EFFECT OF FEEDING OF HYDROPONIC FODDER MAIZE AS PARTIAL PROTEIN SUPPLEMENT ON GROWTH PERFORMANCE IN KIDS

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Received: 15.12.16 Accepted 27.12.16

ABSTRACT

The study was undertaken to assess the effect of feeding hydroponic fodder maize on growth performance of Malabari kids. Twelve healthy weaned kids selected from University Goat and Sheep farm, College of Veterinary and Animal Sciences, Mannuthy, formed the experimental subjects for the study. Kids were divided into two groups (T_1 and T_2) as uniformly as possible with regard to age, sex and body weight. The control group (T_1) was fed with a standard kid starter (24 % CP and 70 % TDN) and the treatment group T_2 was fed with kid starter in which 30 per cent CP was replaced with maize hydroponic fodder and all the kids were fed with hybrid napier (*ad libitum*) as roughage. Feeding trial was conducted for a period of 45 days. Result of the experiment showed that hydroponic fodder maize fed group had a similar dry matter intake (DMI) and body weight gain as that of control group. These finding suggest that 30 per cent crude protein of kid starter can be replaced with the hydroponic maize fodder without affecting growth and drymatter intake.

Keywords: Kids, hydroponics fodder, dry matter intake, body weight gain.

INTRODUCTION

The use of improved feeds and feed resources in animal production systems is the need of the hour as the human population is ever growing. In addition, over exploitation of soil resources has caused in wide land degradation. The denuded grasslands, pastures and forests are the major source of herbage for livestock. The decreasing pasture availability and increasing use of grazing lands for crop production has necessitated the improvement of feeding systems. Feeding systems based on improved feeding practices will help to maintain the body conditions of animals, increase their resistance to diseases and nutrition-related problems and thus to increase animal productivity and rural income opportunities. Hydroponic fodder is an emerging area in this regard.(Naik *et al.,* 2014). The method of growing plants without soil using bare minimum quantity of water is known as hydroponics and it is easier to harvest and hence need less labour. Weeds and other

pesticide free nutritious fodder can be cultivated within a short period of time by this method. Research in evaluation of the nutritive value of the hydroponic fodder as a partial replacement for protein in kid ration is very scanty. With increased pressure on farm lands to produce increasing needs of food grains, supply of hydroponic fodder can partially replace the amount of feed required by the animal. Hence, this research work is planned to evaluate the nutritive value of hydroponic fodder and effect of partial replacement of concentrate in kid rations.

MATERIALS AND METHODS

Hydroponic maize fodder production

Hydroponic maize fodder produced in a hydroponic chamber measuring about 14ft× 5 ft × 6 ft with a daily production capacity of 25 kg and equipped with automatic spraying system of water. After 6 hours soaking, clean maize seeds were transferred to gunny bag and kept for 12 hours. Two kg of these seeds were loaded on a plastic tray of 4 ft × 2 ft. Inside the green house hydroponic fodder was allowed to grow for 9 days and was fed to the kids on tenth day.

Feeding trial

Twelve healthy kids of three months of age, selected from University Goat and Sheep farm, College of Veterinary and Animal Sciences, Mannuthy, formed the experimental subjects for the study. Kids were weaned and housed individually in well ventilated, clean and dry pens with facilities for feeding and watering. The kids were divided into two groups of six animals each as uniformly as possible with regard to age, sex and body weight. T_1 (Control) group was fed with kid starter and *ad libitum* hybrid napier, while T_2 (treatment group) was fed with kid starter of which 30 per cent protein replaced with hydroponic maize fodder and *ad libitum* hybrid napier. All the rations were made isonitrogenous and isocaloric (24 per cent CP and 70 per cent TDN). Proximate composition of hydroponic fodder is presented in table 1. The ingredient and chemical composition of experimental rations are presented in table 2.

