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Effect of Shatavari (Asparagus racemosus) Supplementation on Milk Production and its Composition in Crossbred Cows

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Abstract

Present study was conducted to evaluate the effect of Shatavari (Asparagus racemosus) supplementation on milk production and its composition in crossbred cows. Fifteen lactating crossbred cows were divided into three groups; T1 (control), T2 and T3 (treatment) of five animals each in completely randomized design. In T1 no Shatavari was supplemented while in T2 and T3 Shatavari was supplemented @ 150 mg and 200 mg /kg body weight, respectively. The study was conducted for a period of 90 days. Daily milk yield was recorded. Milk composition of each animal was determined once every fortnight. The milk yield and fat corrected milk yield were found to be significantly higher (P<0.05) in Shatavari supplemented groups than control group. Average milk fat%, SNF%, total solid% and protein% were significantly higher (P<0.01) in supplemented groups as compared to control group. It was concluded that Shatavari supplementation significantly increased milk yield and milk composition (fat%, SNF%, total solid % and protein %).

Keywords: Crossbred, Milk Yield, Milk Composition, Shatavari

Introduction

Dairy animals are dependent on low quality crop residues because of less availability of green fodder. These crop residues are good source of energy. However, these are nutritionally low in protein, vitamins and minerals along with poor digestibility. Therefore, the scientific feeding of dairy animals can only be achieved by providing nutritious feed and fodder in required amounts and by improving the efficiency of utilization of nutrients from low grade roughages for economically viable production. Certain indigenous plants have been traditionally used to improve feed palatability, utilization and animal productivity. Some important herbs, which are grown in India, are being utilized to a large extent for preparation of herbal drugs against various diseases. Further, animal productivity in terms of growth and milk yield can be improved by using different herbs as a component of animal feed.

There are several herbs which have been described to improve the general wellbeing, milk production and reproduction of both humans and animals. Among them, *Asparagus racemosus* (Shatavari) needs a special mention. Shatavari (*Asparagus racemosus*) has galactogogue and mammogenic function through enhancing blood protein and cellular division in mammary gland to augment lactation Pandey *et al.* (2005). Shatavari feeding could either influence feeding pattern or influence the growth of favorable microorganisms in the rumen or stimulate the secretion of various digestive enzymes, which in turn may improve the efficiency of utilization of nutrients or stimulate the milk secreting tissue in the mammary glands, resulting in improved productive and reproductive performance of dairy animals (Bakshi and Wadhwa, 2000). A medicinal herb has properties to improve digestibility, antibacterial, immune-stimulation, coccidiostatic anthelmintic, antiviral or antioxidative (Uegaki *et al.*, 2001). Kumar *et al.* (2014) reported that feeding of Shatavari root powder significantly improved postpartum animal productivity by enhancing milk production, total milk immunogloblulins and reduced the service period and services/ conception and was cost effective. These herbs were being used in pre-vedic time because they were safe to use, cheap and easily available, has no side effect and no residue effect in milk (Krishna *et al.*, 2005).

In Ayurveda, shatavari has been described as absolutely safe on long term use, even during pregnancy and lactation. Hence, it is recommended during last and first trimester of pregnancy to restore the mother's energy, boost the immunity of both mother and foetus, and promote quality breast milk and to ease vata and promote digestion (Maasaanumaasi kapathya, Garbhini Paricharya, Prasuthi Tantra, Ayurveda). Thus, it can be used in routine as the medicinal product of Shatavari is beneficial for the maintenance of proper health, growth and development of the mother and foetus. Considering its importance, the present study was undertaken to determine the effect of shatavari root powder on performance of lactating crossbred cows.

Materials and Methods

The experiment was conducted on fifteen lactating crossbred cows at livestock farm Rajasthan College of Agriculture, Udaipur (Raj.). The animals were randomly divided into three groups of five animals each on the basis of nearness in their body weight and milk yield. The crossbred cows were fed as per ICAR (2013) feeding standards to meet the requirement of nutrients for 90 days. The Shatavari root powder was supplemented daily by mixing in the concentrate. The cows were placed on three dietary experimental feeds (Table 1).

