SUPPLEMENTARY FEEDING TO IMPROVE MILK AND MEAT PRODUCTION OF CATTLE UNDER SMALLHOLDER FARM CONDITION IN BANGLADESH

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ABSTRACT

Cattle on smallholder farms produce milk, meat and manure that are used to improve the nutritional feed security of the farm household. Straw is the most important crop residues contributing more than 90 per cent of the basal dry matter available to the cattle in Bangladesh which is low in organic matter and digestibility. From the results of various experiments, animal nutritionists suggest that the nutritional limitation can also be overcome by supplementation. The main objective of the experiment was to determine the optimum level of Urea Molasses Block (UMB) supplementation for maximum benefit regarding meat and milk production under smallholder farm condition in Bangladesh. One hundred eight lactating crossbred cows were randomly divided into four groups each consisting of 27 cows whose average live weight was 302 kilogram (kg) and all the cows were of 2nd lactation. Four treatments were 0.00, 0.35, 0.50 and 0.65 kg/day/cow UMB supplementation fed with basal diets. Milk yield was increased linearly by the increasing level of UMB intake by cows. The body weight gain of cows up to 6 months of lactation was higher in supplemented cows when compared to unsupplemented cows. Body weight gain of calves up to 6 months of age was significantly ($p<0.001$) increased in the groups of calves of those dams receiving UMB with higher milk composition. The addition of 0.50 kg/d/cow UMB supplement to the basal diets improved milk yield and meat of cows and calves. Cattle fattening before Eid-ul-Azha (Muslim Festival) for beef production has become an important business for smallholder farmers. Of the calves born, very few one reared as bulls for natural breeding. Most of the male calves are therefore available for rearing as beef animal for meat production. Cattle fattening can also be used as a path out of poverty.

Key Words: Body weight, meat and supplementation

INTRODUCTION

Cattle on smallholder farms produce milk, meat and manure that are used to improve the food security of the farm household. The smallholder farmers of Bangladesh cannot feed their cattle adequately. Most fibrous feeds available to animals are deficient in some nutrients and are generally poor in digestibility. Straw is the most important crop residues contributing more than 90% of the basal dry matter available to the cattle in Bangladesh (Saadullah *et al.* 1994). Recently considerable efforts of many animal nutritionists have been directed to improve the nutritive value of straw and its utilization (Hock *et al.*, 1988). Their results suggest that the nutritional limitation can be overcome by physical and chemical treatment or by supplementation with specific nutrients to provide an optimum

ruminal condition for rumen microorganisms. It has been observed from on station trails that the supplementation of urea molasses block (UMB) with straw based diet could increase feed intake, daily milk yield, lactation period and increased live weight gain in cows and calves in Bangladesh (Saadullah, 1991). The most common system for keeping cattle in Bangladesh on which most resource poor people depend, is the mixed crop livestock farming system. However, the feeding system commonly used in smallholder farms in Bangladesh is different to that of organized large farms in urban area including farms of peri-urban area. It was observed in an earlier on station experiment that 500g/d/cow UMB is required for maximum benefit. But it is important to determine the amount of UMB for small farmer's condition at village level. The main objective of the experiment was to determine the optimum level of UMB required for maximum benefit. But it is important to determine the amount of UMB for small farmer's condition at village level. The main objective of the experiment was to determine the optimum level of UMB required for maximum benefit regarding meat and milk production under smallholder farm condition in Bangladesh.

MATERIALS AND METHODS

The experiment was conducted at some selected villages of Mymensingh district. One hundred eight lactating crossbred (Holstein × local zebu) cows were randomly divided into four groups each consisting of 27 cows whose average live weight was 302 (SE 53.93) kg and all cows were of 2nd lactation. Four treatments were 0.00, 0.35, 0.50 and 0.65 kg/cow UMB fed with basal diets designated as T_0, T_1, T_2 and T_3, respectively. The basal diet consisted of rice straw and mixed (at ratio of 4:1) available to smallholder farmers and concentrates mixture made from locally available feed ingredients (36% wheat bran, 36% rice polish, 27% sesame cake and 1% common salt). The UMB consisted of 39% molasses, 20% wheat bran, 20% rice polish, 10% Urea, 6% lime powder (CaO) and 5% common salt (NaCl). The detail compositions of diets are given in Table 1.

Table 1. Composition of diets for different treatment groups (Fresh basis)

Ingredients (Fresh Basis)	Treatments (kg/d)			
	T_0	T_1	T_3	T_4
Roughages				
a. Straw	*ad libitum*	*ad libitum*	*ad libitum*	*ad libitum*
b. Mixed grass	3.00	3.00	3.00	3.00
Concentrate	2.75	2.75	2.75	2.75
UMB	-	0.35	0.50	0.65

The feed and milk samples were collected randomly from study area and were analyzed for proximate components according to the method of AOAC (2003). Milk yield of individual cow was taken daily and body weight of cow was recorded monthly after calving to confirm pregnancy of non-pregnant cow-180 days of lactation. Body weight of calf was recorded monthly up to 6th month of age. Data for milk yield, body weight changes of cows and calves was statistically analyzed by one factor

completely randomized block design using MSTAT statistical package program. Significant differences among the treatment means were compared by DMRT.

