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Effect of Feeding Shatavari (*Asparagus racemosus*) Root Powder on Quantity of Milk in Crossbred Cows

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ABSTRACT

Background: Shatavari (*Asparagus racemosus*) recommended as a galactagogue in case of lactational insufficiency. Shatavari can also help to boost the immune system, ward off infection of the udder and reproductive organs in cows. It may also be used to reduce the stress of dairy cows and increase their producing ability, resulting in the production of clean and nutritious milk.

Methods: The present research work was carried out at the Research cum Development Project, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist- Ahmednagar, Maharashtra. Twenty physically fit milking crossbred cows have been selected for the study and divided into four equal groups, five having five animals each. All the cows from treatment groups were fed as per ICAR (2013) feeding standard to meet the nutritional requirement. The experimental animals from group T1, T2, T3 and T4 were fed a diet containing shatavari root powder @ 0, 40, 80 and 120 gm/cow/day respectively for a period of 60 days.

Result: At the time of milking, each cow's daily milk output (kg) was recorded. The current study found that supplementing with shatavari root powder enhanced milk production significantly ($P<0.05$) over the control group (T1).

Key words: *Asparagus racemosus,* Crossbred cattle, Milk yield, Shatavari root powder.

INTRODUCTION

Crossbred cattle are one of the best converted of coarse feed into valuable commodities like milk and manure. Cattle play a vital role in the rural economy as providing family income and generating gainful employment in the rural sector. Milk production in India has increased by 35.61 per cent in the previous six years, reaching 198.4 million tonnes in 2019-2020, with milk accessibility per capita at 407 gm/day. It grew by 5.70 per cent from 2018-19, according to official Figs. With remarkable development in milk production over the last two decades, India has risen to become one of the world's major dairy producers. In India, however, dairy animal production is extremely poor due to a number of difficulties such as underfeeding, malnutrition, multiple illnesses, stress and so on, all of which have a negative impact on the dairy industry's profitability. The quest for alternative feed additives has become a necessity of the day, with the request for organic products and the restrictions on the use of some antibiotics, negative residual effects and cost effectiveness in animal feed. Herbal feed additives may influence feeding patterns, promote the growth of beneficial microorganisms in the rumen, or stimulate the secretion of various digestive enzymes, all of which may improve nutrient utilization productivity or revive the milk secreting tissue in the mammary glands, resulting in improved dairy animal productivity and reproduction (Bakshi and Wadhwa, 2000). A medicinal herb may have antibacterial, immunostimulatory, coccidiostat, anthelmintic, antiviral, or antioxidative effects (Uegaki *et al*., 2001).

Herbals are concentrated meals that offer vitamins, minerals and other nutrients to keep the human and animal bodies healthy and strong. Herbal medicine has a long history in India and ayurveda is one of the world's oldest surviving healthcare systems. Ayurveda is a herbal medicine that is completely natural. These herbs have been used since pre-vedic times since they are safe to use, inexpensive and readily available and they have no adverse effects or milk residue (Krishna *et al.,* 2005). As a result, including them in the diet should be promoted in order to increase animal performance, feed efficiency, preserve health and reduce the negative effects of environmental stress. In veterinary medicine, traditional herbal remedies offer a lot of promise as an alternative therapy. A galactogogue is a compound that encourages dairy animals to produce milk. It might be synthesized, extracted from plants, or produced naturally. They work by blocking hypothalamic dopaminergic receptors or dopamine-producing neurons and therefore influencing the adrenal-hypothalamo hypophyseal-gonadal axis. By blocking dopamine receptors, these drugs enhance prolactin production (Gabay, 2002). A galactogogue is a compound that encourages dairy animals to produce milk. It might be

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synthesized, extracted from plants, or produced naturally. They work by blocking hypothalamic dopaminergic sensors or dopamine- generating neurons and therefore influencing the adrenal-hypothalamo hypophyseal-gonadal pathway. By blocking dopamine sense organs, these drugs enhance prolactin production (Gabay, 2002). Galactogogues increase secretory activity and hence restore and control milk supply by stimulating alveolar tissue activity (Ravikumar and Bhagwat, 2008).