Table 1: Experimental feeds offered to crossbred cows in different groups

Experimental Group	Experimental Feed
T_1 (Control)	Wheat straw ad-lib. + 10 kg green fodder + Concentrate mixture
T_2	T_1 + Shatavari @ 150 mg/kg BW
T_3	T_1+ Shatavari @ 200 mg/kg BW

The milk yield of all the fifteen crossbred cows was measured daily for the period of 90 days. The representative samples of milk of individual cows were collected on two consecutive days at fortnightly intervals. Milk composition i.e. fat, SNF, total solid and protein were determined by using Lacto Star- automatic milk analyzer.

Calculation of FCM and SCM

For the conversion of whole milk in to 4% FCM, the following equation described by Gaines (1928) was adopted:

$$4\% \text{ FCM (kg)} = 0.4M + 15\ F$$

Where, M = Milk yield in kg; F = Weight of fat content in milk

The solid corrected milk (SCM) was calculated by the method of Tyrrell and Reid (1965) using the following equation:

$$\text{SCM (kg)} = 12.3\ F + 6.56\ SNF - 0.0752\ M$$

Where, 'F', 'SNF' and 'M' were expressed as kg of fat, kg of SNF and kg of milk, respectively.

Results and Discussion

Milk Yield

Perusal of data in Fig. 1 revealed that the supplementation of Shatavari resulted in significant increase in milk yield of crossbred cows as compared to control group. Average milk yield in treatment groups (T_2 & T_3) was significantly ($P<0.05$) higher than that of T_1 (control) group. The average daily milk yield was 8.53±0.405, 9.47±0.208 and 9.83±0.234 kg in treatments T_1, T_2 and T_3, respectively. The 4 per cent FCM yield was 9.27±0.34, 10.60±0.33 and 10.92±0.34 kg in treatments T_1, T_2 and T_3, respectively. Milk yield also observed an increasing trend from T_1 to T_3 suggesting that increased level of shatavari (*Asparagus racemosus*) in the diet extend a positive effect on milk production obviously, such a trend in FCM yield was also observed and can be explained due to the increasing in milk fat percent as a result of feeding higher levels of shatavari in the diets (Mishra *et al.*, 2008, Tanwar *et al.*, 2008, Divya *et al.*, 2015 and Shridhar and Bhagwat, 2007) who reported similar results. The corresponding SCM yield was 9.13±0.35, 10.58±0.37 and 10.95±0.38 in treatments T_1, T_2 and T_3, respectively. The 4 % FCM yield was significantly ($P<0.05$) higher in T_3 and T_2 as compared to T_1 group. The SCM yield was significantly ($P<0.05$) higher in treatment groups as compared to T_1 (control) group. Findings of the present study are in agreement with Jingar *et al*. (2018) who reported that supplementation of Shatavari @ 50 gm per day resulted in significant increase in milk yield of buffaloes as compared to the control group. Soni *et al.* (2016) also reported that milk yield and fat corrected milk yield were significantly ($P<0.01$) higher in Shatavari supplemented groups than the control group. Sharma (2009) reported that supplementation *Asparagus racemosus* at the rate of 250 mg/ kg body weight during both pre and postpartum period in crossbred cows resulted in a decrease in mastitis incidence and a significant increase in daily milk yield.

