

Original Research Article

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## Effect of Fenugreek Seed Supplementation on Milk Yield and its Composition of Crossbred Dairy Cattle

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### ABSTRACT

Effect of fenugreek seed supplementation on milk yield and its composition were studied using twelve crossbred dairy cattle. While six cows were supplemented with soaked fenugreek seed, the rest were treated as control. The study period comprises of 30 days of pre-supplementation, 60 days of supplementation and 30 days of post-supplementation periods. The mean milk yield (litres) was significantly ( $P < 0.05$ ) higher with fenugreek supplementation ( $8.93 \pm 0.16$ ) as compared to pre-supplementation ( $8.24 \pm 0.09$ ) and post-supplementation ( $8.37 \pm 0.22$ ) periods. The total solids and SNF per cent during supplementation period ( $13.51 \pm 0.07$  and  $8.63 \pm 0.03$ ) showed significantly higher values as compared to pre-supplementation ( $13.18 \pm 0.03$  and  $8.54 \pm 0.02$ ) and post-supplementation ( $13.19 \pm 0.05$  and  $8.55 \pm 0.03$ ) periods. The mean fat and protein per cent during supplementation period ( $4.89 \pm 0.06$  and  $3.22 \pm 0.01$ ) were significantly ( $P < 0.01$ ) higher as compared to pre-supplementation ( $4.64 \pm 0.02$  and  $3.12 \pm 0.01$ ) and post-supplementation ( $4.64 \pm 0.03$  and  $3.14 \pm 0.01$ ) periods. This indicated the positive effect of fenugreek seed on milk yield and its composition.

### Keywords

Fenugreek seed,  
Milk yield, Milk  
composition,  
Dairy cow

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### Introduction

Milk production is an important rural activity in India providing supplementary income, employment and nutrition to millions of rural households. India has emerged as the largest milk producer in the world with an annual production of more than 121.8 million tonnes, giving a per capita availability of 281 g per

day (National Dairy Development Board, 2012). However, India's productivity per animal compared with the global average is very low various management and disease conditions of the lactating animals are particularly responsible for low milk yield (Mishra *et al.*, 2006). Use of galactogogues of herbal origin seems to reaffirm the milch-herd health without causing deleterious

alterations in the tissue reactions. Fenugreek (*Trigonella foenum-graecum L.*) is one of the oldest medicinal plant, dating back to Hippocrates and ancient Egyptian times (Jensen, 1992), is an annual herb from *Papilionaceae Leguminosae* family and is extensively cultivated in various parts of the world particularly in India, Middle East, Northern Africa and Southern Europe (Fotopoulos, 2002). The seeds of this herb have been used in traditional medicine to promote lactation in lactating women (Shane-McWhorter, 2001 and Tiran, 2003). But, the galactogogue property of fenugreek seed supplementation has not been explored in crossbred dairy cattle in India. Hence, the present work was carried out to study the effect of fenugreek seed on milk yield and its composition on crossbred dairy cattle.

### Materials and Methods

Twelve crossbred dairy cattle available at Livestock Farm, Department of Livestock Production and Management, Veterinary College and Research Institute, Namakkal, were selected and grouped into two, comprising of six in each, according to their parity using Completely Randomized Design, to avoid the influence of parity. The cows were fed with standard milch cattle ration, chopped green and dry fodders. The soaked fenugreek seed (100 g per day per animal) was supplemented with cattle feed to six animals in a group daily in the afternoon, rest were treated as control. Feed and fodder consumption of each cow were recorded daily. The study period comprised of 30 days of pre-supplementation, 60 days of supplementation and 30 days of post-supplementation periods. Animals were machine milked and the milk yield was recorded daily at 0500 and 1500 hours. fat, solids not fat (SNF), protein and lactose content were estimated by using Lactoscan (Model no. SL 30, MB Version: 60,

Ser.N:1614). The data were subjected to basic statistical analysis and test of significance as per the methods suggested by Snedecor and Cochran (1989).

### Results and Discussion

The mean daily milk yield (litres) observed for the pre-supplementation, supplementation and post-supplementation periods are furnished in Table 1.

The cows during fenugreek seed supplementation period recorded higher milk yield (8.93 litres) as compared to pre-supplementation (8.24 litres) and post-supplementation (8.37 litres) periods and the difference was statistically significant ( $P < 0.05$ ). The galactopoietic effect of fenugreek might be mediated through an increase in total dry matter intake. Similar observation was made by Tomar *et al.*, (1996) and Abo El-Nor *et al.*, (2007) in buffaloes, Al-Shaikh *et al.*, (1999 and 2002) and Al-Saiady *et al.*, (2007) in goats and Rashwan (1998) in rabbits. The relative improvement in milk production was justified by the earlier findings of increased nutrient digestibility (Abo El-Nor *et al.*, 2007); increased plasma prolactin level in buffaloes (Abo El-Nor, 1999). Moreover, the higher milk production in fenugreek seed feeding could be illustrated on the basis that fenugreek seeds might contain some active components stimulating the hypothalamus or directly to pituitary gland leading to release of prolactin (Basha *et al.*, 1987).

