

Effect of Supplementation of Feeding Fenugreek (*Trigonella foenum-graecum*) Seed on Production and Composition of Milk in Crossbred Cows

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Abstract

The present experiment entitled, "Effect of supplementation of feeding fenugreek seed on production and composition of milk in crossbred cows" was conducted at Research Cum Development Project on Cattle, Department of Animal Husbandry and Dairy Science, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist.-Ahilyanagar. The objective of this study was to evaluate the effect of the supplementation of fenugreek seeds on the milk yield and composition of raw milk from crossbred cows in early lactation. The study was conducted for a period of 90 days. Daily milk yield was also recorded. Milk composition of each animal was determined once every fortnight. Cows fed fenugreek seed (*Trigonella foenum-graecum*) significantly ($P < 0.05$) produce high milk fat per cent, milk protein per cent, milk lactose per cent, milk solid not fat per cent, milk total solid per cent, content than control cows. Results of the present study suggests that feeding of 100 g day⁻¹ fenugreek seed (*Trigonella foenum-graecum*) daily to cattle is economical and beneficial for improving the milk yield and milk composition status in crossbred cows. The use of the phyto-genic additive fenugreek seeds stimulates the lactation performance of crossbred cows and improve feed efficiency. The supplementation of cows with fenugreek seeds led to an improvement in the dairy farmers, due to the quantitative and qualitative deficiency of fodder as well as the high cost of feed.

Key words : Fenugreek seed, crossbred cows, production, composition.

Herbs have traditionally been used as feed additives in many countries to improve feed intake by enhancing palatability. These herbs, or mixtures, contain flavoring and medicinal agents that help promote feed intake, ultimately boosting animal production. Feed additives play a vital role in this process by increasing palatability and encouraging higher feed consumption (Mudgal *et al.*, 2003). Aromatic substances like coriander, dill and fenugreek seed often added to animal feeds, can interfere with their sense of smell. This makes the food more attractive and as a result increases intake (McDonald and Linde C, 2002).

Low productivity in Indian dairy animals stemming from underfeeding, malnutrition, infections and stress significantly impacts the dairy industry's profitability making the search for alternative, cost-effective and safe feed

additives a necessity especially with the rise in demand for organic food and the ban on certain antibiotics.

Fenugreek seeds have a chemical composition of 93.0 per cent dry matter, 15 per cent crude protein, 5.1 per cent ether extract, 7.3 per cent crude fiber, 58.17 per cent NFE and 4.3 per cent total ash (Mohammed *et al.*, 2005). Fenugreek seeds, known for their rich nutritional content act as an antibiotic, anticarcinogen, antioxidant, antibacterial agent, gastric stimulant and anti-anorexia agent while also containing significant amounts of phospholipids, glycolipids, various acids, choline, and vitamins (Abdel-Rahman, 2014).

Materials and Methods

The current study was conducted at the Research Cum Development Project on Cattle,

Mahatma Phule Krushi Vidyapeeth, Rahuri. The experimental animals were maintained in conventional housing system, under standard feeding and management conditions being followed at livestock farm. The animals were fed twice daily and watered ad libitum. The major fodder provided to the cows during entire study consisted of Maize, Sorghum, local grass. In addition, the animals were also offered concentrate during milking time. Twenty lactating crossbred cows of similar body weight and age were selected for the study. The research was done for a period of 90 days. The cows were divided in four groups. Group 1(T₀) was control group, in which the animal receive experimental feed without any other feed supplements where as the animals of experimental group 2 (T₁), group 3 (T₂) and group 4 (T₃) were fed a similar feed along with 60 g, 80 g and 100 g fenugreek seeds, respectively.

Result and Discussion

During the 13 week trial, the average daily milk yield of cows ranged from 5 to 10 kg. The control group (T₀) had an average milk output of 5.52 kg while, the treatment group (T₃) which received a fenugreek seed combination averaged 8.81 kg per day. This represented a 63 per cent increase in milk production in the treatment group compared to the control group. These results indicate that supplementing cows with a fenugreek seed combination positively influences milk output. The overall mean of T₃

was higher than other treatment and it was at the par with mean of group of T₂ (7.92 kg) and followed by T₁ (7.39) and T₀ (5.52 kg). The results observed in the present study align with the earlier findings of El-Nor *et al.* (2007), who reported a significant increase in the milk yield of lactating buffaloes with dietary supplemented fenugreek seeds.