Because of the presence of steroidal saponins and sapogenins in various segments of the plant, shatavari (*Asparagus racemosus*) is the most often used herb in traditional medicine (Krishana *et al.,* 2005). It is originally used as a health tonic and a typical Indian home medicine for rejuvenation, vigour, breast milk and sperm production. Cough, dyspepsia, edema, rheumatism, chronic fevers, aphrodisiac, cooling tonic antispasmodic, diarrhoea and dysentery are among its other uses. According to Mishra *et al.* (2005) shatavari contains, 4.60 to 6.10% protein, 36.80 to 47.50% carbs, 3.10 to 5.20 mg/g phenols, 4.80 to 5.10 mg/g tannins, 4.10% saponin and 6.50 to 7.40% ash. Phytosterols (0.79%), saponin (8.83%), polyphenols (1.69%), flavonoids (0.48%) and total ascorbic acid (0.76%) were found in Shatavari root, according to Visavadiya and Narasimhacharya (2005). Using various herbal blends as an ingredient of cattle feed can improve animal output. According to Bakshi *et al.* (2004), herbal plants with galactogogue characteristics such as shatavari are now widely utilized as animal feed additives.

MATERIALS AND METHODS

Twenty healthy lactating crossbred cows in their 3rd to 5th lactation have been selected for the present study from Research cum Development Project (RCDP) university farm. To maintain homogeneity within groups the animals were divided into four equal groups, five animals each having similar body weight and age. All animals were vaccinated and dewormed according to the dairy farm schedule. All the experimental cows were fed balanced ration to meet the nutrient requirement as per ICAR (2013) feeding standard including chelated minerals to take care of any mineral deficiency (Bhosale *et al.,* 2021). The period of experiment was 60 days from 1st february to 2nd April 2021. After the completion of the experiment a 7 days digestion trial has been conducted to see the effect of shatavari root powder on nutrient utilization.

Experimental diet and location of the study

The feeds and fodders used in the experiment were green maize, soybean straw and readymade concentrate mixture. The chemical composition of feed, fodder, concentrate mixture and shatavari root powder is presented in Table 1. The chemical composition of the same was analyzed as per AOAC (1995) standard procedures. The experimental animals were fed 0, 40, 80 and 120 gm/cow/day shatavari root powder as a feed additive for group T1 (control), T2, T3 and T4 respectively. Daily milk yield (kg) was recorded of each animal at the time of milking. Present experiment was carried out at the RCDP, Mahatma Phule Krishi Vidyapeeth, Rahuri, Ahmednagar, Maharashtra province of India. The animals were kept in a loose housing system having standard feeding and watering facilities.

Data related to milk yield were statistically analyzed using the SPSS statistical software program (SPSS version 22.0), one-way analysis of variance. All statements of significant differences were based on 0.05 probability level.

RESULTS AND DISCUSSION

Milk yield (kg)

The mean values of daily milk yield during the experimental period were 7.73±1.30 kg for T1, 10.76±0.43 kg for T2, 11.62±0.73 kg for T3 and 11.56±1.14 kg for T4 group. The statistical analysis of data revealed a significant ($P \leq 0.05$) effect of treatment on daily milk yield and is presented in Table 2; the same depicted in Fig 1. The milk yield increased significantly in all treatment groups, however there is no significant difference among all treatment groups. Treatment T3 showed highest milk yield followed by T4, T2 and minimum in T1 (control).

The improved udder health and galactopoietic action of herb in milch cows might explain the increase in milk production. According to (Sabins *et al.,* 1968; Ghosh *et al.,* 1987; Singh, 2012), shatavari root powder has active components that activate the hypothalamus or pituitary gland, causing the release of prolactin hormone and therefore boosting milk production. Shatavari's estrogenic action on mammary glands promotes alveolar secretory epithelial cell division and proliferation, which aids in the

Table 1: Chemical composition of the feeds offered to lactating crossbred cows (% DM basis).

Attributes	Maize	Soybean straw	Concentrate	Shatavari root powder
DM	22.86	93.11	91.01	94.6
CP	11.76	5.10	16.53	6.19
EE	1.94	2.01	7.58	1.5
NFE	48.11	58.05	36.89	61.51
TA	9.05	10.12	4.18	6.8
OM	90.95	89.88	95.82	93.2
NDF	65.71	24.12	26.35	38.42
ADF	44.6	16.21	14.65	14.2

Table 2: Average daily milk yield (kg) in lactating crossbred cows.

