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EFFECT OF MONENSIN ENRICHED MULTI NUTRIENT BLOCK SUPPLEMENTATION ON PERFORMANCE OF LACTATING MURRAH BUFFALOES

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ABSTRACT

Present study was conducted to determine the effect of monensin enriched multi nutrient block supplementation on performance of lactating Murrah buffaloes. Eighteen lactating Murrah buffaloes were divided into three experimental groups (T_1, T_2 and T_3) having six animals in each group on the basis of average body weight (552.72±4.78 kg), average milk yield (8.25±0.10) and stage of lactation (13 weeks post-partum). Experimental buffaloes were fed total mixed basal diet, comprising of wheat straw and concentrate (51.28:48.72; roughage: concentrate mixture) to fulfil the nutrient requirement according to ICAR (2013) feeding standard. Animal of Group T_1 were supplemented with basal diet, T_2 supplemented with TMR (84% TMR of T_1) + multi nutrient block (MB) and wheat straw (*ad libitum)* and T_3 supplemented with TMR (84% TMR of T_1) + monensin enriched multi nutrient block (MMB) and wheat straw (*ad libitum).* The results showed that supplementation of monensin enriched multi nutrient block had no effect on total dry matter intake, feed conversion efficiency, body condition score (BCS), persistency of milk production and milk composition. Milk yield was increase significantly from 8th week to 13th week in MMB Supplemented group (T_3) and MB Supplemented group (T_2) as compared to Control group (T_1). Gradual reduction in milk yield was observed in all the treatment groups which was 28%, 24%, 21% in Control, MB Supplemented (T_2) and MMB Supplemented group (T_3), respectively. Results of the present study suggested that dietary supplementation of monensin enriched multi nutrient block is beneficial.

Keywords: *Bubalus bubalis*, buffaloes, milk, MMB, digestibility, lactating

INTRODUCTION

Most people in Madhya Pradesh lives in rural areas and their livelihoods are based on the production of crops and livestock. The production of livestock is an integral part of farming system. The principal forages used in Madhya Pradesh for feeding livestock are crop residues and dry grasses. These crop residues are low in nitrogen, minerals and vitamins but high in fibre and lignin, limiting animal intake and digestibility hence leads to low productivity. Thus, main limiting factors for animal productivity in the state are poor nutrition and poor

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feed availability. Strategic nutrient supplementation is essential in this scenario to improve the use of poor-quality roughage. Urea molasses multi nutrient block (UMMB) is one of the strategy and low-cost technology which has great potential to enhance the nutrition of ruminant livestock provided with poor quality feed. Supplementation of urea molasses multi nutrient block (UMMB) can show promising effects on improving the use of nutrients and the productivity of animals (Prasad *et al*., 2001). UMMB provides fermentable nitrogen, energy and minerals intermittently through licking, which is necessary for optimum microbial growth. Further, adding feed additives like monensin to multi nutrient block may encourage ruminal fermentation, feed efficiency and improve nutrient utilization in buffaloes. Monensin is a monovalent carboxylic polyether ionophore produced by *Streptomyces cinnamonensis* (Haney and Hoehn, 1967) which alters rumen fermentation processes (Richardson *et al*., 1976). Monensin supplementation improves propionate production in rumen which is the main precursor of glucose in ruminants which may improve the energy status of the animal (Bassett *et al*., 1970). Many studies have been reported on increasing the impact of monensin on milk production. This effect may be due to an increased supply of glucogenic precursors resulting from changes in the pattern of rumen fermentation. However, little research has been done on monensin enriched multi-nutrient block supplements for improving performance of Murrah buffaloes. Therefore, an attempt has been made to evaluate the effect of feeding monensin enriched multi nutrient block supplement (MMB) on lactation performance and nutrient utilization in Murrah buffaloes in mid stage of lactation.

MATERIALS AND METHODS

Proposed work was conducted at commercial dairy farm and Department of Animal Nutrition, College of Veterinary Science and Animal Husbandry, N.D.V.S.U., Jabalpur (M.P.). Lactating Murrah buffalo (n=18) were selected in commercial dairy farm based on their body weight and in mid stage of lactation, randomly divided into three groups (T1, T2 and T3), having six lactating buffaloes in each group. Lactating Murrah buffaloes in all the three groups were fed TMR (Total Mixed Ration) to meet the nutrient requirement for maintenance and lactation as per ICAR, (2013). The samples of feed, fodder, MMBs and feaces was analyzed for different proximate constituents as per the methods described by AOAC (2012).

Body condition score of animals was evaluated by using technique developed by Anitha *et al.* (2011). Daily milk yield of individual animals will be recorded (morning + evening) and average milk production of individual animal was calculated on weekly basis. Milk from individual animal was analysed monthly for fat, solid not-fat (SNF), total solids, protein and lactose using Lactoscan milk analyzer.

6% fat corrected milk (FCM) was calculated by the equation of Rice *et al*. (1970).

