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# Effect of *Asparagus racemosus* (Shatavari) Supplementation on Intake and Milk Production in Crossbred Cattle

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**Abstract** The effect of *Asparagus racemosus* supplementation on intake, body condition score, milk production and composition was studied in crossbred cattle. 30 crossbred cattle in mid-lactation were randomly and equally distributed into two groups as control non-supplemented, CS group and A *racemosus* supplemented, AS group. AS group cows were fed *A. racemosus* root powder @ 125 mg/kg body weight per day for a period of 60 days. Dry matter intake (DMI) was higher ($p$<0.01) in AS group in comparison to CS group. The increase in body weight gain was more ($p$<0.01) in AS group than CS group. Body condition score was increased ($p$<0.01) from 3.75 to 4 in AS group during 60 days. *A. racemosus* supplementation stimulated oestrus induction in cows and reduced ($p$<0.01) the service period in AS group. 4% fat corrected milk yield (FCM) yield (kg/day) was higher ($p$<0.01)and increased by 16.94% in AS group over CS group. Milk fat and total solid contents were increased ($p$<0.01) in AS group as compared to CS group, whereas other composition values statistically indifferent from the control. Hence, it was concluted that *A. racemosus* root powder can be supplemented for the improvement of animal performance.

**Keywords** *Asparagus racemosus*, Milk yield, Crossbred cattle.

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## Introduction

Livestock is a vital component of the agriculture sector and involve a pronounced influence on the economy of India. Antibiotics, pre and pro biotic, hormones, methane inhibitors and other additives are being used in animal diet to improve the livestock production. The use of naturally occurring compounds like herbs, herbal preparation and other botanicals are preferred over chemical compounds to satisfy consumer concerns over safety and toxicity and it is becoming a new goal in livestock production [1]. Presently, many herbs such as *Asparagus racemosus, Leptadenia reticulata. Withania somnifera, Arundo donax, Cissampelos pareira, Foeniculum vulgare, Eclipta alba, Solanum nigrumon, Ipomea digitata, Tribulus terrestri, Lepidium sativum, Glycyrrhiza glabra, Cumunum cyminum, Cyterus rotundus, Nigella sativa, Foeniculum vulgare* and *Pulrariatuberose* are used for augmenting milk production [2]. *A racemosus*

(Shatavari) is an important medicinal plant of tropical and subtropical part of India. This plant belongs to Liliaceae family, is common at low altitudes in shade and in tropical climates throughout India, Asia, Australia and Africa [3]. It acts as an adaptogen, antitussive, anti-oxidant, anti-bacterial, immunemodulative, digestive, cyto-protective, galactogogue, anti-oxytocic, anti-spasmodic, anti-diarrhoeal and sexual tonic [4].

Conventionally, *A. racemosus* root powder is used for the productive, reproductive and udder health concerns of livestock in several parts of India. However, precise literature on the beneficial effect of *A. racemosus* supplementation in the diet of dairy cows is insufficient . In view of its significance, the present study was designed to evaluate the effect of *A. racemosus* supplementation on intake, body condition score, oestus induction, milk production and composition.

## Materials and Methods

### Location and climate of the study area

The feeding trial was carried out at dairy farms situated in the Jaipur city of Rajasthan . The altitude of Jaipur city is 432 meters above mean sea level, latitude and longitude position being 26°55′ 19.45″ N and 75°46′ 43.98″ E, respectively. The climate is tropical monsoon with a wet season between June and September and a dry season from November to March.

### Experimental animals and feeding

30 crossbred cattle in mid-lactation were randomly and evenly distributed into two groups as control non-supplemented, CS group and an experimental *A. racemosus* supplemental, AS group, AS group cows were fed *A. racemosus* root powder @ 125 mg/kg body weight per day for a period of 60 days. All the animals were fed ready-made concentrate at the rate of 3.5 kg/animal/day, wheat straw and green foddar at the farm. They were housed in well ventilated shed. Deworming and other health care were performed periodically. Clean drinking water was made available for the animals throughout the experimental period.

### Analytical techniques

Ground samples of wheat straw and concentrate ingredients were analyzed for proximate principles as per standard procedures and fiber fractions were determined as per the standard procedure. The body weights of animals were calculated using Shaeffer's formula fortnightly during the experiment and body condition was assessed by using five point scale 1 to 5 (1 poor and 5 excellent) according to the procedure designed.

### Lactation study

Lactation trial was condcted for 60 days during which observations and data pertaining to performance of animals in terms of milk yield and milk composition were recorded. The daily milk yield of individual cattle was measured in the morning and evening using a digital weighing balance. The milk sample from each animal was collected at fortnightly intervals, pooled proportionally and analyzed for composition *viz.* milk fat, protein, lactose, solid not fat and total solids by automatic milk analyzer (Milco scanner).

### Statistical analysis

Data obtained were subjected to independent sample t-test analysis by using statistical software package SPSS 17.0 (SPSS, Chicago, IL, USA). Treatment means were separated by applying Tukey's test and differences were considered as stastistically significant at $p<0.01$.