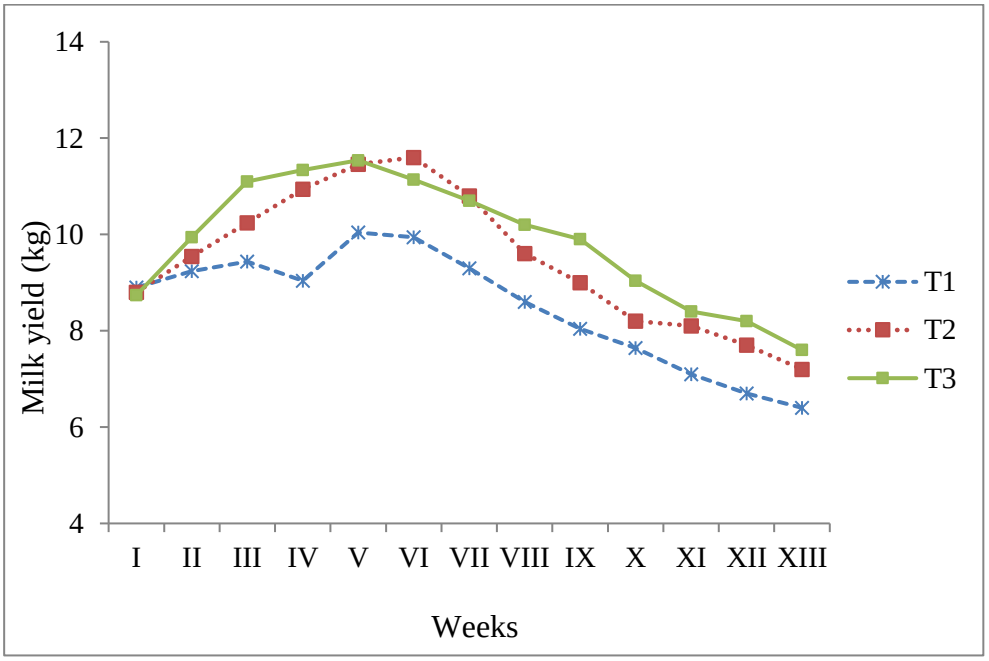

Figure 1: Average milk yield (kg) in lactating crossbred cows under different treatment groups

Milk Composition

Data pertaining to the effect of Shatavari supplementation on milk composition is presented in Table 2. The average milk fat content in T_1, T_2 and T_3 was 3.83±0.072, 4.04±0.036 and 4.12±0.037 per cent, respectively. The results indicated that fat per cent was significantly ($P<0.05$) higher in Shatavari supplemented groups as compared to control group.

Table 2: Effect of shatavari supplementation on milk yield and its composition

Attributes	Treatments		
	T_1 (Control)	**T_2**	**T_3**
Milk yield (kg)	8.53^b±0.405	9.47^a±0.208	9.83^a±0.234
FCM yield (kg)	9.27^b±0.34	10.60^a±0.33	10.92^a±0.34
SCM yield (kg)	9.13^b±0.35	10.58^a±0.37	10.95^a±0.38
Fat %	3.83^b±0.072	4.04^a±0.036	4.12^a±0.037
SNF %	8.59^b±0.034	8.87^a±0.097	8.96^a±0.070
TS %	12.42^b±0.076	12.91^a±0.110	13.08^a±0.090
Protein %	2.92^b±0.054	3.06^a±0.018	3.20^a±0.039

Means bearing different superscripts within a row differ significantly ($p<0.05$)

The per cent of SNF, total solid and protein was significantly ($P<0.01$) higher in shatavari supplemented groups as compared to control group. Present results are similar to other works Mishra *et al.*, 2008, Tanwar *et al.*, 2008, and Saini *et al.*, 2018. A slight increase in milk SNF content from T_1 to T_3 was obviously due to increase in milk protein content, while total solids content was Verge influenced by both protein as well as fat content and thus its value increased from T_1 to T_3. The findings are also in line with Divya *et al.* (2015) who reported that Shatavari roots supplemented feed increased percent milk fat, solid not fat (SNF) and total solids (TS) significantly. Sukanya *et al*. (2014) reported that supplementation of Milkplus a Shatavari based herbal preparation enhanced the milk fat per cent from 3.95% to 4.38% in control and experimental animals respectively. Kumawat *et al.* (2017) also observed that milk fat and total solid contents were increased ($P<0.01$) in Asparagus supplemented group as compared to control group.

Conclusion

Based on the above results, it can be concluded that *Asparagus racemosus* supplementation significantly improved animal productivity by enhancing milk production and also its composition in crossbred cows.

Conflict of Interests

There is no conflict of interest.

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