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Effect of Urea Molasses Multinutrient Block on the Reproductive Performance of Indigenous Cows under the Village Condition of Bangladesh

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Abstract: In the present study urea molasses multinutrient blocks (UMMB) may be used as a catalytic feeding to the straw based diet of the indigenous cows for fertility. With that understanding, 49 indigenous post partum cows from 49 marginal village farmers of village-Boira were selected and a cake of 250 g/h/d UMMB was supplied with their usual feeding from date to calving to the date of confirmation of pregnancy. Cows were stall fed. Reproductive events of cows were recorded as when occurred. Milk progesterone was measured by using radio immuno assay (RIA) technique. Similarly, 49 cows were in control group in the same village. The results in control and UMMB group were-calving to 1st p4 (progesterone) rise (days) 104±52 and 103±37 ($p>0.05$); calving to first service (days) 194±68 and 130±64 ($p<0.01$); calving to conception (days) 199±72 and 162±73 ($p>0.05$) and subsequent calving interval (days) 480±73 and 443±70 ($p>0.05$), respectively. From the study, it may be concluded that UMMB has a positive effect on fertility of the local cows under the village condition of Bangladesh.

Key words: Indigenous cows, UMMB, 1st p4 rise, conception, calving interval

INTRODUCTION

Bangladesh is a developing country having an area of 143,998 sq km with population of 120 million of which 15% is urban and 85% is rural. The rate of human population increase in Bangladesh is 2.4% per year[1]. It is one of the densely populated countries of the world. Cattle population is about 22.06 million[2]. Most of the cattle in Bangladesh are non descriptive type, which do not belong to any specific breed and may be termed as indigenous cattle. Their milk production capacity is much lower and are smaller size than foreign breeds but generally they are; resistant to disease, thrive well in hot and humid climate and thrive well in fluctuating nutrient supply. Shortage of feed is the major constraint of livestock development in Bangladesh. The availability of green grass in Bangladesh is only 0.064 million tons where need is 57.50 million tons annually. The shortage is about 57.436 million tons i.e. 99.88%[3]. Cattle mainly subsist on rice straw which is severely deficient in protein and mineral content[4] and its cellulose and hemicellulose are poorly digested[5]. Straw is the important crop residue contributing more than 90% of the total dry matter available to the dairy cattle of Bangladesh. Recently, considerable efforts of many animal nutritionist have been directed to improvement of the nutritive value of rice straw and its utilization[6-9]. Their results suggested that the nutritional limitations could be overcome by physical and chemical treatments or by supplementation with specific nutrients to provide an optimum ruminal condition for rumen microorganisms. It is also well known that nitrogen is the main limiting factor in the utilization of the roughage as a source of feed for ruminants and protein supplementation undoubtedly could improve its voluntary intake and digestibility as reported by Church and Santos[10], Guthrie and Wagner[11].

It has been demonstrated that the nutritional status of a dairy cow in one lactation can have a substantial carryover effect in the next. In attempting to understand the nutrient requirements for production it is therefore important to consider not only present production but future production as well. Since the initiation of lactation in the dairy cow requires that a calf be carried to term, milk production is dependent on the reproductive efficiency of the herd. Cows calving in the good body condition produced more milk in early lactation than those calving in poor condition[12].

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In general, increased body weight loss in early lactation is associated with a reduction in reproductive efficiency primarily due to both a delay in remitting and a lowered conception rate. Therefore, it is evident that the requirements for milk production are not incompatible with those for ensuring a high level of reproductive performance adequate nutrition both before and after calving is required to allow the cow to attain its true genetic potential for milk production and to ensure that reproduction is not impaired.

An extended postpartum anestrus period (80%; more than 150 days) is a characteristic of local cows in Bangladesh[13]. A prolonged anestrus period after calving is recognized as a major constraint for maintaining a 12 month calving interval. Calving interval is dependent upon the re-establishment of ovarian cyclicity after parturition. Dealyed re-establishment is influenced by body condition[14] suckling[15] milk yield[16] and diseases[17]. Feed supplementation can cover or at least reduce these stresses and enhance the onset of ovarian cyclicity after calving[18].

