1- 44% wheat bran: 0% Yellow corn byproducts treated with urea.
T2- 32% wheat bran: 11% Yellow corn byproducts treated with urea.
T3- 20% wheat bran: 22% Yellow corn byproducts treated with urea.
T4- 10% wheat bran: 30% Yellow corn byproducts treated with urea.
T5- %0wheat bran: 39% Yellow corn byproducts treated with urea.

Statistical Analysis: The data were analyzed in experiment using of SAS (2012) and Duncan's (1955).

Table 1: Chemical composition of feedstuff (%DM)

Chemical analysis	Alfa hay	Treated Yellow corn byproducts	Untreated Yellow corn byproducts	Soybean meal	Wheat bran	Barley
DM	87.37	61.85	93.46	90.32	90.14	91.12
OM	91.20	87.75	87.97	94.59	95.3	95.28
CP	16.32	16.77	7.36	45.19	13.78	11.25
EE	1.47	1.54	3.06	7.91	4.73	3.14
CF	24.33	17.09	19.95	5.92	14.81	11.52
NFE	49.08	52.35	57.60	36.88	62.64	69.37
Ash	8.80	12.25	12.03	5.41	4.04	4.72
MJ/kgDM*	10.51	8.80	10.89	13.20	12.60	12.60
PH	6.37	8.18	6.11	7.57	7.35	7.11

*Metabolized energy (MJ/kg dry matter) = 0.012 x crude protein + 0.031 x ether extract + 0.005 x crude fiber + 0.014 x nitrogen-free extract. (MAFF, 1975).

Table 2: Components of experimental ration (%DM)

Treatments					
Chemical analysis	**T_1**	**T_2**	**T_3**	**T_4**	**T_5**
DM	91.29	89.62	81.67	78.81	71.42
OM	93.53	93.37	92.13	91.53	90.71
CP	15.96	16.17	17.00	17.38	17.52
EE	3.92	3.73	3.81	3.60	3.50
CF	12.20	12.44	12.45	12.68	13.35
Ash	6.47	6.63	7.87	8.47	9.29
NFE	61.45	61.03	58.87	57.87	56.34
MJ/kg DM*	12.35	12.26	12.08	11.74	11.74
PH	6.25	6.40	6.31	7.80	7.85

*Metabolized energy (MJ/kg dry matter) = 0.012 x crude protein + 0.031 x ether extract + 0.005 x crude fiber + 0.014 x nitrogen-free extract (MAFF, 1975).

RESULTS AND DISCUSSION

1-Effect of Treatment on Blood Characteristics in First Week

The results in Table 3 showed no significant differences ($p \leq 0.05$) between the treatments in the original analysis for the first week of the experiment and for all the traits studied, except for the level of glucose and white blood cells, which may be a result of the difference in the level and type of nutrition and the health status of the lambs at the beginning of the experiment.

Table 3: Effect of treatment on Blood chemistry characteristics in first week

Parameter	Treatments					Significant
	T1	T2	T3	T4	T5	
Serum protein(g/dL)	57.08±0.47	55.40±1.43	52.50±1.32	53.39±1.25	54.15±0.37	N.S.
Triglycerides (mg/dL)	42.00±0.57	42.25±0.47	42.00±0.57	40.00±0.70	42.25±0.94	N.S.
Blood urea	40.75±1.10	40.00±1.29	42.00±1.29	40.00±0.70	39.50±0.64	N.S.
Cholesterol (mg/dL)	63.50±1.55	62.00±1.22	60.50±0.64	61.50±1.90	62.50±1.04	N.S
Glucose (mg/dL)	68.66±3.04ab	64.25±0.75b	69.25±1.65ab	69.50±0.65ab	70.39±0.85a	*
Haemoglobin (g/dL)	6.42±0.21	6.55±0.91	7.17±0.79	7.87±0.42	7.37±0.42	N.S.
RBC (106/µL)	7.27±0.25	7.60±0.23	8.02±0.17	8.05±0.37	7.75±0.64	N.S.
PCV (%)	31.00±0.57	31.75±1.43	32.50±1.90	34.25±1.03	31.50±1.19	N.S.
WBC (10^3/µL)	5.02±0.24b	5.40±0.04ab	5.47±0.07a	5.65±0.12a	5.80±0.09a	*

