

ANALYSIS OF REPRODUCTIVE AND PRODUCTIVE PERFORMANCE OF CROSSBRED CATTLE FED WITH UREA MOLASSES MINERAL BLOCK

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ABSTRACT

A field study was conducted to identify effect of Urea Molasses Mineral Block (UMMB) feeding on the productive and reproductive performance of crossbred cow. Thirty cross bred cows in their late gestation were selected and divided into two groups of 15 animals each. Treatment group (T) animals were fed UMMB (*ad lib.*, approximately 300 gms per day by licking method) starting from one month before expected parturition till 120 days after parturition. Control group (C) animals were fed as per routine feeding practice in that particular area. Milk production parameters like average daily milk yield, peak yield, total milk yield, milk fat and SNF per cent, total milk solid and reproductive parameters like days of first post-partum estrus, service period, service per conception, conception rate were compared between treatment and control groups. It was observed that peak yield and total milk production were significantly ($p \leq 0.05$) higher in UMMB Group than Control Group. However, milk parameters differed non-significantly between treatment and control groups. UMMB fed group was also found better than control group in respect to reproductive efficiency. Exhibition of first post-partum estrus and conception rate in treatment group as compared to control group were significantly ($p \leq 0.05$) shorter and higher, respectively. This improvement in performance might be due to the result of positive energy balance and additional NPN and mineral intake through UMMB feeding.

Key words: Crossbred cows, Milk production, Reproduction, UMMB

India is rich in the livestock population, so its land is having extreme pressure to feed them all. Inadequate nutrition is one of the major constraints limiting livestock production in the country. Cattle and buffaloes mainly subsist on straw based diet with limited supplementation of green fodder and add very little unbalanced concentrate. There is severe scarcity of feed and fodder (33 per cent short of concentrate, 60 per cent of greens and 42 per cent of dry fodder) which is a major constraint in ruminant production. The inadequate nutrition causes impaired growth, production and reproduction in dairy animals. It has been reported that livestock supplemented with additional nutrients through urea molasses has better food intake, feed digestibility and milk production to some extent (Thu and Uden, 2001).

Livestock require various quantities of oilseed cakes for fulfillment of their protein needs. However, it is very costly in Indian subcontinent. Non-Protein Nitrogen (NPN) supplements like urea are cheaper, readily available and can improve the nutritional status of low quality fibrous feed. Status of negative energy balance or under nourishment of cattle can be mitigated by introduction of Urea Molasses Mineral Block (UMMB) feeding. Shamilima *et al.* (2000) and Wanapat *et al.* (1999) have reported that supplementation of UMMB could improve livestock growth, milk yield and feed intake. Through UMMB, animal gets ammonia from urea, soluble sugar from molasses, mineral from mineral mixture and some amino acid from wheat bran. By considering above facts, a field study was planned to observe effect of UMMB

feeding on the milk production and reproductive performance of crossbred cattle.

MATERIALS AND METHODS

The present experiment was conducted in two villages of Jalandhar District of Punjab, India. Thirty advanced pregnant crossbred cows in their second or third gestation were identified from two villages. These animals were divided into two groups having 15 cows each. All the selected animals were screened to ascertain their general health, nutritional, reproductive and deworming status. Group I (T) cows were fed UMMB (Table 1) as additional supplement starting from one month prior to their expected date of calving till four month after calving. Control group (C) cows were fed as per normal course of feeding practices without UMMB and other supplement. Rest of the feeding practices like roughages and concentrate feeding were kept similar in both the groups.

Milk production parameters *viz.* daily milk yield, peak yield, days to reach peak yield, total milk production, milk fat percentage, milk SNF and milk total solid were recorded for each group. Milk properties were analyzed every week for the period of study. Reproductive efficiency was judged by recording of parameters like days of first estrus, service period, number of inseminations per conception and conception rate. Estrus sign like bellowing, drop in feed intake and in milk production, mounting behavior and vaginal discharge were also recorded for the analysis of intensity of estrous. Statistical analysis of the recorded data was done by analysis of variance (Snedecor and Cochran 1989) using the Duncan's Multiple Range Tests (Duncan, 1995).

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Table 1
Composition of urea molasses mineral block (UMMB)

Ingredient	Quantity (gram)	Chemical Composition	
Urea	300	Particulars	(%)
Molasses	900	Organic Matter	72.4
Wheat Flour	450	Crude Protein	41
Mineral Mixture	450	Ether Extract	1.4
Deoiled Mustard Cake	300	NDF	11.0
Deoiled Rice Polish	300	Cell Soluble	89.0
Salt	120	Cellulose	2.0
CaO	90		
Guar Gum	90		

Table 2
Effect of UMMB feeding on milk production parameters in dairy crossbred cattle (Mean \pm SE)

Milk Production parameters	Treatment (n=15)	Control (n=15)
Peak Milk Yield (lit.)*	18.7 \pm 0.62	15.8 \pm 1.52
Time laps to reach peak yield (days)	42.3 \pm 1.69	52.7 \pm 1.16
Total Milk Yield for 180 days (lit.)*	1590 \pm 1.03	1375 \pm 0.92
Avg Daily Milk Yield (lit.)*	13.25 \pm 1.53	11.46 \pm 1.19
Avg. Milk Fat %	3.76 \pm 1.11	3.71 \pm 1.06
Avg. Milk SNF %	9.24 \pm 0.32	9.15 \pm 0.46
Total Solid in Milk	13.0 \pm 0.76	12.86 \pm 0.91

*differ significantly between treatment and control groups ($p < 0.05$).

