



# Efficacy of Urea Molasses Minerals Block on Milk Production and Reproductive Performance of Zebu Cattle under Field Condition

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## ABSTRACT

An on farm trial was conducted to evaluate the efficacy of UMMB on performance of zebu cattle and feed economics under semi arid conditions, during the year 2016-17. Twenty lactating cows in mid lactation with similar age, body weight and breed were selected from dairy farms of the local farmers and divided into two equal groups of ten animals in each group i.e. T1 (control) and T2 (UMMB supplementation). The feeding of animals in control group (T1) consisted of 7 kg dry maize stover with some quantity of local dry grasses and 10 kg green fodder i.e. Lucerne with concentrate mixture @40 per cent of milk yield /day. In the treatment group (T2) in addition to the above, a regular supply of urea molasses minerals block as a lick was offered during the whole period of study, without interruption. The average milk yield was recorded  $4.70 \pm 0.20$  and  $6.00 \pm 0.21$  l/day in control and UMMB groups, respectively. The significant increase in the milk yield by 27.65 per cent in experiment group suggested that the supplementation of UMMB improved the milk yield. Reduction in cost of milk production/ l was recorded 12.12 per cent in zebu cows supplemented with UMMB. The postpartum estrus period and service period reduced in experimental group than the control group. It can be concluded that the feeding of UMMB improved the feed efficiency, milk production and reproductive performance of zebu cattle under semi-arid ecosystem.

**Key Words:** Feeding, Milk production, Reproductive performance UMMB and Zebu cattle.

## INTRODUCTION

The crop residues based system of animal feeding in most of the developing countries of the world is not adequate to meet even maintenance requirements of the animals. The crops residues and grasses which are low in nitrogen and high in crude fibre, lignin, restricts their intake and digestibility. These feed and fodder are insufficient to support nutrients requirements, optimal reproductive performance and sustainable milk production from the dairy animals. Singh and Singh (2003) well documented the importance of urea molasses mineral block (UMMB) as supplement for livestock. UMMB can be offered throughout the year but more beneficially utilized during the dry season when animals are grazing on low quality fodder.

The availability of molasses, urea and minerals as source of energy, protein and minerals respectively through UMMB optimize rumen fermentation and consequently increase utilization of crop residues and results into higher consumption which decrease the requirement of concentrate. However, most of the trials have been conducted on farm station and few work have been done to evaluate the response of UMMB supplementation on milk production and reproductive performance on indigenous cattle under the field conditions particularly in semi arid ecosystem. Keeping the above facts in view, an attempt was made to evaluate the effect of UMMB on milk production and reproductive performance of lactating Zebu cattle under field conditions.

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## MATERIALS AND METHODS

An on farm trial was conducted during 2016-17 on 20 Kankrej lactating cattle maintained at farmers' flock in the adopted villages of Krishi Vigyan Kendra, Jalore district of Southern Rajasthan. The animals were selected at the same lactation stage, body weight, milk yield and parity and managed under farmers own traditional system of feeding and management. The average body weight of selected crossbreed cows was 351 kg and average daily milk yield was 4.58 l/day during the start of experiment. The animals were randomly divided into two groups of 10 animals in each group i.e. T1 (control) and T2 (UMMB supplementations). The feeding of animals in control group (T1) consisted of 7 kg dry maize stover with some quantity of local dry grasses and 10 kg green fodder i.e. Lucerne with concentrate mixture @40 per cent of milk yield per day. In the treatment group (T2) in addition to the above, a regular supply of urea molasses minerals block as a lick was offered during the whole period of study, without interruption.

