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Exploring the possibilities of dried *Gliricidia* leaves as least cost protein supplement for goats

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Abstract

A study was conducted to explore the possibilities of *Gliricidia* dried leaves inclusion in the concentrate mixture for goats. For this, *Gliricidia* dried leaves were incorporated in the concentrate mixture for kids at 0, 20, 30 and 40 per cent levels. Twenty four weaned male kids were selected for this study and grouped randomly into four groups viz G-I, G-II, G-III and G-IV fed with the concentrate formulated with 0, 20, 30 and 40 percent of dried *Gliricidia* leaves incorporated. The trial feeds are iso-nitrogenic and iso-caloric to meet the daily requirement specified by BIS. This feeding trial was conducted for a period of three months. Daily dry matter intake and fortnightly body weight of goats were recorded. *Gliricidia* dried leaves contained 92.12, 17.95, 13.34, 3.03, and 12.30 per cent of dry matter, crude protein, crude fibre, ether extract and total ash content. The gross energy content of the *Gliricidia* leaf meal (GLM) was 3654 kcal/kg. There was no significant difference in dry matter intake, over all body weight gain and average daily gain. The cost per kg of feed was reduced on increasing the dried *Gliricidia* leaves from 0 to 40% level without affecting the normal growth performance.

Keywords: *Gliricidia* dried leaves, least cost protein supplement, growth performance, goats

Introduction

Tree leaves plays a major role in small ruminant nutrition especially in goat feeding. The tree fodders are available in bulk quantity after the north east and south west monsoon period. The tree leaves may be collected, dried, preserved and could be used during scarcity period and this can be included in the concentrate mixture of small ruminants to reduce the production cost. The browse species, *Gmelina arborea*, *Leuceana leucocephala* and *Gliricidia sepium* have been fed to ruminants with appreciable results and also have been reported to remain green to larger part of dry season (Lamidi *et al.*, 2009) ^[5]. Browse plants have been reported that being high in protein, mineral and vitamins they have great potential as source of high quality nutrient for ruminants (Babayemi *et al.*, 2003) ^[4]. The dried *Gliricidia* leaves can be stored throughout the dry season without deteriorating the nutritive value as feed reserve (Asoalu *et al.*, 2012) ^[3]. In order to fill the gap between the requirement and availability of feed resources for small ruminants, the locally available feed resources have to be explored for their inclusion in the ruminant diet without affecting the normal production performance and also could be used to reduce the feed cost. *Gliricidia* leaves can be available in huge quantity and it can be stored for long time as dried. Hence a research study was carried out to explore the possibilities of the inclusion level of dried *Gliricidia* leaves as a least cost protein supplement in the concentrate feed for growing kids.

Materials and Methods

The *Gliricidia* tree leaves after the completion of the north east monsoon were collected by following standard lopping method; sun dried and kept in gunny bags for further use. Representative pooled samples were taken for proximate analysis and were analyzed (AOAC, 2000) ^[1] for the dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE) and total ash (TA). Based on the results of Crude protein the dried *Gliricidia* leaves were included in the concentrate mixture for kids at 0, 20, 30 and 40 per cent levels. The trial feeds are iso-nitrogenic and iso-caloric. The per cent ingredient composition of the experimental diets with different inclusion level of *Gliricidia* dried leaves are furnished in Table 1.

Twenty four weaned male kids were selected for this study and grouped randomly into four groups viz G-I, G-II, G-III and G-IV fed with 0, 20, 30 and 40 percent of dried *Gliricidia* leaves incorporated concentrate mixture.

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All experimental kids were fed with *adlibitum* of Hybrid Bajra Napier Co-4 grass and the trial concentrate feeds in two splitted meal to meet the daily requirement specified by BIS. This feeding trial was conducted for a period of three months.

Daily dry matter intake and fortnightly body weight of kids were recorded. The average daily body weight gains were calculated for the trial period. All the values were analysed statistically (Snedecor and Cochran, 1994) [11].

Table 1: Per cent Ingredient composition of the experimental diets with different inclusion level of Gliricidia Dried Leaves

Ingredients	T-1 GLM- (0%)	T-2 GLM- (20%)	T-3 GLM- (30%)	T-4 GLM- (40%)
Maize	19.00	16.65	20.00	16.00
Broken Rice	25.00	22.40	25.00	24.80
DORB	33.00	20.00	3.33	-
Soya bean meal	20.00	17.95	18.67	16.20
Gliricidia leaf meal (GLM)	0.00	20.00	30.00	40.00
Salt	1.00	1.00	1.00	1.00
Mineral Mixture	2.00	2.00	2.00	2.00
Total	100.00	100.00	100.00	100.00
Nutrient Composition				
CP (%)	17.67	18.00	18.16	18.00
TDN (%)	70.00	68.70	70.00	68.80

