EFFECT OF FEEDING STRAW SUPPLEMENTING WITH UREA MOLASSES BLOCK LICK ON THE PERFORMANCE OF SHEEP

K. B. Hossain[1], N. R. Sarker[2], M. Saadullah, M. A. H. Beg and T. M. Khan[3]

Dept. of General Animal Science, BAU, Mymensingh, Bangladesh

Summary

The experiment was conducted to study the effect of supplementary urea molasses block lick with rice straw based diet on the performance of sheep. Six indigenous sheep of about two years of age with an average body weight of 12.88 kg, were selected for this experiment. They grouped into two by stratified randomization, and the experiment was conducted for a period of 90 days. Sheep of group A was fed rice straw and group B was feed rice straw with urea molasses block lick, beside this both the groups received 66 g wheat bran and 167 g of Ipil-Ipil leaf meat. The study revealed that the average daily gain of live weight per sheep per day was 41 gm and 70 gm in group-A and group-B respectively. From the analysis of variance it was evident that live weight gain in sheep of group B, supplemented with urea molasses block lick was highly significant ($p < 0.01$). It was also estimated that group A required 8.12 kg DM to gain 1 kg live weight, whereas group B receiving urea molasses block lick required 5.30 kg DM to gain 1 kg live weight. Therefore, feeding rice straw with urea molasses block lick able to utilize more crop-residues efficiently.
(**Key Words**: Straw, Urea-molasses Block Lick, Performance)

Introduction

Small ruminants like sheep and goat are reared by the landless and marginal farmers all over the country. Total population of sheep in Bangladesh is estimated at 1.1 million heads which represent 2.2 percent of the total livestock population (FAO, 1983). They are sparsely distributed all over the country in the delta areas of Noakhali, Tangail and Rajshahi districts. Although productivity of livestock is low even not adequate to meet demand of the people, sheep and goat yet found to be profitable position. Despite of limitation of feed and management, the high fertility in small ruminant in respect of productivity and as much 4 times found in Senegal and Malaysia (Devendra, 1976). Sheep is a multipurpose animal producing meat, milk, wool and skin. Farmers raised sheep as scavengers primarily for the production of meat, wool and skin become slaughter house by products. The sheep produce only 0.6 percent of the total meat production of the country amounting to 20 tons (FAO, 1983).

The supplementation of low quality roughages with molasses urea feeds was tried by many researchers (Preston et al., 1967). The most popular research feed was urea molasses liquid feed. In the Indian Veterinary Research Institute, Izatnagar a liquid feed containing 2 and 2-5 percent levels of fertilizer grade urea was tried (Ranjhan et al., 1975) and utilization of urea-molasses feed supplement is one of the essential tool in optimizing the conversion of crop residues into animal products through ruminants. Looking into the animal feeding practice in Indian villages a hard solid block lick, which could be easily used a feed supplement for ruminants was developed in the National Dairy Development. Best efforts are also being made by Saadullah et al. (1989) to make urea molasses block lick using locally available ingredients and encouraging results of feeding urea molasses block in calves and milking cows have been reported by (Saadullah et al., 1989) and (Sarker et al., 1990).

The present work would indicate an importance of urea molasses feeding as protein and energy source in sheep and would help in formulation of feeding strategy based on urea-molasses supplements. Hence, with above background, efforts were made to increase the feeding value of supplementing with urea molasses block lick.

[1]Address reprint requests to Dr. K. B. Hossain, Scientific Officer, A.I. Centre, Mymensingh, Bangladesh.

[2]Scientific Officer, BLRI, Savar, Dhaka, Bangladesh.

[3]Livestock Officer, Goat Development Farm, Savar, Dhaka, Bangladesh.

Received October 14, 1993

Accepted January 28, 1995

The objectives of this study were to examine the effect of supplementing urea molasses block lick with straw based ration on the feed intake of sheep and chemical composition of feed ingredients.

Materials and Methods

Study area

This study was conducted in the laboratory and farm attached to the department of General Animal Science, Bangladesh Agricultural University, Mymensingh.

Design of the experiment and experimental ration

Six male sheep of about 2 years of age, grouped into two having three sheep in each were randomly placed on two different experimental ration of A and B and composition of experimental ration were exhibited (table 1). Chopped rice straw was supplied every morning and evening in sufficient quantities to ensure that at least 500 g of straw remained in the feeding through at the following feeding time. The daily straw intake was calculated by subtracting the left over. Ipil-Ipil leaves and wheat bran were supplied two times in a day in each morning and evening. The sheep of Group B had free access to urea molasses block lick during the trial and the intake was recorded carefully. Water was available at all the times.