## Results and Discussion

Data pertaining to proximate composition of the feed ingredients were presented in Table 1. DMI (kg/day, g/kg W and kg/100 kg BW) was higher ($p<0.01$) in AS group as compared to CS group. It was increased from 111.14 (g/kg $W^{0.75}$) in CS group to 116.28 (g/kg $W^{0.75}$) in AS group (Table 2). Herbs enhance and add flavor in animal feed and can therefore influence eating patterns, secretion of digestive fluids and total feed intake [5]. Similar observations were re-

**Table 1.** Chemical composition of feeds used for the experiment (%).

| Ingredients | Concentrate | Wheat straw |
|---|---|---|
| Dry matter | 90.2 | 92.9 |
| Organic matter | 91.5 | 91.3 |
| Crude protein | 21.2 | 4.0 |
| Ether extract | 3.5 | 1.05 |
| Crude fiber | 10.1 | 40.5 |
| Nitrogen free extract | 56.7 | 45.8 |
| Total ash | 8.5 | 8.7 |

corded in *A. racemosus* supplemented group where the DMI was increased from 8.72 to 9.26 kg/d [6]. Similar findings of increased DMI were also reported by feeding of indigenous galactopoietic feed supplements in crossbred cows [7].

The increase in body weight gain was more ($p$<0.01) in AS group than CS group. In the same way, body condition score was increased ($p$<0.01) from 3.75 to 4 in AS group during the 60 days of the experimental period however, these observations were remainun changed in CS group (Table 2). These results in AS group cows could be attributed to an efficient microbial digestion and anabolic effect of *A. racemosus* corroborating with the findings earlier [6]. The buffaloes of treatment group have lost less BCS as compared to control group on polyherbal galactogogue supplementation [8].

Supplementation of *A. racemosus* stimulated oestrus induction in cows and therefore reduced ($p$<0.01) service period (105.67 ± 2.0 days) in AS group than the CS group (Table 2). The observations obtained in the present study are in agreement with the earlier findings [9] who reported reduced ($p$<0.05) service period in *A. racemosus* supplemented group of Karan Fries crossbred cows. Supplementation of Shatavari (100g on alternate day) postpartum alone led to 100% oestrus and 75% conception in the treatment group as compared to 50% in contol crossbred cow within 90 days of calving [10].

Four % FCM yield (kg/day) was higher ($p$<0.01) and increased by 16.94% in AS group over the CS group (Table 3). Milk fat and total solid contents were higher ($p$<0.01) in AS group as compared to CS group, whereas milk protein, lactose and SNF values were statistically indifferent from the CS group however they were numerically increased (Table 3). Herbs and its metabolites modify the rumen ecosystem and their supplementation can change the normal composition of milk [2]. The mammogenic property of *A. racemosus* on udder may be attributed to enhance milk production. The present findings are corroborated with the earlier findings [11] who observed 8.5% increase in milk production supplemented with herbal galactogogue. Authors Kumar et al. [9] also reported increased average daily milk by 15.82% and significant effect on milk total solid contents and non-significant effect on composition values in *A.racemosus* supplemended group.

**Table 2.** Effect of *A. racemosus* supplementation on intake and performance of lactating cows. [ab]Means with different superscripts in the row differ significantly (p<0.01).

| Observations | CS group | AS group |
|---|---|---|
| No. of cows | 15 | 15 |
| Dry matter intake, kg/day | 9.24±0.005[a] | 9.71±0.015[b] |
| Dry matter intake, g/kg $W^{0.75}$ | 111.14±0.23[a] | 116.28±0.28[b] |
| Dry matter intake, kg/100 kg BW | 2.54±0.007[a] | 2.70±0.008[b] |
| Body weight of cows (kg) | | |
| Initial | 359.60±1.11 | 360.33±1.14 |
| Final | 365.20±1.09[a] | 370.60±1.12b |
| Change in body weight | 5.6 | 10.27 |
| Body condition score (BCS) of cows | | |
| Initial | 3.75±0.05 | 3.75±0.05 |
| Final | 3.75±0.65[a] | 4.00 ±0.005[b] |
| Service period | 140.67±2.0[a] | 105.67±2.0[b] |

**Table 3.** Effect of *A. racemosus* supplementation on 4% FCM yield and milk composition. [ab]Means with different superscripts in the row differ significantly ($p$<0.01).

| Observation | CS group | AS group |
|---|---|---|
| 4 % FCM yield kg/day | 7.85 ± 0.005[a] | 9.18 ± 0.017[b] |
| Fat % | 4.22 ± 0.004[a] | 4.40 ± 0.012[b] |
| Protein % | 3.41 ± 0.007 | 3.42 ± 0.011 |
| Lactose % | 4.86 ± 0.007 | 4.86 ± 0.014 |
| Total solids (TS) % | 13.19 ± 0.013[a] | 13.39 ± 0.022[b] |
| Solid not fat (SNF) % | 8.97 ± 0.012 | 8.99 ± 0.013 |

## Conclusion

Supplementation of *A. racemosus* root powder enhanced feed intake, milk yield, quality and ultimately economy of the farmer. Further, it overcomes the vitamin and mineral deficiency as manifested by reduced service period in AS group. Hence, it was concluded that *A. racemosus* root powder can be supplemented for the improvement of animal performance.

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