6% FCM (kg/d) = 0.308× milk yield (kg) + (11.54 × fat yield (kg) × milk yield (kg) ÷ 10)

Persistency of milk production was simply calculated using the formula suggested by Sastry and Thomas (2012). Persistency % = (Milk kg at later test/Milk kg at earlier test) x 100. Statistical analysis of data was done as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSIONS

Chemical composition (% DMB) of experimental diet has been given in Table 1. The average dry matter intake of buffaloes from various Experimental groups was comparable and non-significant (P>0.05) difference was observed in DMI (kg/d) and DMI (% of BW) between groups during the experimental period Table 2. There was a significant (P<0.05) periodic difference among the treatments. Which was correlated to the stage of lactation. However, apparently lower intake was observed in monensin Supplemented group which might be due to improved energetic efficiency with increased molar proportion of propionate in the rumen with monensin supplementation. The results of the present study agree with the work of Martineau *et al*. (2007) also reported that DMI was unaffected (P>0.05) by monensin supplementation (24 mg/kg DM) in mid lactating Holstein cow. Likewise, Silva *et al.* (2021) was found that cows fed monensin (MON) showed similar DM intakes to those fed saponin (SAP), saponin combined with essential oil (SAPEO) treatments, respectively in mid to late lactating Jersey cow. Similarly, Sharma (2022) found that no significant (P>0.05) difference on dry matter intake in multi nutrient and tanniferous multi nutrient block supplemented Murrah buffalo heifers compared with Control group.

Non-significant (P>0.05) difference was observed in body condition score between and within the groups at the start and at the end of experiment. In support to our findings Kebede *et al*. (2018) was supplementing the urea treated straw and urea molasses block (UMB) in Treatment groups and reported that BCS of lactating cows were not influenced (P>0.05) by feeding regimes. As well as Santos *et al.* (2019) reported that the different levels of monensin (12, 24, 48 mg kg^{-1} of DM) supplementation in mid lactating Holstein cow and reported that BCS was non-significant in the Treatment group compared to the Control.

In present study, there was no significant difference (P>0.05) in milk yield at the start of experiment but significant difference (P<0.05) was observed from 8^{th} week to 13^{th} week in T_2 and T_3 group as compared to T_1 group Table 2. Critical perusal of data revealed that there was significant (P<0.05) periodic decrease within all the groups; which was correlated with the stage of lactation in Murrah buffaloes. By these comparisons, it was justified that T_2 and T_3 had shown better production performance as compared to T_1. However, the increased milk yield in monensin supplemented buffaloes might be due to changes in the pattern of rumen fermentation, which in turn increases the supply of glucogenic precursor like propionate and increases the glucose availability for milk production. The results of the present study agree with the work of Akter *et al*. (2004) reported that supplementation of urea molasses mineral block to dairy cows also receiving straw-based diets and reported that the milk production was significantly increased from 2.86 to 4.43 (L/day). Likewise, Ramesh *et al*. (2009) was observed that feeding of UMMB improved milk yield both in buffaloes and cows. This might be due to UMMB supplementation over and above concentrate mixture and feeds offered to lactating animals. Similarly, Gandra *et al.* (2010) reported that the use of monensin in the ration at concentration of 24 mg/kg of DM that increased milk production by 0.66kg/day and it also improved productive efficiency of cows.

In present experiment non-significant (P>0.10) differences were observed in 6% fat corrected milk yield in between the treatments

Table 1. Chemical composition of rations fed during the experimental trial (% DM basis).

Nutrients	TMR	MB	MMB
DM	85.00	85.00	85.00
OM	88.10	89.20	89.20
CP	10.50	38.00	38.00
CF	8.40	6.30	6.30
EE	6.20	8.20	8.20
NFE	63.10	36.70	36.70
TA	11.90	10.80	10.80
NDF	58.00	58.00	58.00
ADF	38.00	38.00	38.00

Table 2. Overall performances of buffaloes from various experimental groups.

Parameters	T1	T2	T3	Result of 'CRD' test
Dry matter intake (kg)	15.10	15.00	14.95	NS
BCS	3.50	3.46	3.49	NS
milk yield (Kg/day)	7.08	7.54	7.64	*
6 % FCM yield (Kg/day)	6.93	7.33	7.53	NS
Persistency (1 to 2 month)	89.48	91.97	92.10	*
Persistency (2 to 3 month)	83.47	86.43	87.96	*
Fat (%)	7.64	7.64	7.64	NS
SNF (%)	7.72	7.72	7.72	NS
Total solids (%)	7.63	7.63	7.63	NS
Protein (%)	10.64	10.64	10.64	NS
Lactose (%)	10.67	10.67	10.67	NS

* = significant at 5% level

during experiment. There was a significant periodic difference (P<0.05) in all the treatments, which was correlated with the stage of lactation in Murrah buffaloes Table 2.

In present study, there was difference in persistency of milk production between groups during experimental period. However, during 1st to 2nd and 2nd to 3rd month of experiment persistency of milk production was higher in T_3 group. By this persistency pattern, it was justified that T_3 group had maintained high persistency as compared to T_1 and T_2. Critical perusal of data revealed that there was no significant (P>0.05) effect of monensin enriched multi nutrient block on milk composition (%) of lactating Murrah buffaloes i.e., milk fat, milk SNF, milk TS, milk protein and milk lactose values in between the treatments during experiment. There was a non-significant (P>0.05) periodic difference in all the treatments, which was correlated with the stage of lactation

in Murrah buffaloes. In support to our findings, Mohini and Singh (2010) observed that non-significant (P>0.05) difference in milk fat and SNF in crossbred dairy cows fed UMMB replacing 35% of concentrate mixture and those fed standard ration without UMMB. Similarly, Vendraminia *et al*. (2016) found that no significant effect on milk composition in mid lactating Holstein cows on supplementation of monensin (24 mg/kg DM) with basal diet. Likewise, Gupta *et al*. (2019) was concluded that monensin supplementation at 24 mg/kg DMI to lactating buffaloes in early lactation had no significant effect on milk composition.

CONCLUSION

Supplementation of monensin enriched multi nutrient block had no effects on total dry matter intake, body condition score (BCS) and milk composition in mid lactating Murrah buffaloes but monensin enriched multinutrient block had beneficial effect on feed conversion efficiency, persistency and milk yield in mid lactating Murrah buffaloes.

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