The UMMB was purchased from Rajasthan cooperative dairy federation (RCDF) unit Saras dairy, Jalore. The UMMB was kept in front of the animals in the manger to allow optimum intake. All the animals fed individually and clean, fresh water was available free choice throughout experimental period. All the animals were dewormed by Albendazole for control of internal parasites before the beginning of experiment. The data recording of experiment trial was carried out for 120 days. The body weights of the cows were estimated before the

initiation and at the end of the experiment indirectly by measuring heart girth of the cows using a metric tape as suggested by (Sastry *et al*, 1988). The milk was recorded daily at morning and evening. The intake of feed and UMMB was recorded daily. Samples of milk were taken constantly at milking time from each cow and analyzed for fat, SNF, and total solid. Milk fat was determined by Gerber's method (BIS, 1977), SNF by using ISI formula based on estimation of specific gravity using corrected lactometer reading and 4 per cent FCM was calculated by the equation of formula (Gaines,1928). Reproductive performance with reference to onset of post- partum estrus, service period and services per conception were also recorded. The data were analyzed statistically in a completely randomized design and the significances of the difference means was determined by using the student- t test (Snedecor and Cochran, 1989).

## RESULTS DISCUSSION

The chemical composition of concentrate mixture, maize Stover and UMMB is given in Table 1. The chemical composition of the concentrate mixture was different to the mixture reported by (Misra *et al*, 2006 and Khadda *et al*, 2014). This might be due to mixing of various ingredients in different proportion to meet the nutritional requirement of the animals. The CP content of concentrate mixture, maize straw and UMMB was 20.78, 3.74 and 41.13 percent, respectively. Supplementation of UMMB significantly improved the quality and nutrient density of the basal diet. Improvement of

**Table I. Chemical composition (% DM) of concentrate mixture, Maize straw and UMMB.**

Particular	Concentrate mixture	Maize straw	UMMB
Dry matter	90.32	89.57	88.58
Organic matter	88.21	91.10	75.86
Crude protein	20.78	3.74	41.13
Ether extract	2.66	1.62	2.06
Crude fiber	10.69	37.90	1.93
Nitrogen free extract	61.98	61.98	58.20
Total ash	11.79	8.90	24.14

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**Table 2. Efficacy of UMMB on yield and composition of milk of zebu cattle**

Parameter	T-1 (Control)	T-2 (UMMB)
Initial body weight(Kg)	350 ±10.75	352 ±10.50
Final body weight(Kg)	363 ±12.50	376 ±6.25
Body weight gain(Kg)*	13a ±1.07	24b ±3.21
Initial Milk yield (l/ d)	4.56± 0.15	4.61± 0.18
Milk yield (l/ d)**	4.70a ± 0.20	6.00b±0.21
4% FCM yield (l/ d)**	4.03a ±0.15	5.40b ±0.20
Lactometer reading**	28.20a± 0.32	30.30b ±0.20
Fat**	2.90a ± 0.01	3.31b ± 0.01
SNF**	7.80a ± 0.08	9.02b ± 0.05
Total solid %	10.70±0.23	12.33±0.15

the basal diet due to UMMB supplementation is well established and may vary widely depending on nature of basal feed and feeding system (Misra et al, 2006). The intake of UMMB ranged from 250 to 350 g with an overall average of 300g/ cow/ day. This variation was due to the variability in taste habits of the animals.

### Effect of UMMB on milk yield

Group mean with different superscripts differ significantly \* (P<0.05) and \*\* (P<0.01). The effect of UMMB on milk yield and its composition (Table 2) revealed that the initial milk yield was similar in both groups but average milk yield recorded during the study period was 4.70 ± 0.20 and 6.00±0.21/ day in control and UMMB group, respectively. The significant increase in the milk yield by 27.65 per cent in experiment group suggested that the supplementation of UMMB improved the milk yield. Similarly, it also helped in improving lactometer reading from 28.20 to 30.30 in cows being statistically different. These results were in

agreement with the earlier study by (Ramesh *et al*, 2009 and Khadda *et al*, 2014). The increase in milk production may be attributed to higher availability of crude protein, energy and area specific minerals in the ration supplemented with UMMB which led to a subsequent maintenance of rumen ammonia content and an improved rumen environment for micro-organisms and increased digestibility of the ration (Tiwari et al, 2013 and Sharma *et al*, 2014). Fat and SNF components of milk in animals fed with UMMB improved considerably as compared to control. Similar results were also reported by (Ramesh *et al*,2009).

