

## **Effect Of Dietary Incorporation Of Ksheerabala Residue On Dry Matter Intake And Nutrient Digestibility In Crossbred Calves**

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### **Abstract**

An experiment was conducted with twelve weaned crossbred calves of one month of age for 90 days to assess the effect of dietary incorporation of Ksheerabala residue on average daily dry matter intake and nutrient digestibility. Calves were divided into two groups (T1 and T2) as uniformly as possible with regard to age, sex and body weight and were offered calf starter containing Ksheerabala residue at 0 and 40 per cent, respectively. Calf starters were made isonitrogenous and isocaloric (24 per cent CP and 70 per cent TDN) and calves were fed as per ICAR standards. Green grass was offered as the sole source of roughage. Data on average daily dry matter intake and digestibility of nutrients were the criteria employed for evaluation. Average daily dry matter intake did not show any significant difference ( $P > 0.05$ ) among the groups. Digestibility of crude protein and ether extract were significantly improved in T2. It could be inferred that Ksheerabala residue can be incorporated at 40% level in calf starter without any adverse effect on dry matter intake and nutrient digestibility.

**Key words:** Ksheerabala residue, Crossbred calves, Calf starter, dry matter intake, digestibility.

### **INTRODUCTION**

Kerala, as famous for ayurveda, has various ayurvedic pharmaceuticals and byproducts from these pharmaceuticals mainly composed of residues of medicinal herbs. Ksheerabala residue is a byproduct obtained during the preparation of ksheerabala oil which is made by incorporating *Sidacordifolia*, cow milk and gingelly oil. This residue is available in considerable quantity and many of the farmers are

using this byproduct for feeding goats. The feeding value of these residues as potential non conventional feed resource (NCFR) are yet to be explored. The main problem with residues from ayurvedic products are their impalatability and probable cumulative toxic effects. As in any ruminant, the microflora in the rumen of cattle can utilize the fibrous residues in the byproducts of ayurvedic preparations and can possibly detoxify the intrinsic factors present in these residues to some extent. Hence the present study is planned to evaluate the effect of dietary incorporation of Ksheerabala residue as a NCFR in the diet of calves on dry matter intake and nutrient digestibility.

## **MATERIALS AND METHODS**

Twelve healthy cross bred calves of fifteen days of age, selected from University Livestock Farm, College of Veterinary and Animal Sciences, Mannuthy, formed the experimental subjects for the study. Calves were housed individually in well ventilated, clean and dry pen with facilities for feeding and watering. The calves were divided into two groups of six animals each as uniformly as possible with regard to age, sex and body weight and were allotted randomly to two treatments T<sub>1</sub> (calf starter) and T<sub>2</sub> (calf starter containing 40 per cent ksheerabala residue). All the rations were made isonitrogenous and isocaloric (24 per cent CP and 70 per cent TDN). Proximate composition of Ksheerabala residue is presented in Table 1. The ingredient and chemical composition of experimental rations are presented in Table 2.

Weighed quantity of calf starter was given in the forenoon and fresh green grass was fed in the afternoon to the calves throughout the experimental period. Individual data on quantities of calf starter and green grass offered daily were recorded. The left over portion of the calf starter and green grass were weighed daily and their moisture content was analyzed to calculate the dry matter intake. Body weights of all the calf were recorded at fortnightly intervals. Based on the body weight, feed and fodder allowances were reviewed fortnightly. Calves were fed as per ICAR standard (Ranjhan, 1998) and maintained on their respective feeding regime for a period of three months.

A digestibility trial involving five days collection period was conducted at 12<sup>th</sup> week of the study period to assess the digestibility coefficient of nutrients. Representative samples of calf starter and green grass offered were taken daily during the digestion trial for chemical analysis. The balance of feed and grass samples were collected from individual animals and their moisture content was determined daily. At the end of the collection period feed samples collected daily were pooled and subjected to chemical analysis. The dung was collected manually as and when it was voided. All precautions were taken to collect the dung quantitatively, uncontaminated with urine, feed residue or dirt. The dung collected each day was weighed accurately and were kept in double lined air tight plastic bags and stored fresh in deep freezer during the entire collection period. At the end of collection period daily samples stored from each animal were pooled and used for chemical analysis. Calf starter, fodder and dung samples were analyzed for proximate principles (AOAC, 1990). The acid detergent fiber (ADF) was

estimated by the method suggested by Van Soest (1963) and neutral detergent fiber (NDF) by the method suggested by Van Soest and Whine (1967).

