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Acacia melonoxylan (Blackwood): Frost resistant tree fodder variety of Nilgiris hilly region

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Abstract
Winter frost followed by the summer drought is the major concern for livestock rearing farmers in hilly tract region. Nutrition is one of the major constraints ruminants, particularly the lack of protein during the dry season. Animals in these areas have to survive on feeding with poor quality roughages that has low nutritive value. Tree fodder plays a vital role during this dry period as a fodder source for the animals. Most of the tree fodders were leguminuous type that is rich in crude protein. Though they are having high protein, it is the digestibility that determines the nutrient availability and the intake of the animals.
A study was conducted to evaluate the conventional proximate analysis and *in vitro* degradability of Acacia melonoxylan, a tree fodder variety available in SBRS, Sandynallah, Nilagiri district of Tamil Nadu, first study in India, to effectively feed the animals that starve during drought period. The tree fodder contains 47.50% of dry matter and Proximate analysis showed 13.66% of CP, 36.75% of crude fibre, 3.52% of Ether extract, 5.95% of Total ash, 40.12% of NFE, 0.89% of Calcium and 0.25% of Phosphorous. Further the *In vitro* dry matter degradability for 24hrs and 48hrs revealed 15.31 and 36.68% for Acacia. Thus the tree fodder has high CP with better digestibility% indicates that the fodder can be very well utilized during the winter and dry summer periods in hilly tract region especially for grazing small ruminants.

Keywords: Acacia melanoxylon, *In-vitro* dry matter degradability, proximate analysis, drought feeding

Introduction
Fodder tree leaves are rich in protein, soluble carbohydrates, minerals and vitamins Supplementation of tree leaves have positive impact on ruminal microbial growth and digestion, resulting in improved animal growth and enhanced productivity in ruminants [8]. Animals in these areas have to survive on feeding with poor quality roughages that has low nutritive value. Tree fodder plays a vital role during dry period as a fodder source for the animals and has appreciable amounts of nutrients which keep intestinal micro flora active for digesting cellulosic biomasses [7]. Most of the tree fodders were leguminous type that is rich in crude protein and have the ability to fix nitrogen. Though they are having high protein, it is the digestibility that determines the nutrient availability and the intake of the animals.
Acacia is a pan-tropical and subtropical genus with species abundant throughout Australia, Asia, Africa and the Americas. They thrive in a diverse range of habitats and environments. Many species are well adapted to the semi-arid and savannah regions but equally others survive in moist forest and riverine areas, tolerating both high pH and waterlogged soils. With such diversity, Acacia has considerable potential in a range of livestock and agro forestry systems. Trees provide fodder and shade for livestock, improve soil fertility through nitrogen fixation and the production of leaf litter and stabilize soils [3]. Hence the present study was carried out to analyze the *in-vitro* digestibility and proximate analysis of *Acacia melonoxylan* (Blackwood).

Materials and Methods
The study was carried out at Sheep Breeding Research Station, Sandynallah, Nilgiris. The samples were collected during the winter months and dried by using hot air oven. Dried samples were sent to Institute of Animal Nutrition, Kattupakkam, Chennai for the proximate analysis and *In vitro* dry matter degradability for 24hrs and 48 hrs. Standard laboratory procedures were followed for analysis of the samples.

Results and Discussion

The tree fodder has 47.50% of dry matter content. Proximate analysis showed, 13.66% of CP, 36.75% of crude fibre, 3.52% of Ether extract, 5.95% of Total ash, 40.12% of NFE, 0.89% of Calcium and 0.25% of Phosphorous. *In-vitro* dry matter degradability for 24 hrs and 48 hrs was 15.31 and 36.68%.

Fodder trees are nutrient-rich and enable them to produce bulky biomass almost round the year makes a significant alternative for animals feed. The minimum threshold for crude protein is 10% [1]; if it is lower than this value it will affect rumen fermentation. The studied tree fodder species had crude protein content in the ranges of 12.05 – 13.15% and it is moderately higher from the threshold. High level of crude protein results in increased ruminal ammonia nitrogen concentration that in turn enhances microbial activity and growth resulting in better dry matter digestibility. Crude protein with this amount is adequate to support the requirements of cattle, sheep, and goats at medium production levels [4]. The ash content of most of the tree leaves varied from 6 to 15% [5] and the result of the present study is also within the range. Reports indicate that the content of ash to a level 8% in the feed increase productive response and digestibility of feed in goats [2]. This seemingly studied fodder tree species have good mineral concentrations with considerable percentage of calcium and phosphorous therefore be suggested as livestock feed supplement with low-quality roughage.

The nutrient content of Acacia is an indication of the tree fodder as a feed supplement for livestock. During the frost and drought period of about five to six months in a year, it serves as source of nutrient to the ruminants. This study proved that supplementation of *Acacia* can meet out the protein and mineral deficiency of animals grazing in dry and inefficient pasture land especially during drought period. For the grazing animals in hilly tract areas, after the winter frost, this fodder variety can be very well utilized.

Acacia melonoxylan

Acacia feeding to animal

Conclusion

The tree fodder has CP value of above 10% which is above the minimum requirement in the diet for adequate digestive activities [6]. Hence this variety can be used during the winter and dry summer periods in hilly tract region especially for grazing small ruminants when there is no lush green pasture. Further studies are required to evaluate the nutrient composition during different seasons and methane emission by the tree fodder.

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