EFFECT OF DIETARY INCORPORATION OF NUTRACEUTICAL 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 nutraceutical 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 nutraceutical residue at 0 and 20 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 feeding standard (2013). Green grass was offered as the sole source of roughage. Data on average daily dry matter intake and digestibility of nutrients were taken. Average daily dry matter intake and digestibility did not show any significant difference (P >0.05) between the groups. It could be inferred that alfalfa pellet can be incorporated at 20% level in calf starter without affecting dry matter intake and nutrient digestibility.

Key words: *Nutraceutical residue, crossbred calves, calf starter, dry matter intake, digestibility*.

Calf starter is formulated to promote growth of the calves by hastening the rumen development. For obtaining optimum growth rate in calves both quality and quantity of protein in feed is very important. Fishmeal is being commonly incorporated as source of animal protein in their feeds. In India, fish protein available for livestock feed is unsalted dried fish and is usually the leftover of human market. Moreover, unsalted dry fish is prone to autolytic, lipolytic, and microbial spoilage and may lodge harmful pathogens which are dangerous for the calves. Apart from that, proteins from plant sources are also poorer in quality due to adulteration.

In such scenario, there is a need for alternate source of protein in the diet of calves. There are plenty of protein residues available from nutraceutical industries and alfalfa pellet is one among them. This nutraceutical residue (alfalfa pellet) contains 48 to 53 per cent crude protein and it can be used as a good alternative source of protein in calf starter. Hence, this research work is planned to determine the effect of feeding nutraceutical residues (alfalfa pellets) on growth performance and nutrient utilization in crossbred calves.

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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 T1 (calf starter without nutraceutical residue) and T2 (calf starter containing 20 per cent nutraceutical residue). Both the rations were made isonitrogenous and isocaloric (24 per cent CP and 70 per cent TDN). Proximate composition of nutraceutical residue is presented in Table 1. The ingredient and chemical composition of experimental rations are presented in Table 2. Calves were fed as per ICAR standard (2013) and maintained on their respective feeding regime for a period of three months.

Weighed quantity of calf starter was given in the morning and fresh green grass was fed in the afternoon to the calves throughout the experimental period of three months. 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 calves were recorded at fortnightly intervals. Based on the body weight, feed and fodder allowances were reviewed fortnightly.

A digestibility trial involving five days collection period was conducted at 12th week of the study period to assess the digestibility coefficient of nutrients by total collection method. 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, 2012). The acid detergent fibre (ADF) was estimated by the method suggested by Van Soest (1991) and neutral detergent fibre (NDF) by the method suggested by Van Soest and Whine (1967). Data gathered on various parameters were analyzed statistically using Analysis of Variance (Snedecor and Cochran, 1994).

Results and Discussion

The average daily DMI of calves belonging to dietary treatments T1 and T2 at fortnightly intervals ranged from 0.51 to 0.55, 0.65to 0.72, 1.04 to 1.23, 1.33to 1.46, 1.65 to 1.78 and 1.75 to 1.88kg 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 Babu *et al* (2003), Rani *et al* (2006), Sarker *et al* (2010), Vinu (2012), Ramniwas *et al* (2013) and Roshma (2014).

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

Table 1. Proximate composition of nutraceutical residue (On percentage basis)

Parameter	Per cent
Dry matter	92.55
Crude protein	48.2
Ether extract	3.46
Crude fibre	12.78
Total Ash	5.42
Nitrogen Free Extract	30.14
Acid insoluble ash	1.23
Neutral detergent fibre	28.45
Acid detergent fibre	16.21

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

Ingredients composition	T1	T2
Maize	35	34
Wheat bran	25	30
Soya bean meal	28	10
Dried fish	9	3
Nutraceutical residue	0	20
Salt	1	1
Mineral mixture	2	2
Total	100.00	100.00
Chemical composition (%)	T1	T2
Dry matter	91.93	91.90
Crude protein	24.34	24.92
Ether extract	4.23	4.54
Crude fibre	5.36	5.43
Total ash	6.67	7.21
Nitrogen free extract	59.4	57.9
Acid insoluble ash	2.34	2.65

78.16, 81.06 and 81.24, 54.97 and 54.79, 85.61 and 85.29, 83.16 and 83.51, 56.47 and 56.45, 50.94 and 51.48 per cent in T_1 and T_2 calves, respectively and statistical analysis revealed no significant difference between the groups in their digestibility of nutrients (Table 3). Rani *et al.* (2006) reported comparable digestibility coefficient of nutrients for buffalo calves fed herbal feed additives. Sarker *et al.* (2010) also observed similar digestibility coefficient of nutrients in crossbred calves, whereas Khir *et al.* (2007), Sirohi *et al*. (2012) Ramniwas *et al.* (2013) reported significant increase in dry matter digestibility of calves fed herbal nutraceutical residue.

On summarizing the overall results of the study, it could be inferred that nutraceutical residue (alfalfa pellet) can be included in the calf ration up to 20 per cent level without any adverse effect on dry matter intake and nutrient digestibility.

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

Fortnight	T1	T2
1	0.51 ± .51	0.55 ± .37
2	0.65± .78	0.72 ± .49
3	1.04 ± 1.2	1.23 ± .83
4	1.33 ± 1.57	1.46 ± .99
5	1.65 ± 1.96	1.78 ± 1.2
6	1.75 ± 2.19	1.88 ± 1.23

*T1 and T2- mean of six values

Table 4. Apparent digestibility coefficient of nutrients of the two experimental rations, %

Parameter	T1	T2
Dry matter	77.26 ± .27	78.16 ± .22
Crude protein	81.06 ± .17	81.24 ± .23
Crude fibre	54.97 ± .16	54.79± .24
Ether extract	85.61 ± .24	85.29 ± .21
Nitrogen free extract	83.16 ± .27	83.51± .16
NDF	56.47 ± .14	56.45 ± .15
ADF	50.94 ± .34	51.48 ± .09

*T1 and T2- mean of six values .Non significant (P>0.05)

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