TABLE 1. DESIGN AND FEEDING REGIMES OF THE EXPERIMENT

Parameters	Group A	Group B
Number of Sheep	3	3
Initial live weight of sheep (kg)	12.66 ± 1.89	13.0 ± 1.0
Straw	*Ad libitum*	*Ad libitum*
Ipil-Ipil leaves (fresh) (g/day/sheep)	167	167
Wheat bran (g/day/sheep)	66	66
Urea molasses block lick (g/day/sheep)	–	*Ad libitum*
Days on experiment	90	90
Housing & management	Identical	Identical

Note : Mean value ± standard deviation.

Management of sheep

All the experimental animals were subjected to same housing and management practices throughout the experimental period. The animals were fed with experimental diet for 15 days before collection of data to adjust with diet and management condition. Sheep were dewormed against liverfluke and round worm before starting the experiment.

Live weight estimation

The live weight of sheep was measured on two consecutive days at the beginning of experiment, that is after the adjustment of two weeks and then once in a week upto the end of the experiment. The sheep were weighed at 8 A.M. prior to the morning feed was given.

Preparation of urea molasses block lick

The composition of urea molasses block lick used in this experiment is presented in (table 2). The manufacturing process of urea molasses block lick involved heating of molasses at first to reduce moisture content. Later other ingredients like wheat bran, Salt and mineral mixture were mixed with time. Then urea and mixed ingredients were placed in the molasses and it was well mixtured by agitating with a stirrer. After cooling the mixture is placed in the dice to make a block. The size of block licks were 22 × 11 × 10 cm and weighing approximately 2 kg. Later it was covered with polythelene to prevent from dirts.

TABLE 2. COMPOSITION OF UREA MOLASSES BLOCK LICK

Ingredients	(%)
Molasses	55.0
Wheat bran	27.0
Urea	9.0
CaO (Lime powder)	8.0
Common salt (NaCl)	0.3
Mineral mixture (Ca, P, Co, S, etc.)	0.7

Analytical procedures

All subsequent chemical analysis of feed ingredients were determined according to procedure (AOAC, 1975) from time to time. The data were subjected to an analysis of variance (Steel and Torrie, 1960) for a Complete Randomized Design (CRD). The level of statistical significance between means was assessed using the student's t-test.

Results and Discussion

The chemical composition

The chemical composition of feed ingredients used in

this trial is shown (table 3). From the table, it revealed that the dry matter, crude protein, crude fibre, ether extract, nitrogen free extract and ash content of rice straw were 88.0, 2.5, 30.6, 1.4, 42.5 and 23.0 percent respectively. The dry matter of different variaties of straw varied from 88 percent to 92 percent. This variability in composition may be due to soil difference, varieties of rice straw and fertilizer used which is similar as reported by Biswas and Choudhury (1981). The higher ash content of straw may be due to the higher silica content. This silica is taken in the form of mono-silicic acid by the roots but it is deposited as silica in the cell-wall of straw (Theander and Aman, 1984). Further, it may be due to soil contamination during harvesting and subsequent handlings. Jackson (1977) also reported that the variation of ash content straw were mostly due to the content of silica. The dry matter, crude protein, curde fibre, ether extract, nitrogen free extract and ash content of Ipil-Ipil leaf were 18.0, 24.6, 21.6, 3.6, 40.4 and 9.8 percent respectively. Wheat bran contained 85.0 percent dry matter, 13.8 percent curde protein, 12.0 percent crude fibre, 3.0 percent either extract 62.8 percent nitrogen free extract and 8.4 percent ash. Urea molasses block lick was used in this experiment to maintain continuous flow of nitrogen in the rumen.

TABLE 3. CHEMICAL COMPOSITION OF FEED INGREDIENTS (SHWON IN % DRY MATTER BASIS EXCEPT FOR DRY MATTER)

Feed ingredients	DM	CP	CF	EE	NFE	Ash
Rice straw	88.0	2.5	30.6	1.4	42.5	23.0
Ipil-Ipil (leaf meal)	18.0	24.6	21.6	3.6	40.4	9.8
Wheat bran	85.0	13.8	12.0	3.0	62.8	8.4
Urea molasses block lick	89.0	31.5	3.0	0.3	41.2	24.0

Note : DM = Dry matter, CP = Crude protein, CF = Crude fibre, EE = Ether extract, NFE = Nitrogen Free Extract.