Weighed quantities of kid starter and fresh green grass were given in the morning and afternoon, respesctively to the kids throughout the experimental period. Individual data on quantities of kid starter and green grass offered daily were recorded. The left over portion of the kid starter and green grass were also weighed daily and their moisture content was analyzed to calculate the dry matter intake. Body weight of all the kids was recorded fortnightly. Based on the body weight, feed and fodder allowances were reviewed fortnightly. Kids were fed as per ICAR (2013) feeding standard and maintained on their respective feeding regime for a period of 45 days.

Kid starter and fodder samples were analyzed for proximate principles (AOAC, 2012). Data gathered on various parameters were analyzed statistically using Analysis of Variance (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

The nutrient contents of the concentrate mixture, hydroponic maize fodder and hybrid napier are shown in table 1. It could be noted that dry matter (DM), crude protein, total ash and AIA content were higher in kid stater compared to hydroponic fodder maize but NFE, Crude fiber and ether extract contents were higher in hydroponic fodder compare to kid starter. There was 27 to 30 cm of shoot length and roots were forming like a mat with embeded seeds at nineth day of cultivation. The growth of hydroponic fodder noted in the present study was similar to that recorded by Naik *et al*. (2015). Similarly, Gunasekaran *et al*. (2016) also found that the height of the hydroponics maize fodder was 27.00± 0.40 cm on ninth day of sprouting.

Table 1. Chemical composition of feeds (% DM basis)

Parameter	Kid Starter	Hydroponic maize fodder	Hybrid napier
Dry matter	91.70	17.97	17.51
Crude protein	23.82	12.89	11.57
Ether extract	2.80	3.45	3.09
Crude fibre	6.80	17.24	26.17
Total ash	5.92	2.93	6.6
Nitrogen Free Extract	52.36	61.57	53.38
Acid insoluble ash	3.37	0.53	1.59

The fortnightly average body weight of experimental kids were presented in Table 2. Data on the average body weight of kids belonging to groups T_1 and T_2 revealed that the kids of both the groups recorded normal pattern of growth, without any significant difference ($p>0.05$) in any of the fortnights. Similar observations were recorded by Fazaeli *et al*. (2012). Kids of T_1 and T_2 had a cumulative weight gain of 2.12 and 2.38 kg, respectively and an average daily body weight gain (ADG) of 37.85 and 42.50 g, respectively (Table 3). Statistical analysis of the data revealed that T_2 group had comparable growth with that of control group. Similar observations were also recorded by Fayed (2011) in lambs and Helal (2015) in goats when fed with hydroponic barley fodder.

The average dry matter intake was 173 g for T_1 and 177 g on T_2 and there was no

Table 2. Fortnightly average body weight of experimental kids, kg

Fort night	T_1	T_2
1	4.7 ± 0. 64	4.83 ± 0.68
2	5.26 ± 0.59	5.50 ± 0.68
3	5.81 ± 0.53	6.13 ± 0.63
4	6.82 ± 0.53	7.21 ± 0.63

Average of six values with SE

Table 3 . Dry matter intake and body weight gain of experimental kids

Parameter	T_1	T_2
Initial Body weight(kg)	4.7± 0.64	4.83± 0.68
Final bodyweight(kg)	6.82± 0.53	7.21± 0.63
Total weight gain(kg)	2.12± 0.07	2.38± 0.05
Average daily gain(g)	37.85± 8.05	42.50± 2.33
Average DM intake(g)/day	173.00± 17.64	177.05± 15.33

Average of six values with SE

significant difference between them. Naik *et al*. (2014) reported no significant difference in DM intake between hydroponic fodder and conventional fodder fed groups. Singh and Chaudary (2007) reported increase drymatter consumption in maize hydroponic fodder supplemented group. On contrary, Fazaeli *et al*. (2012) found that the DM intake was significantly lower in treatment group fed with hydroponic barley fodder than those fed control diet.

CONCLUSION

On conclusion, feeding of hydroponic maize fodder as a partial feed substitute of kid starter on protein basis at 30 per cent level maintains the growth performance of kids compared to those fed with control diet. From this result, it can be concluded that hydroponic maize fodder can effectively substitute up to 30 per cent of protein in kid starter without compromising the growth performance.

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