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## Faba bean (*Vicia faba*) as a cheap protein source in Murrah buffalo diet: Effect on milk production

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### Abstract

The present study was carried out to study the effect of Faba Bean (*Vicia faba*) as protein source on performance of Murrah Buffaloes. For this, eighteen Murrah buffaloes in transition phase were selected and divided into 3 treatment groups having six buffaloes in each group on the basis of milk yield, body weight and parity, following completely randomized design (CRD). Treatment 1 (control) was given concentrate as per ICAR standard 2013 (T<sub>0</sub>), in treatment 2; 15% of the CP of the concentrate of the control group was replaced with faba bean (T<sub>1</sub>) and Treatment 3 was given concentrate by replacing 30% of the CP of the control group with faba bean (T<sub>2</sub>). Production performance parameters were observed. It was reported that replacement of protein source with 15 and 30% faba bean did not have significant effect on average days taken to attain peak yield and persistency period. Overall, it can be concluded that replacement of high cost protein source with faba bean (cheap protein source) upto 30% level does not have any deleterious effect on performance of the animal and also economical to the farmers.

**Keywords:** Faba bean, murrah, protein, yield

### Introduction

Supplementing protein in the diets of high yielding dairy animals poses a challenge for dairy nutritionists <sup>[1]</sup>. Elevated prices and consumer concerns are shifting attention towards more economical and ecologically sustainable methods of producing homegrown protein feeds for the animal feed market <sup>[2]</sup>. In this context, legume seeds emerge as a promising alternative owing to their relatively high crude protein (CP) and starch contents <sup>[3-5]</sup>. Faba bean, for instance, offers a valuable protein source, typically comprising 25 to 33% crude protein <sup>[5-7]</sup> making it a viable substitute for expensive protein supplements in the diets of high-yielding dairy animals. Moreover, it contains a significant amount of starch, ranging from 32 to 44% <sup>[5-7]</sup>, thereby serving as an excellent energy source. Consequently, incorporating faba bean into dairy diets can reduce reliance on costly cereal grains like corn. There is no available literatures on the positive and negative consequences of replacing protein source by faba bean as an alternative protein source on lactation of Murrah buffalo. Therefore, the present investigation was conducted to study the effect of faba bean (*Vicia faba*) as protein source on milk production parameters in lactating buffaloes.

### Materials & Methods

The experiment was conducted at the buffalo farm of Livestock Production Management, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar, over a period of 180 days. Eighteen Murrah buffaloes in the transition phase (one month before calving) were selected and divided into three treatment groups, each comprising six animals. The animals were divided based on milk yield, body weight and parity, following a completely randomized design (CRD). The experimental Murrah buffaloes were provided with a ration consisting of concentrate mixture and roughage (berseem and wheat straw). The concentrate mixture was offered to each animal twice daily (during morning and evening milking) according to the experimental diet. During the transition phase, concentrates were fed in the shed itself. The treatments were as follows: Treatment 1 (control): Concentrate fed as per feeding standards <sup>[8]</sup> (T<sub>0</sub>), Treatment

2: Concentrate with 15% of the crude protein (CP) of the control group replaced with faba bean (T<sub>1</sub>), Treatment 3: Concentrate with 30% of the crude protein (CP) of the control group replaced with faba bean (T<sub>2</sub>). Buffaloes were hand-milked twice daily. Parameters such as average days taken to attain peak milk yield, and persistency period of peak yield were obtained from farm records.

The averages of the treatment groups were subjected to statistical analysis following procedures outlined by Snedecor and Cochran<sup>[9]</sup>. Differences in significance among the variables between the three groups were compared using one-way analysis of variance (ANOVA), conducted with the help of SPSS computer software version 21. Mean differences among different treatments were then separated using Duncan's multiple range tests. A significance level of  $P < 0.05$  was utilized as the criterion for statistical significance<sup>[10]</sup>.

### Results and Discussion

The average days taken to attain peak milk yield, and persistency period of peak yield of experimental Murrah buffaloes under different dietary treatments are presented in Table 1. The results indicate a statistically non-significant difference in all parameters among the three treatment groups. This study aligns with previous research. For instance,<sup>[11]</sup> observed that Holstein Friesian dairy cows fed a concentrate consisting of 345 g/kg dry matter faba bean seeds exhibited similar productive performance compared to cows fed with soybean meal concentrate (150 g/kg DM). Similarly,<sup>[12]</sup> investigated the effect of toasting field beans

and different grass-clover: maize silage ratios on production and found no significant effect on milk production.

Furthermore,<sup>[13]</sup> studied the effect of feeding field beans (FB, *Vicia faba* L. var. minor) as a substitute for soybean meal (SBM) on lactation performance and concluded that milk yield was not influenced by dietary treatment. Similarly,<sup>[14]</sup> tested flaked faba beans as a partial substitute for soybean meal in the diet of Reggiana breed dairy cows and found that milk yield (kg/day) did not differ significantly between treatment groups. Additionally,<sup>[15]</sup> substituted raw or rolled FB seeds at a rate of 171 g/kg DM diet for soybean meal at 9.2 g/kg DM diet in lactating Holstein cows and found no significant effect on milk production. These findings collectively suggest that incorporating faba beans into the diet of dairy animals does not significantly affect milk production, consistent with the results of the present study.

Indeed, previous studies have provided insights into the impact of faba bean substitution on milk production and composition in various dairy cattle breeds. For instance,<sup>[2]</sup> evaluated the production response of Finnish Ayrshire cows to the substitution of faba bean for rapeseed meal at two protein supplementation levels in grass silage-based diets. They observed a linear decrease in milk yields with increasing faba bean inclusion, particularly pronounced at higher protein supplementation levels. This could be attributed to the higher CP content of rapeseed meal compared to faba bean, resulting in decreased milk yield when substituted at higher CP levels.

**Table 1:** Average days taken to attain peak milk yield and persistency period of peak yield of experimental Murrah buffaloes under different dietary treatments

Attributes	Treatment		
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
Days taken to attain peak milk yield (days)	47.00±11.54	45.50±4.33	42.00±6.2
Persistency period of peak yield (days)	60.67±20.09	61.83±2.15	68.83±4.57

### Conclusion

On the basis of results obtained in the present study it may be inferred that there was non-significant difference between the treatment groups in overall production parameters. Overall, it can be concluded that replacement of high cost protein source with faba bean (cheap protein source) upto 30% level does not have any deleterious effect on performance of the animal. The above study was conducted under loose housing system and from period July to Feb. So, further studies are required under different agro-climatic conditions and with larger herd size.

### Competing Interests

The authors declare no competing interest regarding publication of this paper.

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