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Effect of feeding Ksheerabala residue on growth and economics of production in Malabari kids

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Abstract

A feeding trial was done in 18 Malabari kids of 3 months of age (average body weight of 8.29 ± 0.81kg) for a period of 90 days to assess the effect of dietary incorporation of Ksheerabala residue on growth performance and economics of production. Kids were randomly allotted into three dietary treatments (T_1, T_2 and T_3) and were fed with kid starter containing Ksheearabala residue at 0, 10 and 20 per cent, respectively. Kid starters were made isonitrogenous and isocaloric (24 % CP and 70% TDN) and were fed as per ICAR standards (ICAR, 2013). Green grass (Hydrid Napier) was fed as source of roughage. Data on body weight gain, daily dry matter consumption, feed conversion efficiency and economics of production of the experimental kids were recorded. Average daily gain (82 and 73 g) and feed conversion efficiency (4.49 and 4.80) were found to be similar in up T_1 and T_3 groups , however in T_2 group the gain (54 g) and FCR (6.19) was significantly lower than T_1 and T_3. Feed cost per kg gain was found to be lowest (Rs. 80.85) for group T_3. It could be concluded that Ksheerabala residue can be incorporated in kid starter at 20 per cent level without affecting the growth performance of kids and it is more profitable.

Key words: *Ksheerabala residue, kid starter, growth, economics*

Increase in feed ingredient prices and the scarcity of grains are the most important constrains hindering animal production sector in India. Moreover, insufficient production of farm crops to meet the needs of both humans and their domestic animals leads to competition between man and animals for these feed ingredients. This has enforced animal nutrition researchers to

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intensify their research into the feeding values of potentially useful and easily available non-conventional feed resources. Though various agro industrial by-products and crop residues are being used in animal feeds to reduce feed cost, the potential of by-products from ayurvedic pharmaceuticals has not been explored so far. Ksheerabala residue is a by-product obtained during the manufacturing of Ksheerabala oil which is prepared by combining *Sida cordifolia*, cow milk and gingelly oil. This residue is available in plenty, free of cost, but the level of inclusion and the effect of Ksheerabala residue on growth in kids are not yet studied. Hence the present study was done to evaluate the effect of dietary incorporation of Ksheerabala residue as a nonconventional feed in the ration of kids on their performance.

Materials and methods

Eighteen healthy kids of three months of age were selected from University Goat and Sheep farm, College of Veterinary and Animal Sciences, Mannuthy as the experimental animals and were housed individually in well - aired, hygienic and dry shed with amenities for feeding and watering. The kids were allotted randomly in to three dietary treatments, T_1 (kid starter), T_2 (kid starter containing 10 per cent ksheerabala residue) and T_3 (kid starter containing 20 per cent ksheerabala residue). All the rations were made isonitrogenous and isocaloric (24 % CP and 70 % TDN).

Kid starter was offered in the forenoon and green grass (Hydrid Napier) was fed in the afternoon after weighing. Daily feed offered and left-over portion of the kid starter and green grass were recorded and moisture content was evaluated to calculate the dry matter intake. Body weights of animals were recorded at fortnightly intervals. Kids were fed as per ICAR standard (ICAR, 2013) and kept on their respective feeding regime for three months.

Kid starter, fodder and dung samples were evaluated for proximate principles (AOAC, 2012). The acid detergent fiber (ADF) was determined by the method suggested by Van Soest (1963) and neutral detergent fiber (NDF) by the method suggested by Van Soest and Whine (1967). Data collected on various parameters were statistically analysed using Analysis of Variance (Snedecor and Cochran, 1994). Cost of feeding per kg body weight gain was worked out. Proximate composition of Ksheerabala residue is depicted in Table 1. The ingredient and chemical composition of rations are depicted in Table 2.

Results and discussion

Growth

Data on the average body weight of kids belonging to groups T_1, T_2 and T_3 recorded at fortnight intervals (Table 2) revealed that the kids of all the three groups recorded similar pattern of gain, without any significant difference ($P > 0.05$). Kids of T_1, T_2 and T_3 had a cumulative weight gain of 6.39, 4.23 and 5.67 kg and an average daily body weight gain (ADG) of 82, 54 and 73g/d, respectively (Table 4). Statistical analysis of the data revealed that T2 group had significantly ($P < 0.01$) lower total gain and average daily gain compared to T_1 and T_3. The result in this study indicates that inclusion of Ksheerabala residue at 10 per cent level in kid starter ration reduced the growth rate of kids but at 20 per cent inclusion was comparable with that of control group.

Rani *et al.* (2016) observed similar daily gain in crossbred calves fed starter diets with dietary inclusion of Ksheerabala residue at 40 per cent level and control group. In contrary to the results, Obeidat and Gharaybeh (2011) observed higher weight gain in kids fed diet containing 10 per cent sesame hull compared to control diet with zero per cent sesame hull.