### Reproductive performance

The mean duration of postpartum estrus period and service period was reduced significantly (P<0.05) in experiment group as compared to the control group (Table 3). The average number of service per conception was also significantly (P<0.05) higher in control group than the experiment group. Our results were corroborated with the

**Table 3. Efficacy of UMMB on reproductive performance of zebu cattle.**

Particulars	T-1 (Control)	T-2(UMMB)
No. of cow	10	10
Post-partum estrus(days)*	130.6a ± 17.54	80.9b±11.66
Service period(days)*	171.4a ± 11.7	115.7b± 8.40
No. Of service per conception*	3.6a± 1.22	1.37b± 0.20

\* Group mean with different superscripts differ significantly (P<0.05)

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findings of (Ramesh *et al*, 2009) who reported that UMMB supplementation has a positive effect on reproductive performance of cow maintained on straw based diets due to supply on nitrogen resulting in more intake and utilization of straw. The improvement in reproductive efficiency in the present study may be attributed to the beneficial action of supplemented minerals, crude protein and energy on the neuro-endocrine axis and reproductive function.

### Feeding economics of UMMB

A partial budget analysis measures was used in those items of expenditure and income. Therefore, the cost of roughage, concentrate mixture and UMMB have been considered. The cost of labour was not considered for calculation because it was same in both groups as family members were used in management of livestock. The costs of dry fodder, green fodder, concentrate mixture and UMMB was calculated on basis of market rate prevalent during the study period i.e. @ Rs.400/q. for dry fodder, Rs.100/q. for green fodder, Rs.1600/q. for concentrate mixture and Rs. 33/ block of 3Kg for UMMB. Selling price of milk received by farmers

during experimental period was taken Rs. 30/l. The recurring cost which included feeding and income from sale of milk presented in Table 4. The average cost of feeding per liter of milk production in control and experiment group was Rs.14.89 and 13.28, respectively, which showed that dietary supplementation of UMMB under field condition reduced the cost of milk production sizably. The supplementation of UMMB during experimental period indicated that benefit cost ratio 1:2.25 was recorded, which appears to be very lucrative over traditional system of feeding. Significantly higher net return and benefit-cost ratio was also recorded in crossbreed cows (Misra *et al*, 2006) maintained on roughage based diet due to UMMB supplementation under small holder condition.

### CONCLUSION

Hence, it can be concluded that the improvement in nutrient intake, milk yield, onset of estrus and lower cost of production in experiment group in cows could easily be achieved as urea molasses minerals block supplied the adequate nutrients for better performance in zebu cows of medium level of

**Table 4. Feed economics of UMMB on zebu cattle.**

Particulars	T-1 (Control)	T-2(UMMB)
Feed consumed (Kg/ day/ animal)		
Maize Stover	7.0	7.0
Concentrate mixture	2.0	2.4
Lucerne fodder	10.0	10.0
UMMB	-	0.3
Av. Feeding cost Rs. (120 days)	8400/-	9168/-
Cost of UMMB (Rs.)	-	396/-
Total variable cost (Rs.)	8400/-	9564/-
Variable cost of milk production/ day (Rs.)	70.0	79.7
Total milk yield liter (120 days)	564	720
Av. feeding cost/ liter milk production (Rs.)	14.89	13.28
Gross return from sale of milk(Rs.)	16920	21600
Net return (Rs.)	8520/-	12036/-
B:C ratio	2.01	2.25
Additional B:C ratio from UMMB	-	11.81

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production. It was inferred that the supplementation of urea molasses minerals block to the zebu lactating cows @300g/ day under field conditions improved their milk yield and reproductive performance besides reducing cost of milk production. However, awareness needs to be created among the dairy farmers about usefulness of UMMB.

### ACKNOWLEDGEMENTS

The authors are thankful to the Director, Agriculture Technology Application Research Institute, Zone IV, Jodhpur, Rajasthan for encouragement and providing facilities for conducting the experiment.

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Received on 26/04/2017

Accepted on 10/06/2017