Due to the present socio-economic condition it was unable to supply sufficient amount of cereal grains to our dairy cows for milk production and reproduction. It can be mentioned here that huge amount of grains are being used by the growing poultry industries in the country. That's why the milk production and reproduction efficiency of our dairy cows are not increasing satisfactorily. To combat this situation we have to think the alternative way to fulfill the needs of concentrates for dairy animals[19]. Oil cake pulses are the main source of protein in cows ration in Bangladesh but due to scarcity and high price it is necessary to find out an alternative and cheaper source of protein. The use of urea as a source of protein and is being used very extensively as one of the best sources of non-protein nitrogen for dairy cattle by the developed and developing countries of the world. Because rumen bacteria can convert urea to protein, provided sufficient energy is supplied to them[20]. It was found that if urea and molasses mixture is supplied to the animals with the straw then feed intake and digestibility of straw increases[21].

Molasses is a sugar mill by product which can be obtained easily and can provide energy, minerals and vitamins very quickly. It adds sweet flavor, odor and has a special value increasing the palatability and general efficiency of the feed. It has interesting to note that the possible use of non-protein nitrogenous component incorporated in molasses is an economical means of providing suitable protein for ruminant.

Therefore, the present study was carried out with the following objectives:

- To study the effect of UMMB on the reproductive intervals i.e. 1st p4 (progesterone) rise, calving to first estrus, calving to conception and calving interval and
- To assess the profitability of UMMB in terms of diet economy especially in the straw based diet in Bangladesh.

MATERIALS AND METHODS

One typical village-Boira which is about 2 km away from Bangladesh Agricultural University (BAU), Mymensingh, was chosen for this study for improving milk production and fertility of the local cows. The villagers are mostly resource poor farmers (small-holder farms) and 22% of them are landless but every family has some indigenous cattle. The cows of the villagers are used for multipurpose such as drought, dairy as well as meat. Rice straw is the main source of feed for the animals. Very little roadside grass, concentrates e.g. wheat bran, oil cake, rice bran and common salt are fed to the animals. Animals are mainly stall fed and sometimes tethered. Calves are usually tied at night and free access to their dam during day time. From 2 July 1995 to 16 January 1996, 80 individual resource poor village farmers with their 98 postpartum cows in total had been selected. Blocks were being used as catalytic feeding to the straw based diet of the local cows for fertility. Two hundred and fifty g/h/d of UMMB were being supplied to the cows in addition to their usual feeding by the farmers from date of calving to the date of confirmation of next pregnancy by rectal palpation. Blocks contained molasses 53%, wheat bran 16%, rice polish 16%, common salt 5%, lime 4% and urea 6%. An electric powered concrete mixture machine has been set for mixing the feed ingredients and a ball press and mold with lever system is being used for the preparation of UMMB by cold method. For standardization and quality control frequent analysis of nitrogen content of the block were being done by Kjeldahl method. The chemical composition of UMMB was DM, 81.57%; CP, 18.75%; CF, 3%; EE, 2.2% and Ash, 16.62%. Besides this, CP was estimated once a month from the start to end of the experiment. The production responses (biological/economical) after supplementation of UMMB were being recorded routinely-measurement of progesterone (p4 in serial samples of milk were being done by radio immuno assay (RIA) technique from 30 after calving to 7 interval until confirmation of pregnancy by rectal palpation together with records on reproductive events. The chemical composition of supplied feed ingredients (Table 1), which were done in

Table 1: Average composition of village level feed

Feed ingredients	DM (g kg^{-1})	Ash (g kg^{-1} DM)	RDP (g kg^{-1} DM)	UDP (g kg^{-1} DM)	CP (g kg^{-1} DM)	dg CP (%)	dg DM (%)
Rice straw	854	141	39	13	52	76	38
Green grass	204	57	52	19	71	73	70
Wheat bran	876	68	114	43	157	72	85
Sesame oil cake	891	132	197	114	311	63	80

Table 2: Average daily intake of feed at the village level of indigenous cows (control and treated group

	Fresh weight (kg d^{-1})		DM (kg da^{-1})		RDP (g d^{-1})		UDP (g d^{-1})		CP (g d^{-1})	
Feed Ingredients	Control	Treated	Control	Treated	Control	Treated	Control	Treated	Control	Treated
Rice straw	8.0	10.0	6.80	8.54	265	390	88	130	353	520
Road side grass*	4.0	4.0	0.82	0.82	43	43	16	16	59	59
Wheat bran*	0.5	0.5	0.44	0.44	50	50	19	19	69	69
Total	12.5	14.5	8.06	9.80	358	483	123	165	481	648

*Optional

the Animal Nutrition Laboratory of Bangladesh Agricultural University. Amount of nutrient intake by the experimental cows were showed in Table 2.