The total solids per cent ( $P < 0.01$ ) during supplementation period ( $13.51 \pm 0.07$ ) showed significantly higher value as compared to pre-supplementation ( $13.18 \pm 0.03$ ) and post-supplementation ( $13.19 \pm 0.05$ ) periods. The carminative, tonic (Fazli and Hardman 1968) and appetite stimulant (Petit *et al.*, 1993) properties of fenugreek seed could have caused increased green and

dry fodder consumption and the richness of fenugreek seed in protein and free amino acids (Jain and Madhu 1988); vitamins thiamin, niacin, carotene and vitamin E (Kamal and Yadav 1991); organic substance with sulphur and mineral salts with iron, phosphorus and magnesium (Rosioru *et al.*, 2010) could have improved the dry matter intake there by increased the nutrient availability and absorption which in turn increased the total solids content.

SNF per cent was also significantly higher during fenugreek supplementation period ( $8.63 \pm 0.03$ ) as compared to pre-supplementation ( $8.54 \pm 0.02$ ) and post-supplementation ( $8.55 \pm 0.03$ ) periods.

Increase in SNF per cent might be ascribed to the effect of fenugreek seed on hypothalamus to stimulate hunger (appetite centre) in the brain and increase the desire for eating (Petit *et al.*, 1993). Moreover, fenugreek seed contains saponins, which stimulate anaerobic fermentation of organic matter that improve efficiency of utilization of nutrients (Abo El-Nor *et al.*, 2007). In addition, it increased the bacterial number in the rumen of lactating cows (Valdez *et al.*, 1986 and Ali *et al.*, 2005) there by increased the organic matter digestibility and the associated effect between acetate and succinate on rumen microflora and lead to improvement of feed efficiency (Abo El-Nor and Kholif, 2005) which in turn improved the solids not fat content.

**Table.1** Mean ( $\pm$  SE) values of milk yield (litres), milk composition (per cent) of crossbred dairy cattle

Production parameters	Pre-supplementation	Supplementation	Post-supplementation
Milk yield*	$8.24 \pm 0.09^a$	$8.93 \pm 0.16^b$	$8.37 \pm 0.22^a$
Total solids**	$13.18 \pm 0.03^a$	$13.51 \pm 0.07^b$	$13.19 \pm 0.05^a$
SNF*	$8.54 \pm 0.02^a$	$8.63 \pm 0.03^b$	$8.55 \pm 0.03^a$
Fat**	$4.64 \pm 0.02^a$	$4.89 \pm 0.06^b$	$4.64 \pm 0.03^a$
Total protein**	$3.12 \pm 0.01^a$	$3.22 \pm 0.01^b$	$3.14 \pm 0.01^a$
Lactose*	$4.65 \pm 0.01^a$	$4.72 \pm 0.01^{bc}$	$4.69 \pm 0.04^{ab}$

Means bearing the same superscript in a row do not differ significantly  
 \*\* Highly significant ( $P < 0.01$ ), \* Significant ( $P < 0.05$ )

The mean fat and protein per cent during supplementation period ( $4.89 \pm 0.06$  and  $3.22 \pm 0.01$ ) were significantly ( $P < 0.01$ ) higher as compared to pre-supplementation ( $4.64 \pm 0.02$  and  $3.12 \pm 0.01$ ) and post-supplementation ( $4.64 \pm 0.03$  and  $3.14 \pm 0.01$ ) periods. In agreement with higher fat per cent in the present study, Shah and Mir (2004) in cows; and Abo El-Nor (1999) and Abo El-Nor *et al.*, (2007) in buffaloes; and Al-Shaikh *et al.*, (1999) in goats reported that the fenugreek supplementation had higher fat per cent compared to control. This may be attributed to the effect of fenugreek seed on stimulation

of pancreatic digestive enzymes and stimulation of the liver to produce and secrete bile rich in bile acids (Platel and Srinivasan, 2001), antioxidant potential (Choudhary *et al.*, 2001, Mc Carthy *et al.*, 2001 and Suja *et al.*, 2002); appetite stimulation and increasing prolactin (Abo El-Nor 1999) and growth hormone release (Alamer and Basiouni, 2005) and activating the udder tissue (Drackley *et al.*, 2001 and Abo El-Nor *et al.*, 2007) there by increasing the flow of milk (Yadav *et al.*, 2011) which in turn helped to improve the fat content. With respect to increased protein percentage during supplementation similar

observation were made earlier by Tomar *et al.*, (1996), Abo El-Nor (1999) and Abo El-Nor *et al.*, 2007. On the contrary, Shah and Mir (2004) reported no change in the protein content of cows fed with crushed fenugreek seed. The mean lactose per cent (4.72) was significantly ( $P < 0.05$ ) higher during fenugreek supplementation period compared to pre-supplementation (4.65) and post-supplementation (4.69) periods.

From this study we could conclude that crossbred dairy cows supplemented with fenugreek seed during lactation showed better performance in terms of increased milk yield, total solids, fat and protein percentage which in turn improves the net return. Hence, fenugreek seed supplementation can be recommended as a cost effective management measure for improving milk production in dairy cattle.

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