



Mineral Mixture Supplementation in Buffaloes
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Effect of Mineral Mixture Supplementation on Productive and Reproductive Performance of Buffaloes

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ABSTRACT

Providing adequate nutrition is one of the crucial factor in maintaining proper biological, immunological, productive and reproductive traits of milch animals. The current study was carried out to find out the effect of mineral mixture supplementation on productive and reproductive performance of buffaloes under Farmer FIRST Project : Integrated Approaches for Livestock Development : Farmers Context, implemented by ICAR. Under this project five villages namely Mehal Kalan, Moom, Channanwal, Dhaner and Kalala of Mehal Kalan block of Barnala district of Punjab are adopted. A total of 100 beneficiary farmers from these five villages were selected and mineral mixture was given free of cost under the project, then data on the effect of mineral mixture supplementation on productive and reproductive performance of buffaloes were collected and analyzed with the help of relevant statistical tools. Results revealed that average daily milk yield, peak milk yield and lactation yield increased significantly ($P<0.05$) from 8.53 litres, 12.68 litres and 2537.60 litres to 9.14 litres, 13.32 litres and 2664.53 litres respectively in the buffaloes fed with the mineral mixture. Benefit Cost ratio also got enhanced from 1.66 before supplementation to 1.75 after supplementing mineral mixture. Reproductive parameters got improved like average service period got reduced significantly; further average inter-calving period was also decreased from 467.21 days to 386.18 days. Effect was also seen on inseminations per conception got reduced significantly ($P<0.05$) from 4.07 to 2.15. It may be concluded that adding mineral mixtures to the diet of buffaloes is essential for both their improved reproductive and productive efficiency and for boosting dairy farm profits.

KEYWORDS: Beneficiary farmers, Mineral Mixture, Milk yield, Productive traits, Reproduction

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INTRODUCTION

The Punjab now has the highest per capita milk availability in the country at 1,181 gram per day against the National average of 394 gram. Presently, the Punjab produces 345 lakh kg of milk per day. Significantly, the annual milk yield in the state went up from 107.74 lakh tonnes in 2016 to 126 lakh tonnes in 2019 (20th Livestock census, 2019). Despite being the highest producer of milk, the less productivity of dairy animals is mainly due to low adoption of scientific management practices by the farmers, Acharya et al.(2022). Dairy farming faces various problems, including low productivity mainly due to breed deterioration, elevation in the population of non-descript animals, shortage of feed and fodder and poor management practices (Khode et al., 2021).

Reproductive problems are considered to be as one of the most serious problems among dairy farmers, adversely affecting the sustainability of the dairy production system in India (Patel and Ponnusamy, 2018). Therefore, improvement in productive and reproductive traits of milch animals has become an important part in animal husbandry venture. Animals should be fed balanced quantities of feedstuffs providing all nutrients in proper proportion for optimum productive and reproductive efficiency but at present, the country is facing deficiency of around 35.6 per cent green fodder, 10.95 per cent dry crop residues and 44 per cent concentrate feed ingredients to meet requirement of the growing livestock population (Dhawal et al., 2020). Poor nutritional management results in metabolic disorders causing huge economic

losses. As far as Punjab is concerned, a large number of animals in different districts of the state suffer from micro-mineral imbalance (Singh, 2002; Chhabra, 2006). Minerals are crucial for making the animals body functions run smoothly especially productive and reproductive traits and due to their elevated demand for lactation, milch animals are more prone to mineral deficiency. Various reproductive problems like delayed ovulation and puberty, decreased conception rate is chiefly due to lack of minerals in the diet of animals (Boland, 2003). It has been observed that dairy animals with macro- and micro mineral deficiencies produce less milk but subsequently showed improved milk production levels after mineral supplementation (Sharma et al., 2002). The most efficient solution to the problem of mineral deficiency which are not provided through feed and fodder is providing mineral mixture to the animals so the current study was conducted to find the effect of mineral mixture on the productive and reproductive traits of buffaloes.

MATERIALS AND METHODS

The current study was conducted in the five villages (MehalKalan, Dhaner, Moom, Channanwal and Kalala) of Mehal Kalan block of Barnala district which is the operational area of Farmer FIRST Project to evaluate the impact of mineral mixture on buffaloes of beneficiary farmers. Mineral mixture prepared by Animal Nutrition Department of the University was provided to the beneficiary farmers as a nutritional intervention free of cost under the project. Among all the beneficiary farmers, 20 farmers from each village were selected who were feeding mineral mixture to their lactating buffaloes given under the project in order to record the productive and reproductive performance of the buffaloes after supplementing mineral mixture

.Mineral mixture was fed @ 50 gm per day daily by mixing in the feed of the animals. All the animals were managed under the farmers management practices and data on productive and reproductive traits like; daily milk yield, peak milk yield, lactation yield, service period, dry period, inter-calving interval, number of inseminations were collected through structured interview schedule with the farmers. Milk yield was noted in the morning and evening for total of 30 days. The compiled data were analyzed by using Software Package for Social Sciences (SPSS) and the means were compared using t test statistics in order to find out the effect of mineral mixture supplementation on productive and reproductive performance of buffaloes.

