Short Communication

EVALUATION OF THE NUTRIENT COMPOSITION OF TAMARIND HUSK FOR ITS UTILITY AS AN ALTERNATIVE LIVESTOCK FEED

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ABSTRACT

The study was designed to investigate the tamarind husk as an unconventional feed in livestock ration. Tamarind husk samples were collected and analyzed for its nutrient composition. The average dry matter, crude protein, ether extract, total ash, crude fibre and nitrogen free extract of tamarind husk were found to be 89.36, 5.85,1.29, 2.83, 37.15 and 52.88per cent respectively. The non fibrous carbohydrate content of tamarind husk was 17.64 per cent. The mean NDF and ADF of the tamarind husk were 72.39 and 69.45 per cent respectively. The mean calcium and phosphorus content were 1.01 and 0.16 per cent respectively. The total tannin content in tamarind husk was 12.33 per cent. Based on the analyzed nutrient composition, it could be concluded that tamarind husk can be used as an alternative to conventional feed ingredients for livestock.

Keywords: Tamarind husk, Unconventional feed, Tannin

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INTRODUCTION

In developing countries like India, the livestock productivity is constrained due to the low quality of feed supply. An effective use of unconventional feed resources such as agro industrial byproducts, crop residues has become crucial in feeding livestock (Kumar *et al*., 2025) Hence, an attempt is made to collect the unconventional feed tamarind husk and analyse its nutrient composition for its usage as livestock feed.

In India, the total tamarind production is about 152 thousand metric tonnes in an area of 39 thousand hectares. In India, Tamil Nadu stands first in tamarind production with total production of 41.93 thousand metric tonnes in an area of 13.77

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thousand hectares followed by Karnataka with total production of 37.43 thousand metric tonnes in an area of 7.43 thousand hectares. (2023 – 24, 3rd Advance Estimate, National Horticulture Board).

Tamarind is a multipurpose tree and almost all its part are being used. Tamarind fruit contains about 30 to 50 per cent pulp, 25 to 40 per cent seeds and 11 to 30 per cent shell and fibre in a pod(Singh *et al.,* 2021). As the tamarind is mainly cultivated for its pulp, the tamarind seeds and husk are discardedas agricultural waste from tamarind pulp industry. An attempt is made to use tamarind husk on its utility as livestock feed. Tamarind husk is the brown outer covering (shell) after removalof the tamarind fruit (Apsara, 2020) a byproduct of tamarind processing industry.

Generally, disposal of byproducts or waste produced is the major challenge faced by the industries. Hence, converting the waste or byproduct into valuable product would be the choice of most industries. Hence, the byproducts from tamarind processing industries in the were collected and evaluated for their nutritive value to explore their potential as livestock feed.

MATERIALS AND METHODS:

Sample collection and preparation:

About 500 g of six representative samples of Tamarind husk were collected from areas in and around regions of Theni, Dindigal, Madurai, Ramanathapuram and Sivagangai district.The collected samples were dried in hot air oven at 110^0 C for 8 to 10 hours and they were ground and stored for further analysis.

Analysis of nutrient composition

The proximate composition namely the Dry Matter(DM), Crude Protein (CP), Ether Extract (EE), Total Ash (TA), Crude Fibre (CF) and Nitrogen Free Extract (NFE) were analyzed as per AOAC (2000) and expressed on the per cent dry matter basis. The per cent Neutral Detergent Fibre (NDF) and Acid Detergent Fibre (ADF) content of tamarind husk were determined as per Soest *et al.*, (1963). The non fibrous carbohydrate fraction (NFC) of the feed was determined by the equation given by NRC (2001) which is mentioned hereunder

NFC (%)= [100-(%NDF+% CP+% EE+% Total Ash](NRC,2001)

Estimation of tannin content:

The tannin content of the tamarind husk was assessed by the volumetric method as given by Sastry *et al.,* (1999). Around 5 grams of dried, powdered and fat free sample was taken in 1000 ml beaker. The sample was refluxed in 300 ml distilled water for 1 hour and the filtrate was collected by decantation. The residue was again refluxed with another 200 ml of distilled water for 15 minutes. The filtrate was then collected, cooled and the volume was made upto 500 ml and filtered using Whatman Filter Paper No.1. Titration was done against 0.1 N potassium permanganate with blank and the sample. In blank, about 101 ml of distilled water was taken, 2 ml of indigo carmine solution was added and titrated against 0.1 N potassium

permanganate solution. The volume of 0.1 N KMnO4 was measured as V0 (Blank). In sample, to 1 ml of aliquot, 100 ml of distilled water and 2 ml of indigo carmine solution were added. The sample was titrated against 0.1 N potassium permanganate and the volume used is measured as V.