Statistical analysis of the collected and calculated data were carried out to analyzed of variance in randomized complete block design (RCBD) according to Gomez and Gomez[22], test was carried out to find out the significant difference between means.

RESULTS AND DISCUSSION

An attempt was made to evaluated the potential effect of urea molasses multinutrient blocks (UMMB) on the reproductive (intervals between calving to 1st p4 rise, calving to 1st service, calving to conception and subsequent calving interval) performance of deshi cows in this experiment.

Interval between calving to 1st p4 rise for control and UMMB groups were 104±52 and 103±37 days (Table 3), respectively which was not statistically significant. Interval from calving to first service in case of control and UMMB groups were 194±68 and 130±64 days, respectively. This result was supported by Alam and Ghosh[23]. There were significant ($p<0.01$) differences in the interval (days) from calving to first service. In both the control and UMMB group, calving to 1st p4 rise occurred earlier onset of first estrous postpartum/calving to first service, it may be partially due to silent estrous or suboestrus or quiet ovulation but this could also due unobserved estrous. The above mentioned variation was found more in control group of cows. It could be said that the UMMB has a positive effect on the regularity of estrous cycle containing less silent heat symptoms of cow which could be due to better available nutrients. Intervals from calving to first service in case of UMMB group was decreased due to the catalytic effect of UMMB which is supported by Tegegne *et al.*[24]. Their result showed 54 days shorter in treated group than that of control group.

Intervals from calving to conception in case of control and treated groups were 199±72 and 162±73 days, respectively (Table 3). There were no significant differences between control and treated groups on the interval from calving to conception. The calving to conception interval of treated groups supported by Alam and Ghosh[23]. The postpartum anoestrous and conception intervals between breeds in a location or within the same breed at different locations, may be a reflection of genetic, nutritional and managemental status of cows. For optimal, reproductive performance, cows must conceive within 80-85 days of calving[25].

Although there were no significant differences between control and UMMB groups on the interval from calving to conception but it was biologically important. Most of the cows of control group conceived above 210 days of calving but in case of UMMB group the maximum conception occurred the days between 90-120 days of calving. It may be due to the catalytic effect of UMMB supplementation on available feed resources. Calving intervals in case of control and treated groups were 480±73 and 443±70, respectively (Table 3). There were no significant differences between groups but it was biologically important. Because calving interval has been reduced greatly in UMMB group than that of control group. In control group, most of the cows calved between 17-19 months of postpartum. On the other hand, most of the cows in treated group calved between <13 to 13 month of postpartum. This may be due to more intake of rice straw and its better degradation and ultimately more available nutrients to the animals by using UMMB. Calving interval is the best index for monitoring herds reproductive status. The calving interval reported in this study was similar to the findings of Rahman *et al.*[26] and Ghose *et al.*[27].

Cost benefit calculation was done to see the reasonability of using UMMB in the straw based diet under the village condition of Bangladesh. The overall cost and benefit ratio in this study was approximately 1:6.

Table 3: Reproductive performance of animals in control and UMMB groups (n=22)

Parameters	Control (Mean±SD.)	UMMB (Mean±SD.)	Level of significance
Calving to p4 rise (days)	104±52	103±37	NS
Calving to 1st service (days)	194±68	130±64	**
Calving to conception (days)	199±72	162±73	NS
Calving interval (days)	480±73	443±70	NS

NS = Non-significant, ** = Significant at 1% level of probability

From the overall study it can be concluded that UMMB has a positive effect on the reproductive performance in the straw based diet under the village condition of Bangladesh.

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