

CHEMICAL COMPOSITION OF TREE LEAVES FOR SMALL RUMINANTS IN SOUTHERN TAMILNADU

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Abstract: Chemical composition in terms of proximate principles was analysed in seven leguminous and seven non leguminous tree leaves during four different seasons with a view of using them as feed for small ruminants in Southern Taminadu. Leguminous tree leaves had higher CP and lower CF than non leguminous tree leaves. Significant seasonal differences ($P<0.05$) in DM, CF and no variation in CP, EE, TA were observed in both leguminous and non leguminous tree leaves. DM and CF were higher in summer. NFE was significantly lower ($P<0.05$) in summer in non leguminous tree leaves. Both leguminous and non leguminous tree leaves could be effectively used as feed for small ruminants throughout the year according to their availability and on the basis of nutrient content.

Keywords: Tree leaves, leguminous, non leguminous, proximate composition, seasons.

INTRODUCTION

Sheep and goat rearing remains the major livelihood occupation of poor and marginal farmers in Southern Tamilnadu region; Tirunelveli, and Thoothukudi districts in particular, possessing high sheep and goat population - 6.90 and 7.32 lakhs respectively (Livestock Census, 2014). These animals are mainly grazed in fallow lands, bunds and harvested fields. The fodder value of tree leaves is often superior to herbaceous plants particularly in case of legumes. In arid and semi arid zones, they provide the largest part of protein supply during the driest months (Rai *et al.* 2007). Although tree leaves and shrubs form an integral part of the diet of grazing small ruminants, there is little information on nutritive value and utility of the tree fodders available in Southern region of Tamilnadu. Hence, a detailed study was carried out to analyse the chemical composition and seasonal variation in nutrient content of the commonly available leguminous and non leguminous tree leaves.

MATERIALS AND METHODS

Six random leaf samples of each of seven leguminous trees *viz.* *Albizia lebbbeck*, *Inga dulci*, *Albizia saman*, *Acacia nilotica*, *Acacia leucophloea*, *Leucaena leucocephala*, *Sesbania*

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grandiflora and seven non leguminous trees viz. *Ficus bengalensis*, *Artocarpus heterophyllus*, *Ficus religiosa*, *Mangifera indica*, *Azadirachta indica*, *Lannea coromandelica* were collected during four seasons viz. I - Spring (January – March), II -Summer (April – June), III - Pre monsoon (July – September) and IV - Monsoon (October – December). Representative samples of individual species were drawn immediately after collection and oven dried for estimation of dry matter (DM). Rest of the samples was oven dried, ground to pass through 1mm sieve and used for analysis of proximate principles – crude protein (CP), crude fibre (CF), ether extract (EE), total ash (TA) (AOAC, 1995). Nitrogen free extract (NFE) was calculated by difference. The data obtained were statistically analysed by using methods as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Among leguminous tree leaves, *Sesbania grandiflora* contained the highest CP during all the four seasons of the year, values ranging between 31.65 ± 0.60 and $34.56 \pm 0.41\%$, followed by *Leucaena leucocephala* (range : 21.43 ± 0.55 - $23.12 \pm 0.29 \%$). Lowest CF was observed in *Sesbania grandiflora* leaves ($7.88 \pm 0.65 \%$) during monsoon season. Similar values for CP and CF in *Sesbania* and *Leucaena* leaves were recorded by Reddy et al. (2009). Among non leguminous tree leaves, *Albizia saman* had the highest CF during summer ($27.45 \pm 0.60\%$). Fibre content increases with advanced foliage maturity due to lignification (Minson, 1990). Most of the tree leaves contained high level of soluble carbohydrates (NFE), values ranging from 48.16 ± 0.36 to $55.24 \pm 0.62\%$, highest in *Acacia nilotica* ($62.17 \pm 0.94\%$). Similar NFE values in fodder trees were recorded by Pawar et al. (2015). Season wise consolidated values of proximate composition of leguminous and non leguminous tree leaves during four seasons are given in Table 1.

Table 1. Proximate Composition of Leguminous and Non Leguminous tree leaves during four seasons (% DMB)

Tree leaves	Season	DM	Proximate Principles				
			CP	CF	EE	TA	NFE
Leguminous	I	34.34 ± 0.27^x	17.67 ± 0.09	19.64 ± 0.64^x	3.75 ± 0.08	10.79 ± 0.21	48.16 ± 0.36
	II	36.29 ± 0.45^y	16.82 ± 0.21	21.24 ± 0.42^y	3.95 ± 0.09	11.24 ± 0.16	46.71 ± 0.75
	III	33.53 ± 0.52^x	17.59 ± 0.18	19.33 ± 0.33^x	3.68 ± 0.14	10.73 ± 0.11	48.67 ± 0.29
	IV	33.37 ± 0.60^x	17.47 ± 0.20	19.51 ± 0.30^x	3.86 ± 0.12	10.72 ± 0.18	48.44 ± 0.54
Non leguminous	I	38.12 ± 0.44^a	11.55 ± 0.25	19.76 ± 0.70^a	3.63 ± 0.15	10.17 ± 0.16	54.91 ± 0.44^b
	II	41.10 ± 0.36^b	11.11 ± 0.19	21.84 ± 0.29^c	3.56 ± 0.10	10.64 ± 0.22	52.85 ± 0.53^a
	III	37.27 ± 0.29^a	11.41 ± 0.27	19.51 ± 0.42^a	3.54 ± 0.09	10.30 ± 0.20	55.24 ± 0.62^b
	IV	39.19 ± 0.56^a	11.41 ± 0.17	20.42 ± 0.26^b	3.42 ± 0.16	10.13 ± 0.15	54.72 ± 0.80^b

Means with different superscripts within groups vary significantly ($P < 0.05$)

DM and CF contents were significantly ($P < 0.05$) higher in summer than other seasons in both leguminous and non leguminous tree leaves. Though the CP level was higher in spring season compared to other seasons, the differences were not statistically significant. No significant difference was observed in EE and TA among all the tree leaves during the four seasons. However, seasonal variation was observed in NFE of non leguminous tree leaves with significantly ($P < 0.05$) lower values in summer. The variations in crude protein and crude fibre values in tree leaves could be attributed to the differences to stage of growth, proportion of young leaves and mature leaves (Reddy et al., 2009).

CONCLUSION

Based on the findings of this study, it can be concluded that leguminous and non leguminous tree leaves available in Southern Tamilnadu can very well be exploited as feeds for small ruminants throughout the year as they are rich in protein and low in fibre.

REFERENCES

- [1] A.O.A.C. (1995). Official methods of analysis, 16th Edn., Washington, D.C.
- [2] Minson, D.J. 1990. Forage in Ruminant Nutrition. Academic Press Inc., San Diego, CA, USA
- [3] Pawar, M.M., Kumar, A., Bhagwat, S.R., Ankuya, K.J. and Bhosale, D.S. 2015. Nutritional evaluation of some leaves used as top-feeds in North Gujarat region. Anim. Nutr. Feed Technol., 15: 457- 464
- [4] Rai, P., Ajit, K. and Samanta, A.K. 2007. Tree leaves, their production and nutritive value for ruminants: A review. Anim. Nutr. Feed Technol., 7: 135-159
- [5] Reddy, D.V., Tiwari, C.M., Elanchezian, N. and Uma Maheswari, D. 2009. Evaluation of supplementary feeding value of local tree foliages in goats fed on Napier Bajra green fodder. Anim. Nutr. Feed Technol., 9: 155-163
- [6] Snedecor, G.W. and Cochran, W.G. 1994. Statistical methods, 8th ed, Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, India.