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## Effect of Supplementary Concentrate Feeding on Milk Production, Quality and Body Weight Changes of Red Chittagong Cows and Their Calves under Village Management Condition

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**Abstract:** Milk production, quality and body weight gain of red Chittagong cows and their calves were studied in the village management conditions. From the study it was seen that feeding supplementary concentrate containing more UDP had beneficial effect on milk yield and body weight gain of red Chittagong cows and their calves reared traditionally under village management condition. Amount of per day milk production and weight gain of red Chittagong cows was higher than other indigenous cattle of Bangladesh except Pubna cattle.

**Key words:** Red Chittagong cattle, rumen undegradable, rumen degradable, milk production and body weight

### Introduction

The milk production of indigenous cattle is low compared to improved breed of cattle (Hussain *et al.*, 1984). This is due to poor genetic make up of native stock and lack of adequate nutrient supplied in the ration. More than 80 % of rural people kept local cattle in Bangladesh (Khan *et al.*, 2000). They have no distinct phenotypic characteristics except red Chittagong cattle (RCC). The RCC are characterized by red body coat along with reddish muzzle, horns, hooves and eyeballs. The fibrous crop residues constitute an important source of feed for dairy cattle nutrition in Bangladesh. Among the crop residues paddy straw is the main source of roughage in Bangladesh. Low digestibility, low content of minerals and poor crude protein places crop residues in the category of a low quality forage. Besides, the crop residues, green roughage and rice polish is generally fed by the farmers to their indigenous milking cows in the village level. That is why supplementation of concentrate is needed to achieve good production. Out of different types of concentrates, fish meal and urea can be used because of their high nutritive value. No research work has yet been done to increase milk production of RCC, so, in order to increase the milk production of the country we need to conduct more research under village management conditions. For this reason the present study was undertaken to monitor the effect of feeding supplementary concentrates to RCC along with their normal roughage based basal diets and also to observe the comparative efficiency of feeding fish meal and urea based concentrate feeds.

### Materials and Methods

The present study was carried out to know the effect of supplementary concentrate feeding on milk yield, milk composition and body weight changes of RCC and their calves under village management conditions at 8 villages of Potia Thana under Chittagong District of Bangladesh for a period of 13 weeks. For this purpose, 12 (twelve) milking RCC having almost similar milk production, lactation number, body weight were selected. Cows were divided into three groups each group containing 4 (four) animals and were designated as A, B and C. Cows on A group received the more rumen undegradable protein (UDP) concentrate mixture (0.526 kg DM/cow/day). On the other hand, cows on B group received the less UDP but more rumen degradable protein (RDP) concentrate mixture (0.532 kg DM/cow/day). Besides, the concentrates mixture all the cows from both groups received other basal roughage diets (straw, green grass, tree leaves etc) usually fed by the farmers. Cows that were on C group did not receive any kind of concentrate mixture and were reared traditionally by farmers. The concentrate mixture used in A and B groups are shown in Table 1. DM and CP content of the feed stuffs were analyzed in the Animal Nutrition Laboratory of CGVC by proximate analysis and ME and degradability values were adopted from "Nutrient allowances for cattle and sheep" an in term publication of Scottish Agricultural College (1984). Experiment was started after two weeks of calving. Concentrate mixture was fed after 15 min. of milking. Milking was done once in a day, about 9'0 clock in the morning and amount was recorded daily. Milk sample from

Table 1: Chemical Composition of concentrate mixture and their approximate nutritive value

Name of ingredients	Fresh weight (g)	DM (g)	ME (MJ)	RDP (g)	UDP (g)	CP (g)
Concentrate mixture for A group (High UDP)						
Wheat bran	375	330	3.92	43.56	14.52	58.08
Sesame oil cake	125	113	1.34	23.50	12.70	36.20
Fish meal	75	68	0.75	13.60	20.40	34.00
Molasses	20	15	0.18	0.48	0.12	0.60
		526	6.19	81.08	47.74	128.82
Concentrate mixture for B group (low UDP)						
Wheat bran	375	330	3.92	43.56	14.52	58.08
Sesame oil cake	125	113	1.34	23.50	12.70	36.20
Molasses	104	78	0.94	2.50	0.62	3.12
Urea	11	11	-	31.90	-	31.90
		532	6.20	101.46	27.84	129.30
Concentrate mixture for C group						
No Concentrate mixture was given to the animals of C group						

each cow of a group was analyzed at Dairy Science Laboratory of CGVC at 15 days interval to monitor the quality of milk. Milk fat was determined by applying Gerber method and SNF was calculated by using formula as described by Eckles *et al.* (1951).

Before starting the experiment weight of all cows and their calves were taken initially and then after every 15 days interval to know their body weight changes. Data collected from this experiment was statistically analyzed by using completely randomized design. Analysis of variance test was done to find out the statistical differences between treatments. In case of significant difference, least significant difference (LSD) test was done to find out the significant difference between treatment means.