Treatment	0 days	15 days	30 days	45 days	60 days	Overall mean
T1	8.08±1.16	7.63±1.30^{b}	7.68±1.34^{b}	7.69±1.37^{b}	7.55±1.34^{b}	7.73±1.30^{b}
T2	10.36±0.48	10.55±0.40^{ab}	10.62±0.37^{a}	10.97±0.48^{a}	11.29±0.43^{a}	10.76±0.43^{a}
T3	10.56±0.52	11.42±0.84^{a}	11.83±0.75^{a}	11.93±0.76^{a}	12.37±0.76^{a}	11.62±0.73^{a}
T4	10.98±1.14	11.40±1.13^{a}	11.57±1.16^{a}	11.80±1.17^{a}	12.06±1.12^{a}	11.56±1.14^{a}
C.D.	N.S.	2.96	2.96	3.04	2.95	
SE(m)	0.885	0.98	0.979	1.006	0.975	
SE(d)	1.251	1.386	1.384	1.423	1.379	
C.V.	19.793	21.38	21.011	21.244	20.16	

^{ab}Means with different superscripts differ significantly within the column. NS: Non significant.

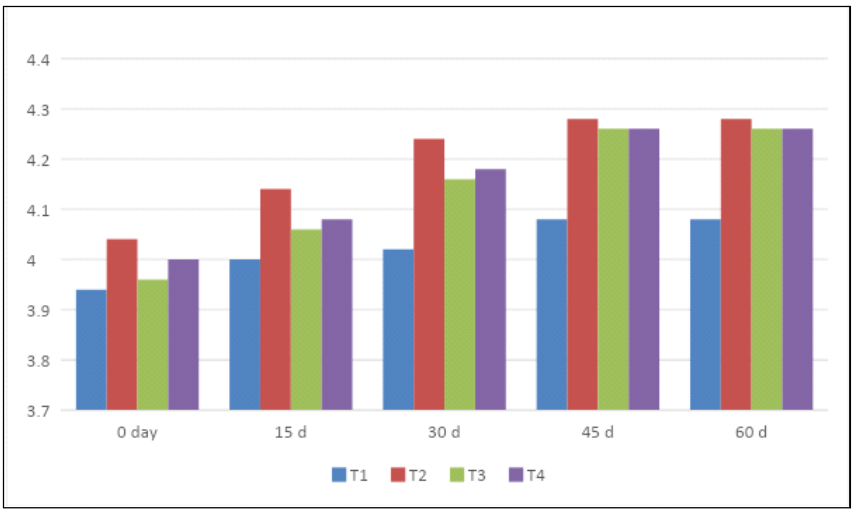


Fig 1: Average daily milk yield (kg) in lactating crossbred cows.

maintenance of enhanced milk production (Sabins *et al.,* 1968; Pandey *et al.,* 2005). Higher feed intake and efficient energy usage due to increased feed digestibility have been cited as reasons for increased milk production (Dalvi *et al.,* 1990; Kumar *et al.,* 2006).

According to Sabins *et al.* (1968), an alcoholic extract of *Asparagus racemosus* root extract increases milk secretion and maintains milk production in weaning rats *via* releasing corticoids and prolactin. According to Mahantra *et al.* (2003), feeding a herbal formulation containing 25% Shatavari considerably increased milk output (25.1%) over control. Many studies (Somkuwar *et al.,* 2005; Tanwar *et al.,* 2008) found that feeding shatavari to buffaloes and crossbred cows increased milk production significantly ($P<0.05$). A similar trend was observed in present work. Sumanth and Narashimaraju (2011) found that supplementing pregnant rats with *Asparagus racemosus* root extract causes microscopic proliferation of mammary gland luminal ducts, which is driven by prolactin hormone. He also reported that prolactin hormone increases milk supply by stimulating the growth of myoepithelial cells and the number of secretory cells in the mammary glands.

Conclusion

In the present experiment, the effects of feeding shatavari (*Asparagus racemosus*) root powder were assessed in terms of quantity of milk, in crossbred cows. The diet led to better results in all supplemented groups *i.e.* T2- 40 gm/day, T3- 80 gm/day and T4- 120 gm/day. Although there was no significant difference between the shatavari supplemented groups, the highest milk production was observed in treatment T3. Hence, it can be concluded that shatavari root powder significantly improved animal productivity by enhancing milk production.

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