Effect of supplementary feeding on productive and reproductive performance of milch buffalo and feed economics under field conditions in Panchmahal district of Central Gujarat

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Abstract

Average milk yield recorded during the study was period 5.42 ± 0.43 , 6.43 ± 0.57 and 6.67 ± 0.39 litre per day in T₁, T₂ and T₃ groups, respectively. The results indicated that the buffaloes supplemented with mineral mixture and common salt produced 23.06 per cent more milk as compared to control without any adverse affect on the body weight and health of the animals. The increase in milk yield was significantly higher ($P < 0.05$) in the animals of supplemented group as compared to control. The results of study revealed that 16.38 per cent reduction in cost milk production per litre in buffalo were due to the supplementation of mineral mixture and common salt under of hot semi-arid ecosystem. The supplementation of mineral mixture and common salt during experimental period indicates that benefit cost ratio 1:2.24 was recorded, which appears to be very lucrative over traditional system of feeding. Based on observations, it can be concluded that supplementary feeding of mineral mixture and common salt economically improved the milk production and reproductive performance of buffaloes under hot semi-arid ecosystem.

Key Words: Benefit cost ratio, common salt, mineral mixture, milk production, service period.

Introduction

India is predominantly an agrarian society where dairy animals are the backbone of rural economy and can be a powerful tool for eradication of rural poverty especially in semi arid ecosystem. The crop residues, forages and mature grass are the main source of feed and fodder for livestock feeding during most of the year in almost all parts of the country. The milk production of our livestock is mostly depends on roughage based ration. Feeding management is probably one of the important needs, because currently the country is facing a wide gap between demand and availability of nutrients. The whole gamut of the dairy industry as well as its lucratibility by and large depends upon the availability and type of feed being offered to the animals by dairy cattle owners. As about 70 -75% of the total cost of production is spent on feeding of livestock. Therefore judicious use of feed and fodder to the animals to meet their body requirement is essential. To make dairy farming profitable enterprise it is essential to reduce feeding cost of the animal and productivity of milch animals. These feed and fodder are insufficient to support nutrients requirements, optimal reproductive performance and sustainable milk production from the dairy animals. In view of the above, a study was undertaken to assess the efficacy of Mineral Mixture supplementation on milk production and reproductive performance in lactating crossbred dairy cattle and also determined the cost effectiveness of supplements under field conditions.

Materials and Methods

The present study was conducted on the milch buffaloes under the banner of KVK-Panchmahal under semi arid ecosystem of middle Gujarat. Thirty three lactating Mahasana buffaloes was divided in to three groups of 11 buffaloes in each group i.e. T₁ (control), T₂ (Mineral Mixture supplementation @ 50g/ day) and T₃ (Mineral Mixture and common salt supplementation @ 50g/ day and deworming by fenbendazole) during 2010-11 and 2011-12. All animals were managed under farmers own traditional system of feeding and management. The animals were selected nearly at the same lactation stage, body weight, milk yield and parity. The trainings were organized for benefitted livestock keepers by KVK scientists in respective years. In trail especial emphasis was given to proper use of mineral mixture and common salt feeding to milch buffalo's ration. The feeding of selected animals in control group (T₁) were consisted of 5-6kg dry fodder viz., Maize, Sorghum and Per millet straw with some quantity of local dry grasses and 25kg green fodder i.e. hybrid Napier and Lucerne with 2.5kg / day/ animal. In the treatment group (T₂) in addition to the above, a regular supply of mineral mixture as supplementations and in group T₃ in addition to the above T₁, a regular supply of mineral mixture and common salt as supplementations was offered during the whole period of study, without interruption. The drinking water was offered *ad lib*. The data recording of experiment trial was carried out for 150 days. The milk was recorded daily

at morning and evening. Reproductive performance with reference to 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 between treatment means was determined by using the student-t test according to Snedecor and Cochran (1989). Partial budget analysis and benefit cost ratio was calculated to assess the economic profitability of mineral mixture supplementation according to Danilo (2002).

Result and Discussion

Effect of mineral mixture supplementation on milk yield: The effect of mineral mixture supplementation on milk yield presented in the Table 1 revealed that the initial milk yield was similar in the both groups but average milk yield recorded during the study was period 5.42 ± 0.43 , 6.43 ± 0.57 and 6.67 ± 0.39 litre per day in T₁, T₂ and T₃ groups, respectively. The results indicated that the buffaloes supplemented with mineral mixture and common salt produced 23.06 per cent more milk as compared to control without any adverse affect on the body weight and health of the animals, which was apparent from the improved body weight of the buffaloes during the study period. The increase in milk yield was significantly higher ($P < 0.05$) in supplemented group as compared to control. More or less similar effects of mineral mixture supplementation on milk production were also reported by Tiwari et al. (2012) and Tiwari et al. (2013).