RESULTS AND DISCUSSION

As shown in Table 2. there were an increasing values for DM and ME ($P>0.05$) intake. On the other hand CP intake increased significantly ($p<0.001$) as the level of UMB increased with basal diets. Analysis indicated that there was a positive relationship of DM, CP and ME intake with different levels of UMB intake.

Table 2. Nutrient intake of unsupplemented and UMB supplemented cows

Ingredients (DM basis)	Diets (kg/d)				SEM	Significance
	T_0	T_1	T_2	T_3		
Total DM (kg/d)	8.63	8.98	9.69	9.77	0.38	NS
CP (g/d)	587^b	671^b	793^a	825^a	41.68	***
ME (MJ/d)	62.67	65.74	72.11	97.74	14.37	NS

Values with different superscripts in the same row differ significantly

NS = Non-Significance ($p>0.05$), *** = 0.001

Table 3. Composition of milk at unsupplemented and at different levels of UMB supplemented cows

Parameters	Treatments				SEM	Significance
	T_0	T_1	T_2	T_3		
Milk fat (g/kg)	41.2	44.5	47.1	47.1	0.528	NS
Protein (g/kg)	34.3	34.4	35.7	36.0	0.131	NS
Lactose (g/kg)	41.4	40.2	40.7	40.6	0.139	NS
Total Solids (g/kg)	122.6	126.1	130.6	131.8	0.625	NS
Ash (g/kg)	6.7	7.0	7.1	7.1	0.098	NS

NS = Non-Significance ($p>0.05$)

Table 4. Mean values of milk yield and body weight gain of cows and calves

Parameters	Treatments				SEM	Significance
	T_0	T_1	T_2	T_3		
180 days av. yield (kg/d)	5.42^b	5.49^b	6.81^a	6.83^a	0.47	*
Lactation average (kg/d)	3.68 (306 days)	5.08 (303 days)	5.95 (336 days)	5.99 (335 days)	0.81	NS
Body weight changes of cows (g/d)	9.37^c	65.89^{ab}	88.04^a	88.44^a	22.35	*
Calf weight gain(g/d)	159^b	167^b	215^a	228^a	14.12	***

Values with different superscripts in the same row differ significantly

NS = Non-Significance ($p>0.05$), * = $p<0.05$, *** = 0.001

The average milk yield of 180 days in 4 groups differed significantly ($P<0.05$). The highest milk yield was observed in T_3 but the difference between T_2 and T_3 was negligible and the difference was not statistically significant ($p>0.05$). The lactation average was also increased linearly by the increasing level of UMB intake by cows. The body weight gain of cows up to 6th month of lactation was higher in supplemented cows when compared to unsupplemented cows. Body weight of calves up to 6th month of age was significantly (pI may select you to assess one further application, I may select you to assess one further application,<0.001) increased in the groups of calves of those dams receiving UMB with higher milk composition (Table 3). Cattle fattening before Eid-ul-Azha (Muslim festival) for beef production has become an important business for smallholder farmers. Of the calves born, very few one reared as bulls for natural breeding. Most of the male calves are therefore available for rearing as beef animal.

CONCLUSIONS

The addition of 0.50 kg/d/cow UMB supplement to the basal diets increased milk yield of cows and meat production of cows and calves. Cattle fattening can also be used to improve the livelihood of the smallholder village farmers.

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REFERENCES

AOAC, (2003). Official Method of Analysis of AOAC International. 17th Edition, Horwitz, Revision 2, Volume 1 & 2, AOAC International, Suite 500, 481 North Frederick Avenue Gaithersburg, Maryland 20877-2417, USA.

Hock, R. D. V., Muttetuwegama, G. S. and Sciere, J. B. (1988). Overcome the nutritional limitations of rice straw for ruminants. Urea ammonia treatment and supplementation with rice bran and glicirida for lactating Surti buffaloes., Asian Australasian Journal of Animal Science., 1(4): 201-208.

Saadullah, M. (1991). The importance of urea molasses blocks and by-pass protein in animal production: the situation in Bangladesh. Isotope and related techniques in animal production, IAEA-SM-318/28 pp. 145-156.

Saadullah, M., Sarkar, D.R.D., Haque, M. A. Samad, M. A. and Islam, S. (1994). Study on the effect of replacement of wheat bran by urea molasses block lick in straw base diet on the performance of draught cows. Bangladesh Journal of Animal Science, 23(1-2): 163-168.