The tannin content in the sample was calculated by the formula mentioned below.

$$\text{Tannic acid (on DM basis)} = (V\text{-}V_0) \times 0.006235 \times 500 \times 100 / W$$

Where, V = Volume of 0.1 N KMnO4 used in sample; V0 = Volume of 0.1 N KMnO4 used in blank; W = Dried weight sample.

RESULTS AND DISCUSSION

Nutrient Composition:

The nutrient composition and the total tannin content of the unconventional feed Tamarind husk is presented in the Table given below.

In the evaluation of Tamarind husk, the protein content is lower whereas the fat, ash and crude fibre content are higher than the findings of Thanomwongwatatana, (2018); Ezekiel Tagwi William *et al*., (2022) and Girish *et al*., (2023). The NDF and ADF content were lower than Thanomwongwatatana, (2018) but higher than the reports of Bhatta *et al*., (2001). The nitrogen free extract which is the soluble carbohydrate content of the tamarind husk in the present study was lower than Thanomwongwatatana, (2018) and Girish *et al*., (2023). Changes were noticed in the nutrient composition of tamarind husk in different studies from the present study. These changes in different studies could be due to variation in the climate, temperature, vegetation and the soil type (Silva *et al.*, 2020).

The protein which is an essential nutrient for the growth and development is lower than other studies. This lower protein content may be due to the fact that the protein storage occurs in seed portion rather than husk Bewley *et al*. (2012). The lower fat content in the tamarind husk could be due to the fact that husk which is the outer covering of the grain contains predominantly indigestible fibre rather than the fat or soluble carbohydrates (Ravindran *et al.*, 2014). The crude fibre content which is the insoluble carbohydrate content of the feed is essential for the good function of rumen and to prevent acidification of rumen (Chiba, 2014). Also the higher crude fibre in the feed also increases the satiety value in ruminants (Allen, 1996). The fibre content namely the NDF and ADF plays an important role in evaluating the nutritive value of ruminant feeds. NDF represents the total cell wall components of the feed namely cellulose, hemicellulose and lignin. ADF includes cellulose and lignin (Van soest, 1994). The NDF and ADF content of tamarind husk in the present study explores its potential as a partial roughage sourcewhen fed along with digestible nutrients ensuring balanced nutrient supply to ruminants.

Tannin content:

The tannin content in the present sample was lower than the findings of Bhatta *et al.*, (2001) and Malik *et al.*, (2017). Tannin, a polyphenolic compound and is anti-nutritional factor having both beneficial and harmful effects in ruminants depending on its level of consumption by the animals, the structure and the molecular weight of the compound and the physiology of the species that consumes it (Hagerman and Butler, 1991).

One of the main effects of tannin containing compounds is to reduce the methane emission in ruminants. Hence, inclusion of tamarind husk, may reduce the methane emission from ruminants. Also, at optimum levels of supplementation, tamarind husk may improve protein utilisation by reducing the protein degradability mainly due to the presence of tannin in it.

CONCLUSION

From the present study, it can be concluded that tamarind husk is a reasonably good source of nutrients. When incorporated at optimum levels in livestock rations, tamarind husk can serve as a viable alternative feed resource to bridge nutritional gaps and support livestock productivity.

Nutrient composition (%)	Tamarind husk (%)
Dry matter	89.36
Crude protein	5.85
Ether extract	1.29
Total ash	2.83
Crude fibre	37.15
NFE	52.88
NFC	17.64
NDF	72.39
ADF	69.45
Calcium	1.01
Phosphorus	0.16
Total Tannin	12.33

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