Table 1. Impact of supplementary feeding on milk production of milch buffaloes

Average milk production lit./ day			Increase in milk production in T-3
T-1	T-2	T-3	
$5.42^b \pm 0.43$	$6.43^a \pm 0.57$	$6.67^a \pm 0.39$	23.06

Estimates with different superscripts differ significantly.

Reproductive performance: The service period and number of services per conception under supplemented and control groups are given in (Table 2). The average service period was recorded 125.08 ± 15.46 , 88.8 ± 10.67 and 74.35 ± 11.37 days in T₁, T₂ and T₃ groups, respectively. The results revealed that the mean duration of service period was reduced significantly in supplemented group than the control group under hot semi-arid ecosystem. The services per conception was also observed significantly ($P < 0.05$) higher in non-supplemented group than the supplemented ones. The average number of service per conceptions in T₁, T₂ and T₃ groups was recorded 1.32 ± 0.20 , 1.64 ± 0.29 and 3.2 ± 1.12 , respectively. The results showed that supplementation of miner mixture and common salt in the diet significantly ($P < 0.05$) influenced the reproductive performance in buffaloes. The present findings of conception/ pregnancy rate on supplementation of mineral mixture to anoestrus dairy animal are in agreement with the findings of many workers (Samanta et al.

1995; Lalla 2002; Upadhayay 2004; Tiwari et al. 2012). Improvement in reproductive efficiency in these buffaloes supplemented with mineral mixture containing Ca, P, Cu, etc. has been attributed to various factors. Minerals have a beneficial role on endocrine system and play an important role in resumption of follicular growth and fertility in dairy cows (Smith & Akinbamijo 2000). Phosphorus is associated with energy metabolism and its deficiency results in delayed sexual maturity, anoestrous, repeat breeding and irregular estrous cycle (Quayam et al. 1988). A positive interaction between Cu and reproductive hormones has been reported by (Prasad et al. 1989). Hence, the improvement in reproductive efficiency in the present study may be attributed to the beneficial action of supplemented minerals on the neuro-endocrine axis and reproductive functions.

Table 2. Impact of supplementary feeding on reproductive performance of milch buffaloes

Particulars	T-1	T-2	T-3
No. of buffaloes	11	11	11
Service period (days)	125.08 ^b ±15.46	88.8 ^a ±10.67	74.35 ^a ±11.37
No. of services (AI) per conception	3.2 ^b ±1.12	1.64 ^a ±0.29	1.32 ^a ±0.20

Estimates with different superscripts differ significantly.

Economics of mineral mixture: A partial budget analysis measures was used in those items of expenditure and incomes suggested by Danilo (2002). Therefore, the cost of roughage, concentrate mixture and mineral mixture 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 mineral mixture was calculated on basis of market rate prevalent during the study period *i.e.* @ Rs.300/q. for dry fodder, Rs.100/q. for green fodder, Rs.1100/q. for concentrate mixture and Rs.50/kg for mineral mixture. Selling price of milk received by farmers during experimental period was taken Rs. 30/ litre. The recurring cost which included feeding and income from sale of milk presented in Table 3. The results of study revealed that 16.38 per cent reduction in cost milk production/ litre in buffalo were due to the supplementation of mineral mixture and common salt under of hot semi-arid ecosystem. The supplementation of mineral mixture and common salt during experimental period indicates that benefit cost ratio 1:2.24 was recorded, which appears to be very lucrative over traditional system of feeding.

Table 3. Economics of s supplementary feeding on milch buffaloes

Particulars	T-1	T-2	T-3
Av. Milk yield (lit./d)	5.42 ^b ±0.43	6.43 ^a ±0.57	6.67 ^a ±0.39
Additional increase in milk yield (lit./d)	--	1.01	1.25
Av. Feeding cost Rs. per days	87/-	87/-	87
Additional cost of supplementation feeding (Rs.) per day	--	2.00/-	2.50/-
Total variable cost (Rs.) per day	87/-	89.00/-	89.50/-
Av. Feeding cost/ lit. milk production (Rs.)	16.05	13.84	13.42
Gross return from sale of milk (Rs.)	162.60	192.90	200.10
Net return (Rs.)	75.6	103.90	110.60
B:C Ratio	1.87	2.17	2.24

Conclusion

Based on observations, it can be concluded that the supplementary feeding of mineral mixture and common salt and deworming by fenbendazole economically improved the milk production and reproductive performance of buffalo under hot semi-arid ecosystem. All the farmers readily accepted the practice of using mineral mixture and common salt supplementation and are also willing to continue. Mineral mixture has potential to increase the viability, dry season milk supplies, improvement in the reproductive performance of dairy animals and increase household incomes. However, awareness needs to be done among the dairy farmers about the usefulness of mineral mixture and common salt and availability should be ensured at the village level milk collection centre or state animal husbandry department.

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