Live weight change

Live weight gain of experimental sheep is shown in table 4. The average daily live weight gain per sheep per day was 41 g and 70 g in Group A and Group B respectively. Analysis of variance was done to observe the differences in live weight gain of sheep of the treatment Group of A and Group B respectively (table 5). It is evident that live weight gain of sheep of Group B due to supplementation with urea molasses block lick was highly significant ($p < 0.01$).

TABLE 4. DAILY LIVE WEIGHT GAIN OF SHEEP OF TWO GROUPS SUPPLEMENTED WITH OR WITHOUT UREA MOLASSES BLOCK LICK

Group A (without urea molasses block lick)			Group B (with urea molasses block lick)		
Initial LW (kg)	Final LW (kg)	Daily LWG (g)	Initial LW (kg)	Final LW (kg)	Daily LWG (g)
10.50	14.18	43	13.00	18.92	70
14.00	17.45	41	12.00	17.85	69
13.50	16.80	39	14.00	19.97	71
Mean LWG (g/day)		41 ± 2			70 ± 1

Note : LW = Live weight of sheep, LWG = Live weight gain in sheep.

TABLE 5. ANALYSIS OF VARIANCE OF LIVE WEIGHT GAIN WITH OR WITHOUT UREA MOLASSES BLOCK LICK WITH A STRAW BASED DIET

Sources of variation	Degree of freedom	Sum of squares	Mean squares	Computed F value	Tabulated F
Treatment	1	1,261.5	1,261.5	504.6**	7.71
Error	4	10.0	2.50		
Total	5	1,271.50	254		

Note : ** = Highly significant at 1% levle of probability.

During the experimental period the weekly live weight change of sheep fed without or with urea molasses block lick with basal diet of Group A and Group B is shown in figure 1. It appears from the figure that virtually there was not so much change in live weight of sheep of Group B compared to that of Group A up to 4 weeks of experiment. After this period the sheep of Group B started to change their live weight almost linearly indicating the effect of supplementation of urea molasses block lick in the ration. Higher growth rate of animals on straw with urea molasses block lick is in agreement with that of the result of Kumar et al. (1983). The result of this experiment also agrees with the result of El-Fouly and Leng (1987) and Sudana and Leng (1986). They observed a positive response on the daily live weight gain and lower feed conversion ratio in sheep fed with urea molasses block lick. Urea molasses block lick was also

found to be very effective with straw based diets in increasing the daily live weight gain in cattle and goats (Leng and Preston, 1984).

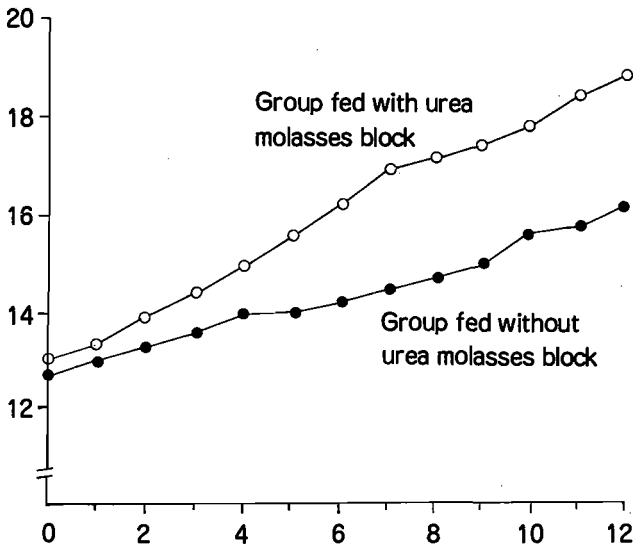

Figure 1. Effect of supplementing urea molasses block in the straw based diet of sheep on the weekly live weight change during experimental period.