The average daily milk fat per cent of cows in the control (T₀) and treatment (T₃) groups was 2.99 and 4.01 per cent respectively. The average values of milk fat was 2.99 per cent for T₀, 3.76 per cent for T₁, 3.85 per cent for T₂ and 4.01 per cent for T₃ group. These results showed the milk fat content increased as increase in fenugreek seed feeding. The treatment T₁, T₂ and T₃ were at par with each other. The result shows that T₃ treatment group having higher fat percentage than other treatment group. The current results are in agreement with the findings of Chandrasekar *et al.*, (2019) in Murrah buffaloes, and Degirmencioglu *et al.*, (2016) in buffaloes, where different feed supplementations increased the milk fat percentage during the early lactation period.

The mean values of milk solid not fat during lactation study were found to be 8.37 per cent for T₀, 8.66 per cent for T₁, 9.12 per cent for T₂ and 9.23 per cent for T₃ group. T₃ shows the most effective and consistent improvement in SNF percentage with the highest values on most days and an overall mean of 9.23 per cent. T₁ and T₂ also show strong performance with SNF percentages steadily increasing over time and overall means of 8.66 per cent and 9.12 per cent, respectively. T₀ (control) shows the lowest SNF percentages, with an overall mean of 8.37 per cent, and while there were improvements, it lags behind the other treatments. Results shows that treatment T₃ and T₂ which was at par and followed by treatment T₁. Treatment T₀ was shows

Table 1. Effect of Fenugreek seed supplementation on milk yield and composition (%)

Groups	T ₀	T ₁	T ₂	T ₃
Milk Yield	5.52 ^c	7.39 ^b	7.92 ^a	8.81 ^a
Fat	2.99 ^b	3.76 ^a	3.85 ^a	4.01 ^a
Solid Not Fat	8.37 ^b	8.66 ^b	9.12 ^a	9.23 ^a
Protein	3.07 ^b	3.28 ^a	3.42 ^a	3.61 ^a
Lactose	3.11 ^c	4.76 ^b	4.94 ^a	5.05 ^a
Total Solid	8.22 ^b	9.51 ^a	9.75 ^a	9.91 ^a

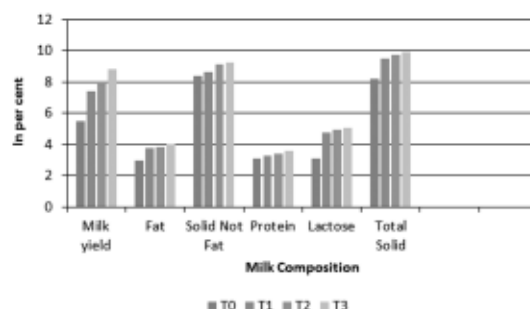
decreasing SNF content day by day. Similar findings were observed by Thakur *et al.*, (2008) in crossbred cows, Barjibhe, (2016) in Sahiwal cows reported that herbal supplementation affected the milk SNF percentage, through the effect was significant change in milk solid not fat content in sahiwal cows supplementing with fenugreek seeds.

The control group shows relatively stable protein percentages across the days, with an overall mean of 3.07. T_1 starts with a lower protein percentage on day 0 but increases significantly by day 90, resulting in an overall mean of 3.28%. T_2 shows consistent increases throughout the experimental period, reaching its peak value on day 90 with an overall mean of 3.42%. T_3 displays stable values with minor fluctuations, peaking on day 90 and has an overall mean of 3.61%. Treatment T_3 , T_2 and T_1 which was at par and followed by treatment T_0 . The present findings of the study are contradictory to the results of Al-Sherwany, (2015) who observed significant results in the total milk protein percentage of lactating cows.

The statistical analysis of data showed that a significant effect ($P < 0.05$) on milk lactose of treatment. The T_0 (Control) group showed moderate lactose percentages, with values fluctuating and peaking at day 90 and having an overall mean of 3.11 per cent. T_1 exhibited the highest lactose percentages, at days 90 with, a overall mean of 4.76 % indicating a positive effect of the treatment. T_2 maintained consistently high lactose percentages throughout the experiment, with values peaking at days 90 and recorded the highest overall mean of 4.94% . T_3 showed a positive response, with its highest percentage at day 90 and an overall mean was 5.05% suggesting some benefit from the treatment. Similar findings were reported by Berhane and Singh (2002) in crossbred cows, Tanwar *et al.*, (2008), Patel *et al.*, (2015)

in Surti buffaloes, Chandrasekar *et al.*, (2019) in buffaloes and Barjibhe, (2016) in Sahiwal cattle where herbal feeding in lactating animals resulted in significantly higher milk lactose percentage compared to the non-supplemented group.

