

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

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## Introduction

Cattle on smallholder farms produce milk, manure and meat 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 residue 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 rice straw and its utilisation (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 trials that the supplementation of urea molasses block (UMB) with straw-based diet could increase feed intake, daily milk yield, lactation period and increase 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 organised large farms in urban areas including farms of peri-urban areas. 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 conditions 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 conditions in Bangladesh.

## Materials and Methods

The experiment was conducted at some selected villages in the Mymensingh district. One hundred and eight lactating crossbred (Holstein x 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 the cows were of 2<sup>nd</sup> lactation. Four treatments were 0.00, 0.35, 0.50 and 0.65 kg/d/cow UMB fed with basal diets designated as T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> respectively. The basal diet consisted of rice straw and mixed grass (at a 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 detailed composition 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 <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
Roughages				
a. Straw	<i>ad libitum</i>	<i>ad libitum</i>	<i>ad libitum</i>	<i>ad libitum</i>
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 analysed for proximate components according to the method of AOAC (2003). Milk yield of each individual cow was taken daily and body weight of the cow was recorded monthly after calving to confirm pregnancy of non-pregnant cow-180 days of lactation. Body weight of each calf was recorded monthly up to 6<sup>th</sup> months of age. Data for milk yield, body weight changes of cows and calves was statistically analysed by one factor completely randomized block design using the MSTAT statistical package program. Significant differences among the treatment means were compared by DMRT.

## Results and Discussion

As shown in Table 2, there were 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 <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
Total DM (kg/d)	8.63	8.98	9.69	9.77	0.38	NS
CP (g/d)	587 <sup>b</sup>	671 <sup>b</sup>	793 <sup>a</sup>	825 <sup>a</sup>	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), \*\*\*=P<0.001

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

Parameters	Treatments				SEM	Significance
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
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

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

Parameters	Treatments				SEM	Significance
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>		
180 days av. yield (kg/d)	5.42 <sup>b</sup>	5.49 <sup>b</sup>	6.81 <sup>a</sup>	6.83 <sup>a</sup>	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 <sup>c</sup>	65.89 <sup>ab</sup>	88.04 <sup>a</sup>	88.44 <sup>a</sup>	22.35	*
Calf weight gain (g/d)	159 <sup>b</sup>	167 <sup>b</sup>	215 <sup>a</sup>	228 <sup>a</sup>	14.12	***

Values with different superscripts in the same row differ significantly  
NS= Non-Significance (P>0.05), \*=P<0.05, \*\*\*=P<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<sub>3</sub> but the difference between T<sub>2</sub> and T<sub>3</sub> 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 the 6<sup>th</sup> month of lactation was higher in supplemented cows when compared to unsupplemented cows. Body weight of calves up to the 6<sup>th</sup> month of age was significantly (P<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 are reared as bulls for natural breeding. Most of the male calves are therefore available for rearing as beef animals.

#### Conclusions

The addition of 0.50 kg/d/cow UMB supplement to the basal diets improved milk yield, milk composition and meat of cows and calves. Cattle fattening can also be used as a path out of poverty.

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