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RESEARCH ARTICLE

STUDY OF DIGESTIBILITY COEFFICIENT OF PROXIMATE NUTRIENTS AND FEED CONVERSION EFFICIENCY OF GOATS FED SOLELY ON TREE LEAVES AND GREEN FORAGE

*Vivekin Pachauri, Singh, A. K. and Tripathi, A. K.

Jawaharlal Nehru Krishi Vishwa Vidyalaya, Krishi Vigyan Kendra, Sagar - 470 002 (MP), India

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ABSTRACT

An experiment was conducted with fifteen healthy goat's kid of 4-6 month of age and divided into three groups. Experimental feeding was done for 90 days during which a metabolic trial was conducted. At the end of 45 days feeding of tree leaves *Albizia lebbek*, *Ficus glomerata* and *Sorghums sudanense*, the results indicated that the requirement of crude protein and calcium have been made adequately. The weekly body weight gain was 152.52 ± 3.12 , 152.52 ± 3.12 , 180.54 ± 3.82 gram, whereas, the daily body weight gain was 21.78 ± 0.44 , 21.78 ± 0.44 , 25.78 ± 0.54 gram in groups I, II and III respectively, showing a significant difference. Feed gain ratio (g/day) revealed that the group II animals fed with (Dumer) *Ficus glomerata* tree leaves as a sole feed had the highest feed conversion efficiency (2.6:1 g) followed by the group I (Series) *Albizia lebbek* showed (3.22:1 g) while the group III (Sudan grass) *Sorghums sudanense* had the lowest feed conversion efficiency (4.61:1 g).

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INTRODUCTION

Ruminants play a significant role in the conversion of low quality plant material (Agriculture by products/waste, tree etc.) into high quality protein rich food besides playing a greater role in conserving the fertility of soil, through organic manure. Since feed resources are the major limiting factor in exploiting the genetic potential of livestock. Indian's goat population is 120.6 millions which is 17.1% of the world's population and contributed nearly 7% towards its national income. Under the scenario of increasing livestock population and concomitant shrinkage of grazing land it is becoming difficult to maintain small ruminants on extensive range management alone. Incorporation of fodder tree/shrubs, having multifaceted utility on the grazing land substantially adds to availability of feed resources during lean season besides helping in eco-conservation. To explore the possibility regarding usage of these feed resources as animal feeds it is essential to have a knowledge of their nutritional value. The objectives of present study is to find out the potential feeding value of tree leaves Series (*Albizia lebbek*) and Dumer (*Ficus glomerata*) and to compare them with sudan grass by feeding the growing kids with the following objectives:

1. To study digestibility coefficient of prominent nutrients of tree leaves and sudan grass by kids.
2. To study the feed conversion efficiency of the kids.

*Corresponding author: Singh, A. K.

Jawaharlal Nehru Krishi Vishwa Vidyalaya, Krishi Vigyan Kendra, Sagar - 470 002 (MP), India.

MATERIALS AND METHODS

For the present study 15 healthy kids of about 4-6 months of age with a body weight ranging from 10-15 kg were selected. The kids of group I and II were fed with adlib Series (*Albizia lebbek*) and Dumer (*Ficus glomerta*) tree leaves respectively whereas the kids of group III were fed with Sudan grass (*Sorghum sudanense*). The feeding of kids was continued for a period of 90 days. At the end of 45 days feeding, a metabolic trial was conducted for 6 days on all the kids to study the intake, utilization of nutrients and balance of Nitrogen, Calcium and Phosphorus. The representative samples of the feed offered and the residue left during the metabolism trial were collected for six days, for the determination of dry matter intake and proximate principles as per the methods of AOAC and also pooled for further chemical analysis.

RESULTS

The Digestibility coefficient of the experimental animals in all the three groups of dry matter DM was 55.15 ± 0.949 , 54.188 ± 0.980 , 59.34 ± 0.735 present in group I, II and III respectively from original the treatment was found to be highly significant. The digestibility of organic matter was 55.35 ± 2.69 , 54.05 ± 4.08 , 64.66 ± 0.83 percent in group I, II and III respectively. There was a highly significant difference in the Digestibility coefficient of organic matter among all the 3 groups. The Digestibility of crude protein was 69.47 ± 1.10 , 68.67 ± 0.42 , 69.63 ± 0.84 in group I, II and III respectively with a non significant difference among the 3 groups. There was no

significant difference in the Digestibility of Ether extract and the values were 56.81 ± 0.80 , 53.61 ± 1.17 , 56.91 ± 1.44 percent in group I, II and III respectively. The corresponding values for the Digestibility of TCHO were 51.68 ± 1.17 , 51.11 ± 1.58 , 64.38 ± 0.62 percent in group I, II and III respectively showing highly significant difference in group III as compared I and II. The digestibility coefficient of crude fiber was 35.19 ± 0.83 , 32.44 ± 1.31 , 55.91 ± 1.84 in group I, II and III respectively, being highly significant. The digestibility coefficient of NFE was 62.03 ± 1.68 , 54.49 ± 2.15 , 68.52 ± 2.02 percent in group I, II and III respectively showing highly significant difference among the groups.

Feed Conversion Ratio

Feed gain ratio gm/d revealed that the group II animals fed with Dumer (*Ficus glomerata*) tree leaves as a sole feed had the highest feed conversion efficiency (2.6 : 1g) followed by the group I Serias (*Albizia lebbek*) showed (3.22 : 1g) while the group III Sudan grass *Sorghum sudanense* had the lowest feed conversion efficiency (4.6 : 1g).

