

STUDIES ON TANNIN CONTENTS OF LOCALLY AVAILABLE TREE LEAVES COMMONLY FED TO GOATS IN KERALA

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Tree fodder can play an important role in mitigating the fodder shortage in the country. Over 60 per cent of the fodder requirements of goats are normally met from shrubs, tree leaves, weeds etc. Many palatable fodder species, however, contain one or more anti-nutritional factors and/or inhibitors. Plant tannins which are complex phenolic polymers are reported to depress the nutritive value of feeds (Patel *et al.*, 1972, Lohan *et al.*, 1980 and Ahn *et al.*, 1989). Though there are many reports on the deleterious effects of total tannins on the digestibility and nutrient availability in feeds and fodders, studies on the nature of tannins present in common tree fodders available in Kerala are scanty. Hence an investigation was

taken up to assess the nature and extent of different types of tannins in common tree leaves available for feedings of goats in Kerala.

Materials and methods

Fourteen different locally available tree leaves commonly fed to goats were collected and analysed for their proximate principles, (AOAC, 1990), total tannins (Folin and Denis, AOAC, 1990) and condensed tannins (Kumar and Patnayak, 1986).

Results and discussion

Data on the percentage chemical composition and the total tannin, condensed tannin and hydrolysable tannin contents of the leaves analysed are given in Table 1.

Table 1 Percentage chemical composition and tannin contents of locally available tree leaves commonly fed to goats (on dry matter basis)*

Forage	DM	CP	CF	EE	Total Ash	NFE	Ca	P	Total tannins	Condensed tannins	Hydrolysable tannins
AXAYAL <i>Ficus religiosa</i>	30.20	13.00	27.30	1.80	04.90	53.0	1.18	0.20	5.30	4.80	0.50
KIRINI <i>Manilkra hexandra</i>	28.30	15.30	08.30	1.40	06.50	68.5	1.30	0.15	6.00	2.40	3.60
KAINI <i>Bridelia rhetusa</i>	32.50	08.20	24.90	4.60	04.20	58.1	1.20	0.10	5.20	3.20	2.00
POOVAM <i>Schleichera trijuga</i>	29.50	11.50	15.90	3.10	04.80	64.7	1.21	0.14	5.70	1.20	4.50
ATHI <i>Ficus racemosa</i>	32.60	10.40	14.10	0.50	04.60	70.4	1.10	0.20	3.60	3.00	0.60

Contd...

Forage	DM	CP	CF	EE	Total Ash	NFE	Ca	P	Total tannins	Condensed tannins	Hydrolysable tannins
PERAL <i>Ficus bengalensis</i>	35.00	21.30	10.30	1.90	04.50	62.0	1.28	0.10	2.60	1.40	1.20
AMAPATTY <i>Trema orientalis</i>	37.00	12.00	27.40	6.70	09.40	44.5	1.32	0.14	4.20	2.20	2.00
THANNI <i>Terminalia bellerica</i>	30.80	16.40	14.20	4.70	11.40	53.3	2.00	0.61	3.80	1.50	2.30
SAPOTTA <i>Achras zapota</i>	36.80	11.50	23.50	4.60	05.10	55.3	1.20	0.12	7.80	6.30	1.50
STAR APPLE <i>Donella roxburghii</i>	34.80	08.80	27.30	3.10	05.00	55.8	1.20	0.42	3.60	0.90	2.70
SUBABUL <i>Leucaena leucocephala</i>	34.50	23.90	18.40	7.40	10.40	39.9	1.70	0.24	5.50	2.90	2.60
JACK <i>Artocarpus heterophyllus</i>	54.50	15.10	18.00	4.00	10.40	52.5	1.40	0.32	4.00	3.40	0.60
VENGA <i>Pterocarpus marsupium</i>	58.30	14.90	26.30	4.20	10.50	44.1	1.50	0.21	4.70	3.00	1.70
BANANA <i>Musa paradisiaca</i>	25.90	12.10	23.00	5.80	07.70	51.4	1.20	0.52	3.70	1.60	2.10

* Average of four samples

It can be seen from the data on chemical composition that the various tree leaves are, in general, higher in dry matter, crude protein and calcium and lower in crude fibre and phosphorus when compared to the common grass fodders as reported by James *et al.* (1977), Ranjhan (1980) and Thomas *et al.* (1981). Further, the results on the chemical composition of subabul, jack, vengal and banana leaves reveal that the values obtained in the present study are in general agreement with those reported by other workers in this regard (James *et al.*, 1977; Ranjhan, 1980; Kumar, *et al.* 1987; James and

Gangadevi, 1991). Minor differences observed in the chemical composition are attributable to the location, stage of maturity and seasonal variations (Lohan *et al.*, 1983; Kumar and Vaithyanathan, 1990; Makkar and Singh, 1991).

A perusal of the data on the concentration of total tannins, condensed tannins and hydrolysable tannins indicates that the tree leaves are rather high in total tannin content, the concentration ranging from 2.6 to 7.8 per cent on dry matter basis, the observation in this regard being in agreement with those of James

et al. (1977), Kunjikutty, *et al.* (1980) and Thomas *et al.* (1981).

Slight variations observed by different workers in this regard may be due to the location, seasonal differences and the stage of maturity of leaves at the time of collection for analysis (Dogra *et al.*, 1986; Kumar and Vaithiyanathan, 1990; Makkar and Singh, 1991). The results also reveal that a greater proportion of the total tannins in majority of the tree leaves studied is in the form of condensed tannins. This observation is in keeping with those of McLeod (1974), who reported that the principal forage tannings are of the condensed type.

Summary

Fourteen different locally available tree leaves, commonly fed to goats were analysed for their chemical composition, total tannins, condensed and hydrolysable tannins. The different tree leaves studied are found to be higher in dry matter, crude protein and calcium but lower in crude fibre and phosphorus when compared to the common grass fodders. The total tannin content in the different leaves ranged from 2.6 to 7.8 per cent on dry matter basis with condensed tannins predominating in majority of the fodders.

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