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## RESULT AND DISCUSSION

**Table 1. Proximate composition of Ksheerabala residue**

|                         |       |
|-------------------------|-------|
| Dry matter              | 92.55 |
| Crude protein           | 29.52 |
| Ether extract           | 13.26 |
| Crude fibre             | 6.39  |
| Total ash               | 8.42  |
| Nitrogen Free Extract   | 42.41 |
| Acid insoluble ash      | 0.06  |
| Neutral detergent fibre | 33.34 |
| Acid detergent fibre    | 14.21 |

**Table 2. Ingredient and chemical composition of calf starters, %**

| Ingredients composition     | T1     | T2     |
|-----------------------------|--------|--------|
| Maize                       | 35     | 24     |
| Wheat bran                  | 25     | 20     |
| Soya bean meal              | 28     | 10     |
| Dried fish                  | 9      | 3      |
| Ksheerabala residue         | 0      | 40     |
| Salt                        | 1      | 1      |
| Mineral mixture             | 2      | 2      |
| Total                       | 100.00 | 100.00 |
| <b>Chemical composition</b> | T1     | T2     |
| Dry matter                  | 91.93  | 91.90  |
| Crude protein               | 24.34  | 24.71  |
| Ether extract               | 4.23   | 5.98   |
| Crude fibre                 | 5.36   | 6.98   |
| Total ash                   | 6.67   | 7.25   |
| Nitrogen free extract       | 59.4   | 55.08  |
| Acid insoluble ash          | 2.34   | 2.58   |

**Table 3. Fortnightly average of daily dry matter intake\* of calves maintained on two experimental rations, kg**

| Fortnight | T1            | T2            |
|-----------|---------------|---------------|
| 1         | . 51 ±. 51    | . 56 ±. 38    |
| 2         | . 65±. 78     | . 75 ±. 51    |
| 3         | 1. 04 ± 1. 2  | 1. 27 ±. 86   |
| 4         | 1. 33 ± 1. 57 | 1. 59 ± 1. 07 |
| 5         | 1. 65 ± 1. 96 | 1. 87 ± 1. 02 |
| 6         | 1. 75 ± 2. 19 | 1. 91 ± 1. 28 |

\*T1 and T2-mean of six values

**Table4. Apparent digestibility coefficient of nutrients\* of the two experimental rations, %**

| Parameter             | T1                          | T2                          |
|-----------------------|-----------------------------|-----------------------------|
| Dry matter            | 77. 26 ±. 2744              | 77. 43 ±. 111               |
| Crude protein         | 81. 06 ±. 1687 <sup>a</sup> | 82. 34 ±. 0952 <sup>b</sup> |
| Crude fibre           | 54. 97 ±. 169               | 54. 63±. 0979               |
| Ether extract         | 85. 61 ±. 2475 <sup>a</sup> | 86. 41 ±. 1148 <sup>b</sup> |
| Nitrogen free extract | 83. 16 ±. 2696              | 83. 63±. 1652               |
| NDF                   | 56. 47 ±. 1433              | 56. 58 ±. 1556              |
| ADF                   | 50. 94 ±. 3405              | 50. 75 ±. 3058              |

\*T1 and T2-mean of six values a, b-Means with different superscripts within the same row differ significantly Significant ( $P < 0. 05$ )

The average daily DMI of calves belonging to dietary treatments T1 and T2 at fortnightly intervals ranged from 0. 51 to 0. 56, 0. 65to 0. 75, 1. 04 to 1. 27, 1. 33to 1. 59, 1. 65 to 1. 87 and 1. 75 to 1. 91kg respectively. There was no significant difference ( $P > 0. 05$ ) in average daily dry matter intake between two dietary treatments. These results were in agreement with Babuet *al* (2003), Neelamet *al* (2006), Ramniwaset *al* (2013), Roshma (2014), Sarkeret *al* (2010)and Vinu(2012). Digestibility of dry matter (DM), crude protein(CP), crude fibre(CF), ether extract(EE), nitrogen free extract (NFE), NDF and ADF observed in the present study were 77. 26 and 77. 43, 81. 06 and 82. 34, 54. 97 and 54. 63, 85. 61 and 86. 41, 83. 16 and 82. 63, 56. 47 and 57. 58, 50. 94 and 50. 75 per cent in T<sub>1</sub> and T<sub>2</sub> calves, respectively and statistical analysis revealed significant difference between the groups in their digestibility of CP and EE (Table 3). Whereas the digestibility of DM, CF, NFE, ADF, and NDF did not differ significantly. Neelamet *al* (2006) reported comparable digestibility coefficient of nutrients for buffalo calves fed herbal feed additives. Ramniwaset *al* (2013) and Sarkeret *al* (2010) also observed similar digestibility coefficient of nutrients in crossbred calves.

## CONCLUSION

Critical evaluation of the results obtained in the present study revealed that inclusion of Ksheerabala residue in calfstarter had similar effect on drymatter intake. Dietary incorporation of Ksheerabala residue in crossbred calves improved digestibility of CP and EE. On summarizing the overall results of the study, it could be inferred that Ksheerabala residue can be included in the calf ration up to 40 per cent level without any adverse effect on nutrient digestibility and dry matter intake.

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