### Results and Discussion

**Milk yields of cows:** Average milk yield of RRC belongs to A, B and C groups was  $2.2 \pm 0.07$ ,  $2.0 \pm 0.07$  and  $1.85 \pm 0.07$  kg/cow/day respectively (Table 2). Statistical analysis showed that milk yield of group A and B was significantly higher ( $P < 0.05$ ) than the cows that were on group C. The amount of production per RCC belongs to C group was almost similar to the findings of Khan *et al.* (2000) but higher incase of group A and B. Mean milk yield was about 10% higher in group A than group B and also differed significantly at same level of significance. Cows on A group received the concentrate mixture which contain high level of UDP and low level of RDP, on the other hand cows on B group received the concentrate mixture which contain high level of RDP and low level of UDP. Fish meal was added in the diet of A group as a source of UDP. Mehrez *et al.* (1980) reported that fish meal is rich in amino acids lysine and methionine and on an average 60% of the protein of fish meal passed undegraded from the rumen. Thus, these properties of fish meal may have contributed to the increase of milk yield. In this connection, Ørskov (1981) mentioned that in lactating cows when their intake are restricted during early lactation

or when they are given a diet which does not enable them to meet their need, a response of supplements of UDP occurs. In most cases RRC are underfed and usually do not get the exact amount of nutrients which they need. In this situation, when two types of concentrate mixture were offered to them, more UDP concentrate mixture responded better than the more RDP concentrate mixture diet. That is why, milk production was higher in A and than B group. Lower milk yield of C group might be due to the fact that they did not receive any king of concentrate mixture.

**Milk composition:** Fat content in the milk (Table 2) of RRC belongs to A, B and C groups was  $44.07 \pm 0.47$ ,  $45.35 \pm 0.47$  and  $46.40 \pm 0.47$  respectively. Statistical analysis showed that there was highly significant difference ( $P < 0.01$ ) among the fat content of milk of different groups of cows. The fat content of milk of indigenous cows are high which agrees with the findings of Islam and Oliuzzaman (1992). High fat content of milk of C group might be due to the fact that they were reared mainly on roughage feeds and their amount of milk production also low. It is now well established that milk fat percentage depends on amount of milk production also. When milk production decreases than milk fat percentage increases. From the data it was observed that the mean SNF content of A, B and C group was  $80.12 \pm 0.71$ ,  $81.36 \pm 0.71$  and  $82.72 \pm 0.71$  g kg<sup>-1</sup>, respectively. The amount of SNF was little bit lower than that has been found by Islam *et al.* (2001) incase of indigenous cattle. Although SNF content of C group was little higher than A and B group but statistically there was no significant difference.

**Body weight changes of cows:** Cows on all groups gained little weight during the 91 days study period. Average total weight gain per cow for A, B and C group was  $6.00 \pm 0.67$ ,  $4.00 \pm 0.67$  and  $1.5 \pm 0.67$  respectively. Statistical analysis showed that body weight gain of cows that were on C group was significantly ( $P < 0.05$ ) lower than the cows were on A and B groups. Cows on C group did not

Table 2: Milk yield, milk composition and body weight changes of cows and their calves

Parameters studied	Types of feed			Level of significance
	High UDP concentrate mixture for group (A)	Low UDP concentrate mixture for group (B)	NO concentrate Mixture for group (C)	
Milk yield (kg/cow/day)	2.2±0.07a	2.0± 0.07ab	1.8±0.07b	*
Fat content (g/kg)	44.07±0.47b	45.35± 0.47ab	46.40±0.47a	**
SNF content (g/kg)	80.12±0.71	81.36±0.71	82.72 ±0.71	NS
Total body wt. gain of cows (kg)	6.00±0.67a	4.00±0.67a	1.5±0.67b	*
Total body wt. gain of calves(kg)	23.66±1.05a	20.93±1.05a	15.93±1.05b	*
Per day body wt. gain of calves (kg)	260±6.67a	230±6.67b	175±6.67c	*

Different superscripts in the same row differ Significantly

\* Significant at 5% level

\*\* Significant at 1% level

NS= Non Significant

receive any concentrate mixture during the study period. On the other hand, cows on A and B group received concentrate mixture which might have created significant difference between weight gain of different groups of cows. Highest body weight gain was seen for group A. This might be due to the effect of UDP. Undegradable protein escapes degradation in the rumen but breaks down post ruminally which latter provides amino acids for absorption from the small intestine more directly and efficiently (Islam, 1988). For this reason body weight gain of cows have highest in A group than other groups.

**Body weight changes of calves:** It was seen that calves that were on group A, B and C gained 23.66±1.05, 20.93±1.05 and 15.93±1.05 kg during the 91 days of experiment period. Body weight gain per calf per day was 260±6.67, 230±6.67 and 175±6.67 in A, B and C group respectively. Statistical analysis showed that body weight gain of calves that were on C group was significantly lower ( $P<0.05$ ) than A and B group. Though the calves of C group obtained less milk and hence, their body weight gain was lower than other groups. Growth rate of our local calves agrees with the work of Islam and Arshed (1995) who reported that the average body weight gain of indigenous calves under traditional feeding and management conditions was 170 g day<sup>-1</sup>.

From the above discussion it may be concluded that feeding supplementary concentrates containing more UDP had beneficial effect on milk yield and body weight gain of cows and calves of RCC reared traditionally under village management conditions.

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