RESULTS AND DISCUSSION

Milk production parameters

Results revealed that average daily milk yield in the buffaloes after supplementing mineral mixture was 9.14 litres and it was significantly ($P<0.05$) higher as compared to the milk yield before the mineral mixture supplementation (8.53 litres) as given Table 1. These findings are in line with Noeek et al. (2006) and Singh et al. (2016) who also recorded the increase in the average daily milk yield of dairy animals after giving mineral mixture. Peak milk yield and lactation yield were also significantly ($P<0.05$) higher in buffaloes of beneficiary farmers fed with mineral mixture over buffaloes not supplemented by 4 per cent and 4.7 per cent respectively. Lactation length increased significantly ($p0.05$) from 289.63 days before to mineral supplementation to 311.10 days following supplementation, as seen in Table 1. So it can be said that production performance of buffaloes after feeding mineral mixture was quite improved and similar results were reported by Gupta et al.(2017).

Table 1. Effect of mineral mixture supplementation on milk production parameters in buffaloes (Mean \pm SE)

| S.No. | Parameters | Before supplementing | After supplementing mineral |
|-------|-----------------------------------|-------------------------------|-------------------------------|
| 1. | Average daily milk yield(litres)* | 8.53 \pm 0.052 ^b | 9.14 \pm 0.058 ^a |
| 2. | Peak milk yield(litres)* | 12.7 \pm 0.052 ^b | 13.3 \pm 0.055 ^a |
| 3. | Lactation yield (litres)* | 2537 \pm 10.56 ^b | 2664 \pm 11.11 ^a |
| 4. | Lactation length (days)* | 289 \pm 0.56 ^b | 311 \pm 0.51 ^a |

*Means within rows with different superscript are significantly differ ($p<0.05$)

Economics of supplementing mineral mixture

Economic analysis of the data revealed that feeding cost per litre of milk become lower (Rs. 22.7) in buffaloes after they were fed with mineral mixture as compared to earlier when they were devoid of such intervention as stated in Table 2. It could be inferred from Table 2 that gross return which was obtained from the sale of milk in the market and net profit per litre of milk also got incremented to Rs.

368 and Rs. 17.26 respectively which were previously Rs. 340 and Rs. 16 respectively before feeding mineral mixture. Increment in the benefit cost ratio was also observed afterwards (1.75) when buffaloes were given mineral mixture and when they were not supplemented, ratio was 1.66 as depicted in Table 2. Similar results were found by Srivara (2019) and Singh, et al.(2020) in their studies on supplementation of mineral mixture to dairy animals.

Table 2. Economic analysis of mineral mixture supplementation benefit cost ration in buffaloes

| Parameters | Before supplementing | After supplementing |
|---|----------------------|---------------------|
| Feeding cost / day/ animal (Rs.) | 204.7 | 209.2 |
| Average feed cost per litre of milk (Rs.) | 24 | 22.7 |
| Gross return from sale of milk (Rs. 40/litre) | 340 | 368 |
| Net profit per day (Rs.) | 136 | 158.8 |
| Net profit per litre of milk (Rs.) | 16.00 | 17.26 |
| B:C ratio | 1.66 | 1.75 |

Reproductive parameters

Parameters which were recorded in the present study to check the reproductive efficiency in buffaloes were service days, inter-calving days, number of inseminations per conception and dry days. It was found that in mineral mixture fed animals service period was significantly ($P<0.05$) lesser (77.64 days) as compared to service period (100.70 days) when they were not fed mineral mixture as depicted in Table 3. Higher service period reduces the return of farmer from buffalo farming. These findings are in line with Sahoo et al. (2017). Number

of inseminations per conception in buffaloes was also significantly high (4.07) where as number of inseminations per conception was lower (2.15) in buffaloes supplemented with mineral mixture and similar results were mentioned by Gupta et al. (2017) in his study. Moreover, inter calving period and dry days got reduced from 467.21 days and 101.1 days to 386.18 days and 86.2 days respectively in buffaloes when given mineral mixture. It was quite clear that mineral mixture improved the reproductive parameters in buffaloes.

Table 3. Effect of mineral mixture supplementation on reproductive parameters in buffaloes (Mean \pm SE)

| Sr. | Parameters | Before supplementing mineral | After supplementing mineral |
|-----|-------------------------------|------------------------------|------------------------------|
| 1. | Service period (days)* | 100 \pm 1.20 ^a | 77.6 \pm 1.04 ^b |
| 2. | Inter-calving interval (days) | 467 \pm 3.49 | 386 \pm 3.66 |
| 3. | Dry period (days) | 101 \pm 0.70 | 86.2 \pm 0.78 |
| 4. | No. of inseminations per | 4.07 \pm 0.07 ^a | 2.15 \pm 0.06 ^b |

*Means within rows with different superscript are significantly differ ($p<0.05$)

CONCLUSION

It can be concluded that mineral mixture prepared by Animal Nutrition Department of the University given to beneficiary families under Farmer FIRST project proved as a boon for farmers as it improved

the productive and reproductive performance of buffaloes. Hence, by supplementing mineral mixture in buffaloes economic status of beneficiary farmers got uplifted. Moreover after observing the positive outcomes of feeding mineral mixture like increase

in the milk yield, reduction in the service period, inter calving interval and dry period in buffaloes of beneficiary farmers, other non beneficiary and fellow farmers of operational area adopted these interventions and started feeding mineral mixture to their dairy animals.

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