Overall, the table illustrates that feeding fenugreek seed (T_3) consistently increases the percentage of milk total solids (9.91%) compared to the control (8.22%) and other treatment groups (Table 1). This suggests that fenugreek seed may provide nutritional benefits that enhance the quality of milk produced by the cows. El-Nor *et al.*, (2007) found that there was significant difference in the total solids content of milk supplemented 100 or 200 g fenugreek seeds in lactating buffaloes.



Conclusion

1. Feeding fenugreek seed has significant effect ($P < 0.05$) on milk production, with the highest daily milk yield observed in group T_3 (8.81 kg), which was supplemented with fenugreek seed at 100 g day animal⁻¹ and it was at par with group T_2 (7.92 kg) supplemented at 80 g day⁻¹ animal⁻¹, and followed by group T_1 (7.39 kg) at 60g day⁻¹ animal⁻¹.
2. The Effect of feeding fenugreek seed supplementation was also found to be significant ($P < 0.05$) on all aspects of milk composition, and T_3 (100 g day⁻¹ animal⁻¹) being the most effective among all groups.

3. Economically, T_3 was most efficient treatment, with a benefit-cost (B:C) ratio of 1.42 as compared to the other treatment.

References

- Abdel-Rahman, H. A., Fathallah, S. I., Helal, A. A., Nafeaa, A. A. A. and Zahran, I.S., 2014. Effect of turmeric (*Curcuma longa*), fenugreek (*Trigonella foenum-graecum* L.) and/or bioflavonoid supplementation to the broiler chicks diet and drinking water on the growth performance and intestinal morphometric parameters. *Global Veterinaria*, 12(5), pp. 627-635.
- Al-Sherwany, D. A. O., 2015. Feeding effects of fenugreek seeds on intake, milk yield, chemical composition of milk and some biochemical parameters in Hamdani ewes. *Al-Anbar J. Vet. Sci*, 8(1), pp. 49-54.
- Barjibhe, S., 2016. Effect of Polyherbal Mixture, Butyrate and Mustard Oil Supplementation During Transition Period on Productive and Reproductive Performance of Sahiwal Cows (Doctoral dissertation, NDRI, Karnal).
- Berhane, M. B. and Singh, V. P., 2002. Effect of feeding indigenous galactopoietic feed supplements on milk production in crossbred cows.
- Chandrasekar, T., Lathwal, S.S., Singh, P. and Karuthadurai, T., 2019. Effect of polyherbal Mixture supplementation on postpartum productive Performance in Karan Fries (KF) Cows. *Journal of Animal Research*, 9(1), pp.115-118.
- Degirmencioglu, T., Unal, H., Ozbilgin, S. and Kuraloglu, H., 2016. Effect of ground fenugreek seeds (*Trigonella foenum-graecum*) on feed consumption and milk performance in Anatolian water buffaloes. *Archives Animal Breeding*, 59(3), pp.345-349.
- El-Nor, S. A., Khattab, H. M., Al-Alamy, H. A., Salem, F. A. and Abdou, M. M., 2007. Effect of some medicinal plants seeds in the rations on the productive performance of lactating buffaloes
- McDonald, B. A. and Linde, C., 2002. Pathogen population genetics, evolutionary potential, and durable resistance. *Annual review of phytopathology*, 40(1), pp. 349-379.
- Mohammed, F. F., Pennington, C. J., Kassiri, Z., Rubin, J. S., Soloway, P.D., Ruther, U., Edwards, D.R. and Khokha, R., 2005. Metalloproteinase inhibitor TIMP 1 affects hepatocyte cell cycle via HGF activation in murine liver regeneration. *Hepatology*, 41(4), pp. 857-867.
- Mudgal, V., Mehta, M. K., Rane, A. S. and Nanavati, S., 2003. A survey on feeding practices and nutritional status of dairy animals in Madhya Pradesh. *Indian Journal of Animal Nutrition*, 20(2), pp. 217-220.
- Patel, J., Dhruve, J. and Talati, J., 2015. Nutraceutical and molecular characterization of different Fenugreek (*TrigonellaFoenum-Graecum* L.) genotypes. *World J Pharm Pharm Sci*, 4, pp.1267-1287.
- Thakur, J. K., Arthanari, H., Yang, F., Pan, S. J., Fan, X., Breger, J., Frueh, D. P., Gulshan, K., Li, D. K., Mylonakis, E. and Struhl, K., 2008. A nuclear receptor-like pathway regulating multidrug resistance in fungi. *Nature*, 452(7187), pp. 604-609.
- Tanwar, P., Nandy, T., Ukey, P. and Manekar, P., 2008. Correlating on-line monitoring parameters, pH, DO and ORP with nutrient removal in an intermittent cyclic process bioreactor system. *Bioresource technology*, 99(16), pp.7630-7635.