Table 1. Average digestibility coefficient (%) of experimental animals

Attributes Improved	Groups		
	I	II	III
Dry matter Digestibility	55.15 ± 0.94	54.18 ± 0.98	59.34 ± 0.735
Organic matter Digestibility	55.35 ± 2.69	54.05 ± 4.08	64.66 ± 0.83
Crude protein	69.47 ± 1.10	68.67 ± 0.42	69.63 ± 0.84
Ether extract	56.81 ± 0.80	53.61 ± 1.17	56.91 ± 1.44
Crude fiber	35.19 ± 0.83	32.44 ± 1.31	55.91 ± 1.84
Nitrogen free extract	62.03 ± 1.68	54.49 ± 2.15	68.52 ± 2.02
Total Carbohydrate	51.68 ± 1.17	51.11 ± 1.58	64.38 ± 0.62

Table 2. Weekly and daily body weight gain, feed gain ratio of experimented kids (Mean±SE)

Groups	Initial body Weight (kg)	Final body Weight (kg)	Weight gain (kg)	Weekly gain (gm.)	Daily gain (gm.)	Feed/gain ratio
I	12.200	14.16	1.96	152.52 ± 3.12	21.78 ± 0.44	3.22
II	11.72	13.96	1.96	152.52 ± 3.12	21.78 ± 0.44	2.62
III	11.880	14.00	2.32	180.54 ± 3.82	25.78 ± 0.54	4.61

DISCUSSION

Digestibility coefficient of DM, NFE, CF, OM and TCHO were found to be highly significant where as digestibility coefficient of ether extract and crude protein was non significant among the three groups of Serias (*Albizia lebbek*), Dumer (*Ficus glomerta*) and Sudan (*Sorghum sadanense*), when compared with Guyton and Hall (1998) they have reported that the digestibility coefficient of DM, OM, CP and CF were higher in T2 (30 : 70) as compared to T1 15 : 85 and T2 45 : 55 having Serias (*Albizia lebbek*) ± mature dry gran (*Sehima - Heteropogon*) in 3 different ratio. He also concluded that the crude fiber digestibility was lower in T3 and attributed that this might be due to the presence of pipercolic acid derivative and legnin in Serias (*Albizia lebbek*) leaves at higher level. The range of digestibility coefficient of

digestibility coefficient leaves in the present study DM 55.15 ± 0.94 , OM 55.35 ± 2.69 , CP 69.47 ± 1.10 , EE 56.81 ± 0.80 , Total carbohydrate 51.68 ± 1.17 , CF 35.19 ± 0.83 , NFE 62.03 ± 1.68 respectively were in agreement with the results of Murugan et al. (1987) and Singh et al. (1998). *Ficus glomerata* leaves under study have the digestibility coefficient of DM 54.18 ± 0.98 CP 68.67 ± 0.42 CF 32.44 ± 1.31 NFE 54.49 ± 2.15 EE 53.61 ± 1.17 TCHO 51.11 ± 1.58 OM 54.05 ± 4.08 . The results of digestibility coefficient of DM 51.0 ± 0.94 OM 53.39 ± 1.21 and were found to be well comparable with the reported values as reported by Singh et al. (1995) in bullocks fed with *Ficus nemoralis* leaves while lower digestibility coefficient of CP 56.37 ± 2.78 EE 42.59 ± 2.60 and higher CF digestibility of 57.92 ± 1.92 is observed. This might be due to high tannic acid content which reduces its palatability. *Sorghum sudanense* grass have digestibility coefficient of DM 59.34 ± 0.73 CP 69.93 ± 0.84 CF 55.91 ± 1 NFE 68.52 ± 2.02 TCHO 64.38 ± 0.62 OM 64.66 ± 0.83 . Singh et al. (1987) reported digestibility coefficient of DM, CP, TCHO, OM which was found to be lower than the present study 48.55 ± 3.59 , 43.21 ± 2.79 , 53.41 ± 3.39 , 59.93 ± 3.14 respectively which might be due to the stage of harvesting while EE and EF content were in the comparable range 55.19 ± 3.95 , 55.09 ± 4.29 respectively and concluded that the mature guinea grass cannot be fed as sole feed and supplementation of concentrate mixture is required to maintain body weight.

Feed gain ratio

Loss in body weight @ $138.46 \text{ g/d} \pm 16.26$ due to low DM intake of Guinea grass (*Panicum maximum*) was reported by Singh et al. (1987). The loss in body weight in calves due to sole feeding of *Panicum maximum* grass has also been reported. In the present study weight gain of kids may also be correlated with the availability of Calcium and Phosphorus to the body. Calcification of long tissues in growing animals are initiated by the activity of alkaline phosphates in the plasma as reported by Tiwari et al. (1996) in presence of adequate calcium and phosphorus.

Conclusion

Present study with the feeding of tree leaves *Albezia lebbak* (Serias), *Ficus glomerata* (Dumer), *Sorghums sudanense* (Sudan grass) indicate that the requirements of crude protein and calcium have been met adequately, whereas, the requirement of phosphorus could not be met since they are very poor in phosphorus. Therefore, tree leaves and grass included under the present study need to be supplemented with phosphorus supplements in the ration of goats.

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