Table 3
Effect of UMMB feeding on reproductive parameters in dairy crossbred cattle (Mean \pm SE)

Reproductive Parameters	Treatment (n=15)	Control (n=15)
First Post Partem estrous (Days)*	49.1 \pm 3.16	57.7 \pm 2.59
Number of Insemination/conception	1.62 \pm 1.84	1.93 \pm 2.16
Service Period (Days)*	73.7 \pm 2.69	89.5 \pm 1.94
Conception Rate (%)	73.33	53.33

*differ significantly between treatment and control groups ($p < 0.05$).

Table 4
Effect of UMMB feeding on the expression of estrous sign in dairy crossbred cattle

Estrus sign		Intense	Moderate	Weak
		No. of animals (%)		
Bellowing	Treatment (n=15)	11 (73.33)	2 (13.33)	2 (13.33)
	Control (n=15)	5 (33.33)	8 (53.33)	2 (13.33)
Drop in Feeding	Treatment (n=15)	8 (53.33)	4 (26.67)	3 (20.00)
	Control (n=15)	2 (13.33)	6 (40.00)	7 (46.67)
Vaginal Discharge	Treatment (n=15)	11 (73.33)	4 (26.67)	0 (0.00)
	Control (n=15)	3 (20.00)	10 (66.67)	2 (13.33)
Drop in Milk Production	Treatment (n=15)	7 (46.67)	4 (26.67)	4 (26.67)
	Control (n=15)	2 (13.33)	4 (26.67)	9 (60.00)
Mounting	Treatment (n=15)	10 (66.67)	2 (13.33)	3 (20.00)
	Control (n=15)	4 (26.67)	7 (46.67)	4 (26.67)

RESULTS AND DISCUSSION

Cross bred cattle accepted UMMB very gradually. The daily average UMMB consumption by each cow was calculated to be 328 \pm 34 gms. The group averages for milk production parameters are given in Table 2. The results indicate that supplementation with UMMB

resulted in substantial increases in milk production.

Average daily milk yield was found significantly ($p < 0.05$) higher in treatment group (13.25 \pm 1.53) than in the control group (11.46 \pm 1.19). The increase in milk production in treatment group (T) may be due to fulfillment of nutritional requirements additionally supplied by UMMB. Likewise higher peak milk yield was observed in treatment group (18.7 \pm 0.62) as compared to control group (15.8 \pm 1.52). Total milk production during the study period was found significantly higher in the UMMB fed group (1590 \pm 1.03) than the control group (1375 \pm 0.92). These results are in agreement with the earlier studies (Ramesh *et al.*, 2009 and Khadda *et al.*, 2014). Value of milk fat (3.76 \pm 1.11 vs 3.71 \pm 1.06) and SNF (9.24 \pm 0.32 vs 9.15 \pm 0.46) percentage were non-significantly higher in treated group. No significant difference was observed between the two groups for milk quality parameters. Brar and Nanda (2002) also observed similar improvement in the milk production in UMMB fed buffaloes. Better performance of treatment group indicates better nutritional status of UMMB fed animals compared to control group. These body reserves of better nutrients reflect in the better quality of milk of treated cows (Kumar, 2001; Buttler, 2000). UMMB feeding is also known to reduce free fatty acid concentration in the blood which indicates better nutritional status in the animal (Randhawa *et al.*, 2003)

Effect of UMMB feeding on reproductive parameters:

An efficient reproductive process is a prerequisite for profitable dairy farming. Delayed onset of postpartum ovarian activity (90-180 days) and high incidence of deep anoestrus, especially during summer (50-75%), lead to prolonged inter-calving intervals (15 – 25 months) in Indian dairy cows, causing huge economic losses to the Indian dairy industry. The major limiting factor is lack of sufficient good quality feed and fodder, coupled with the limited purchase capacity of smallholder and landless farmers.

Reproductive performance of both the groups is presented in Table 3. It was observed that animals of treatment group (T) showed signs of estrus earlier (49.1 \pm 3.16 days) in comparison to control group (57.7 \pm 2.59 days) ($p < 0.05$). Service period was found significantly ($p < 0.05$) lower in treatment group (73.7 \pm 2.69 days) in comparison to control group (89.5 \pm 1.94 days). Rate of conception was higher in treatment group than the control group; 20% more animals conceived in treatment group than the control group. Ghosh *et al.* (1993) also observed that UMMB supplementation initiated ovarian cyclicity between day 14 and 44 postpartum while in control group it was day 60 and 125 postpartum. Record of various signs of estrus is presented in Table 4. It was found that UMMB

fed cows revealed estrus sign very efficiently as compared to control group cows. Estrous behavior like bellowing, vaginal discharge and mounting was found very intense in treatment group while these sign in control group were observed in moderate and weak form. Intensity of other estrus sign like drop in feeding, drop in milk production was intense to moderate in treatment group while in control group they were moderate to weak. The results were in line with those observed by Ghosh *et al.* (1993), who have observed behavioural oestrus in within 35–84 days in UMMB supplemented group, against 145-196 days in non supplemented group.

CONCLUSION

It is concluded that urea molasses minerals block supplied the adequate nutrients for better performance in crossbred cattle as a result of improved nutritional intake, milk yield and its quality and reproductive performance.

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