Results and Discussion

Representative pooled samples of Gliricidia dried leaves were analysed for the dry matter, crude protein, crude fibre, ether extract and total ash. Gliricidia dried leaves contained 92.12, 17.95, 13.34, 3.03, and 12.30 per cent of dry matter, crude protein, crude fibre, ether extract and total ash content respectively. The gross energy content of the GLM was 3654 kcal/kg. These values are agreed with the values by Asaolu *et al.*, (2012) [3] and Okafer *et al.*, (2012) [6]. The protein content of the Gliricidia dried leaves were comparable to the results published for Black gram husk (Arulnathan *et al.*, 2013) [2] and green gram Husk (Radhakrishna *et al.*, 2002) [8]. This

indicates that Gliricidia dried leaves could be used as a replacer for the agro-industrial by-products like gram husk or gram chunies in the concentrate feed of goats.

Feeding trial was conducted in twenty four weaned male goats fed with the concentrate formulated with 0, 20, 30 and 40 percent of dried Gliricidia leaves incorporated for three months. Daily dry matter intake and fortnightly body weight of kids were recorded. The average daily body weight gains were calculated for the trial period. The production performance of the kids fed with various inclusion level of dried Gliricidia leaves are furnished in Table 2.

Table 2: Effect of different inclusion level of Gliricidia Dried Leaves on Growth Performance weaned male kids

Parameters	T-1 GLM-0%	T-2 GLM-20%	T-3 GLM-30%	T-4 GLM-40%
Initial Body wt(Kg) ^{NS}	9.30 ± 0.81	8.26 ± 0.61	9.28 ± 0.83	9.13 ± 0.80
Final Body Weight(Kg) ^{NS}	15.18 ± 0.73	14.25 ± 0.74	15.40 ± 0.87	15.50 ± 0.77
Over all Weight Gain(Kg) ^{NS}	5.88 ± 0.16	5.98 ± 0.14	6.16 ± 0.17	6.36 ± 0.18
Average Daily Gain (gm) ^{NS}	65.37 ± 1.86	66.48 ± 1.55	68.51 ± 1.91	70.74 ± 1.91

GLM-Glyricidia Leaf Meal dried. NS- Not significant

The overall weight gain (expressed in kg) were 5.88 ± 0.16, 5.98 ± 0.14, 6.16 ± 0.17 and 6.36 ± 0.18 for G-I, G-II, G-III and Group-IV respectively. The average daily gain were 65.37 ± 1.86, 66.48 ± 1.55, 68.51 ± 1.91 and 70.74 ± 1.91 (expressed in g) for G-I, G-II, G-III and Group-IV respectively. In the present study the overall weight gain and average daily gain were statistically not significant among all treatment groups. The per kilogram cost of feed were Rs.20.23, Rs.17.88, Rs.16.92 and Rs.15.46 for G-I, G-II, G-III and Group-IV respectively. The cost per kg of feed was reduced on increasing the dried Gliricidia leaves from 0 to 40% level without affecting the normal growth performance. Senani *et al.*, (1999) [10] reported that nutritive value of Gliricidia fodder for goats were 14.02% DCP and 60.2% TDN. Supplementation with *Gliricidia* leaves is very beneficial to improve intake, digestibility and gain of Bali cattle fed elephant grass basal diets. Therefore, *Gliricidia* leaves can play a major role as economic supplement to improve performance of Bali cattle fed low quality feed and can be recommended to be cultivated in the farm to reduce feed cost in cattle enterprise (Rusdy *et al.*, 2019) [9]. Ondiek *et al.*, (2000) [7] concluded that the

Leucaena and Gliricidia could contribute as nitrogen sources in compounded diet supplements without any detrimental effects on production in dairy goats. Vrushali., (2017) [12] concluded that feed containing 20% dried Gliricidia leaves was found superior in respect of the digestibility of nutrients, body weight gain, acceptability and palatability of the bucks. As Gliricidia leaves are available throughout the year, the dried leaves can be stored throughout the dry season without deteriorating nutritive value and thus can serve as a feed reserve.

These results shows that Gliricidia dried leaves in combination with other locally available conventional feed ingredients could be utilized as feed component in goat feeding. This inclusion would be enhance the nitrogen balance level and also reduce the cost of production of the feed. Since there is no significant difference in the graded level of inclusion of Gliricidia dried leaves in the goat growth performance, it would be a choice of reducing the production cost and in turn enhance profit of the goat farmers.

Conclusion

Hence, it was concluded that since the Gliricidia dried leaves

have a good source of protein, available in huge quantity and also can be produced in the least cost. It can be dried and stored for long time and it could be included up to 40 per cent level in the concentrate mixture for goats without affecting normal growth and at economic cost for the benefit of the goat farmers.

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