Mean dry matter intake as percent of live weight, metabolic body weight (kg $W^{0.75}$) and feed conversion ratio (kg feed dry matter / kg live weight gain) are shown in table 6. From the table, it appears that Group A required 8.12 kg dry matter to gain 1 kg live weight, whereas group B receiving urea molasses block lick required 5.30 kg DM to gain 1 kg live weight. Daily weight gain and feed conversion ratio is also presented in table 6. By another comparison Group A will need 16 months to gain 20 kg live weight while Group B will need only 9.5 months to gain 20 kg live weight by supplementation of urea molasses block lick in the at this observed rate of gain in this study.

Conclusion

From the above studies it may be concluded that there is need for systematic study to assess the feeding value of straw and urea molasses block lick on the performance of ruminants. Feeding of such straw and molasses block lick might be able to produce more utilizing the crop residues and agroindustrial by products efficiently.

TABLE 6. EFFECT OF SUPPLEMENTING UREA MOLASSES BLOCK LICK WITH STRAW BASED ON THE PERFORMANCE OF SHEEP

Parameters	Group A	Group B
Mean live weight (kg)	14.33 ± 1.12	16.05 ± 1.99
Dry matter intake in % of live weight	2.32	2.30
Dry matter intake (g/kg $W^{0.75/day}$)	45.20	46.14
Daily live weight gain (g/day/sheep)	41.00	70.00
Feed conversion (kg dry matter/kg live weight gain)	8.12	5.30

Note : Mean value ± standard deviation.

Literature Cited

AOAC. 1975. Official Methods of Analysis (10th ed.). Assoc. of official Agric. chemists. Washington. D.C., U.S.A.

Biswas, S. K. and N. H. Choudhury. 1981. The nitrogen and mineral contents of paddy straw. Proc. of Seminar on Maximum Livestock Production from Minimun Land. Bangladesh Agricultural University, Mymensingh, Bangladesh. pp. 88-96.

Devendra, C. 1976. Goat production on small farms in South East Asia. Rpt. FAO. expert group meeting on livestock for small farmers. Bangkok, Tailand, 31st May-4th June, 1976.

El-Fouly, H. A. and R. A. Leng. 1987. Enhancing fermentative digestion of cereal straws by using urea molasses block. In Isotope aided studies on non-protein nitrogen and agro-industrial by-products utilizing by ruminants (panel Inoc. seres). International Atomic Energy Agency. Vienna pp. 31-40.

FAO. 1983. Food and Agriculture Organization. Production year book. Vol. 37. Rome, pp. 326.

Jakson, M. C. 1977. Rice straw as livestock feed. World Animal Review. 23:25-40.

Kumar, S., U. B. Shingh and M. Y. Khan. 1983. Effect of feeding ammoniated Bagomolasses on live weight gain and nutrient utilization on cross-bred calves. Ind. J. Ani. Sci. 53 (N):1177-1180.

Leng, R. A. and T. R. Preston. 1984. Nutritional strategies for the utilization of agro-industrial by-products by ruminant and extension of the principles and technology to the small farmers in Asia In: proceedings of the 5th world conference on animal

production, Japanese society of zoo-technical science. Tokyo, Japan. pp. 310-318.

Preston, T. R., A. Elias, M. B. Willis and T. M. Sutherland. 1967. Intensive beef production from molasses and urea. Nature, 216-271.

Ranjhan, S. K., N. N. Pathak, U. B. Singh, D. N. Verma and A. Verma. 1975. Tracer studies on non-Protein nitrogen for ruminants symposium. FAO / IAEA, Vienna, Australia.

Saadullah, M., A. Haque, M. H. Mondal and A. Wahid. 1989. Livestock and Poultry Development in Bangladesh. 2nd annual report. Rotary Club of Mymensingh / BAU / DLS. p. 12.

Sarker, N. R., M. Saadullah, M. A. Huq, B. Hossain and D. Begum. 1990. Effect of feeding untreated and ammoniated rice straw supplementing with or without urea molasses block lick on the performance of lactating cows. The Bangladesh Journal of Veterinary Science. 24:1-4.

Steel, R. G. D. and J. H. Torrie. 1960. Principles and Procedure of Statistics. McGrow Hill Company Inc.

Sudana, I. B. and R. A. Leng. 1986. Effects of supplementing a wheat straw diet with urea or a urea molasses block and / or cottonseed meal on intake and live weight changes of lambs. Anim. Feed Sci. Tech. 16:25-35.

Theander, O. and P. Aman. 1984. Straw and other fibrous by-product as feed (Eds. F. Sundstol and E. Owen). Devet. Anim. and Vet. Sci. pp. 45-79.