Table 1. Proximate composition of Ksheerabala residue

Nutrients	%
Dry matter (DM)	92.55
Crude protein (CP)	29.52
Ether extract (EE)	13.26
Crude fibre (CF)	6.39
Total ash (TA)	8.42
Nitrogen Free Extract (NFE)	42.41
Acid insoluble ash (AIA)	0.06

Table 2. Ingredient and chemical composition of kid starters, with dietary incorporation of ksheerabala residue at different levels

Ingredients, %	Percentage composition of kid starter		
	T_1	T_2	T_3
Maize	35	29	23
Wheat bran	25	26	28
Soya bean meal	28	23	17
Dried fish	9	9	9
Ksheerabala residue	0	10	20
Salt	1	1	1
Calcite	2	2	2
Total	100.00	100.00	100.00
Chemical composition			
Dry matter (DM)	92.19	91.73	91.93
Crude protein (CP)	23.74	23.99	24.51
Ether extract (EE)	4.95	5.38	6.04
Crude fibre (CF)	5.43	5.71	6.08
Total ash (TA)	9.72	10.07	10.41
Nitrogen free extract (NFE)	55.65	54.84	52.87
Acid insoluble ash (AIA)	1.11	1.23	1.28
Neutral detergent fibre (NDF)	22.34	22.83	25.84
Acid detergent fibre (ADF)	6.61	7.81	9.48
Calcium	1.03	1.12	1.18
Phosphorus	0.65	0.70	0.86

Table 3. Fortnightly average body weight of experimental kids fed diets containing ksheerabala residue

Fortnights	Dietary treatments		
	T_1	T_2	T_3
0	8.27 ± 0.58	8.39 ± 0.66	8.23 ± 1.25
1	9.31 ± 0.64	9.24 ± 0.68	9.01 ± 1.44
2	10.37 ± 0.59	9.83 ± 0.68	10.05 ± 1.59
3	11.00 ± 0.53	10.36 ± 0.63	11.19 ± 1.75
4	12.42 ± 0.53	11.42 ± 0.69	12.26 ± 1.83
5	13.34 ± 0.5	11.89 ± 0.73	13.29 ± 1.72
6	14.66 ± 0.63	12.63 ± 0.77	13.91 ± 1.72

Table 4. Growth rate, feed efficiency and cost of feeding per kg gain of kids fed with ksheerabala residue

Parameters	T_1	T_2	T_3
Initial body weight (kg)	8.27 ± 0.58	8.39 ± 0.66	8.23 ± 1.25
Final body weight (kg)	14.66 ± 0.63	12.63 ± 0.77	13.91 ± 1.72
Total weight gain (kg)	6.39 ± 0.13^{a}	4.23 ± 0.23^{b}	5.67 ± 0.54^{a}
Average daily gain (g)	82 ± 0.002^{a}	54 ± 0.003^{b}	73 ± 0.01^{a}
Total dry matter consumed (kg/calf)	28.7 ± 0.89	26.17 ± 1.58	27.26 ± 2.94
Average daily dry matter consumed (kg/calf)	0.37 ± 0.01	0.34 ± 0.02	0.35 ± 0.04
Feed efficiency	4.49 ± 0.13^{a}	6.19 ± 0.21^{b}	4.8 ± 0.26^{a}
Cost per kg gain (Rs.)	91.97	115.92	80.85

Dry matter intake

There was no significant difference in the average daily dry matter intake (DMI) and total DMI and the values were 0.37, 0.34 and 0.35kg and 28.70, 26.17 and 27.26 kg respectively for T_1, T_2 and T_3 (Table 4). The result of present study is in agreement with Bambidis *et al*. (2005) who observed no significant difference in DMI of lambs which were fed with diet containing garlic bulb at zero, three and six per cent level. The results are in contrast with that of Rani *et al* (2016) and Sheethal *et al* (2016) who reported higher DMI in growing kids fed Ksheerabala residue at 40 per cent level inclusion.

Feed conversion efficiency

Feed conversion efficiency of experimental kids was 4.49, 6.19 and 4.80, respectively for T_1, T_2 and T_3 (Table 4) and statistical analysis of the data revealed that kids of T_3 had significantly lesser feed conversion efficiency ($P < 0.01$) compared to T_1 and T_3. From the results it can be inferred that inclusion of Ksheerabala at 10 per cent level in kid starter ration reduced the feed conversion efficiency but at 20 per cent level, feed conversion efficiency was similar to that of control group. In contrast to this findings, Jasmine *et al.* (2017) reported higher FCR (9.2) in kids fed starter diets containing rosemary residue.

Economics of gain

The cost of feed per kilogram body weight gain of kids maintained on dietary treatments T_1, T_2 and T_3 were Rs. 91.97, 115.92 and 80.85, respectively (Table 4). This result indicates that, kid starter containing 20 per cent Ksheerabala residue supported growth of kids similar to that of control ration and it is more economical.

Conclusion

Critical assessment of the results attained in the present study revealed that dietary incorporation of Ksheerabala residue at 10 per cent level in kid starter ration significantly reduced growth rate and feed conversion efficiency but at 20 per cent level, kids had similar growth rate as that of control group. Also, economics of production was lowest for kids maintained on kid starter containing 20 per cent Ksheerabala residue. From the overall results it can be concluded that inclusion of Ksheerabala residue at 20 per cent level in kid starter ration provided satisfactory growth rate and better profit.

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