Different letters within the line mean the presence of significant differences, NS = no significant differences within the same column, *there is a significant difference at the level (0.05)

2-Effect of Treatment on Blood Characteristics in Final Week

The results indicated in the table showed in final week that there were significant differences ($p \leq 0.05$) as a result of the use of Yellow corn byproducts treated with urea on some of the traits studied in the table, as treatment 5 for the total protein trait was superior to all treatments, but it did not differ from treatment 4, which were 66.50 and 63.50 g/dl, respectively. Which is the result of the utilization of urea by rumen bacteria and an increase in microbial protein production, thus increasing the absorption of amino acids in the small intestine (Taylor-Edwards *et al.*, 2009). While treatments 3 and 4 were significantly superior to treatments 1, 2, and 5 for triglyceride characteristics. The reason for this is due to the diet's content of easily digestible carbohydrates and the conversion of excess calories into triglycerides. We also notice a significant increase in the cholesterol levels, as treatment 1 and 2 were superior to 4 and 5, but they did not differ from treatment 3. As for the blood urea trait and red blood cells, all treatments outperformed the control treatment. The reason for this is due to the urea content of the feed used in treating Yellow corn byproducts. The results of this study are consistent with what was mentioned when using urea in diets. Additionally, urea is an inexpensive non-protein nitrogen (NPN) source for young lambs when compared to other protein feeds (Colmenero and Broderick, 2006). However, the results did not show significant differences in hemoglobin quality and the size of packed blood cells. All blood parameters were within normal levels for sheep.

Table 4: Effect of treatment on Blood chemistry characteristics in final week

Parameter	Treatments					Significant
	T1	T2	T3	T4	T5	
Serum protein(g/dL)	53.75±3.17c	53.75±3.17c	53.75±3.17c	63.50±1.70ab	66.50±0.64a	*
Triglycerides (mg/dL)	55.25±1.70b	55.00±2.67b	61.25±0.94a	64.50±1.65a	51.00±0.70 c	*
Blood urea	41.25±0.85b	47.75±0.62a	50.25±0.47a	50.25±3.32a	47.25±0.75a	*
Cholesterol (mg/dL)	67.75±1.31 a	67.00±0.70 a	65.50±1.90 ab	60.25±1.14 b	60.75±2.95 b	*
Glucose (mg/dL)	71.50±0.64 bc	76.50±1.65 a	68.50±0.64 c	75.00±2.12ab	77.00±0.19a	*
Haemoglobin (g/dL)	5.37±0.37	5.30±0.04	6.22±0.34	5.45±0.38	5.62±0.12	N.S.
RBC (106/µL)	4.15±0.15 b	4.30±0.31ab	4.71±0.17a	4.50±0.24ab	4.50±0.24ab	*
PCV (%)	28.50±0.64	28.50±0.64	28.00±0.47	28.25±1.37	29.25±0.47	N.S.
WBC (10^3/µL)	5.00±0.09a	4.65±0.23ab	4.35±0.23b	5.0 ±0.12a	4.57±0.07ab	*

Different letters within the line mean the presence of significant differences, NS = no significant differences within the same column * there is a significant difference at the level (0.05).

CONCLUSION

According to the results of the study: treatment with urea led to an increase in the blood serum content of total protein, urea, and red blood cells, all of which were within the normal levels of blood characteristics for sheep, eliminating any negative effect on the animal. using of urea in sheep's diets is safe for the animal and has an effect in improving the characteristics, and improves the productive qualities of lambs.

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