

## CHEMICAL COMPOSITION OF CERTAIN TREES AND SHRUBS

by

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**Summary**

*Foliage of certain forage trees and shrubs, being tried in the Range Management farm at the Pakistan Forest Institute, has been chemically analysed for the estimation of nutritive value. Range of nutritive constituents of these forages has been compared with those of the common grasses of Thal, Cholistan and Kala Chitta areas.*

*It has been concluded that since the nutritive components of these forages compare favourably well with those of the common grasses, already supporting large herds of cattle, and since no toxic component exists, these forages, by virtue of their narrow range of nutritive ratio (ratio between proteins and total energy producers) are capable of supporting growing calves and cows in milk.*

**Introduction**

Trees and shrubs constitute an important part of forages available to range livestock in Pakistan. They are particularly valuable in range areas because they remain green, for a longer time in winter, when the grasses are dry. It is, therefore, important to know their chemical composition for the purpose of assessing their nutritive value. Forage from some of the shrubs and trees, being experimentally grown in the Range Management farm at the Pakistan Forest Institute, has been chemically analysed and the nutritive potential is being reported in the text.

**Material and Method**

Foliage was collected in December, 1971, dried in shade, finally powdered and stored in air-tight glass jars. The material was analysed for nutrient composition using methods prescribed in the A.O.A.C. (2).

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## Results and Discussion

The results of chemical essay are given below:

Botanical name	Dry matter %	Mineral ash %	Ether extract %	Crude fibers %	Crude proteins %	Carbo- hydrates %
<i>Acacia arabica</i>	93.0	9.3	3.2	16.4	12.8	50.3
<i>Amorpha fruticosa</i>	92.8	8.0	4.6	19.1	16.8	44.3
<i>Atriplex canescens</i>	85.5	22.8	2.3	4.8	13.8	41.8
<i>Atriplex halinus</i>	89.0	21.9	4.6	8.6	16.8	37.1
<i>Bauhenia purpurea</i>	90.0	13.1	4.7	13.3	12.8	46.1
<i>Bauhenia variegata</i>	92.5	14.1	2.0	14.6	12.1	49.7
<i>Celtis australis</i>	90.1	13.6	3.1	6.1	13.0	54.3
<i>Ficus glauca</i>	91.0	19.2	6.0	4.5	12.1	49.2
<i>Gleditsia triacanthos</i>	92.0	7.0	4.9	6.2	11.8	62.1
<i>Milletia ovalifolia</i>	91.0	10.7	4.2	9.0	15.8	51.3
<i>Pongamia glabra</i>	90.0	17.6	2.3	4.4	14.5	41.2
<i>Putrunjiva roxburghii</i>	92.3	10.0	3.6	15.4	14.3	49.0
<i>Zizyphus mauritiana</i>	94.0	8.1	9.3	24.2	11.3	41.1

Though chemical analysis, by itself, does not indicate the nutritive value of a forage, it at least hints at the potential value and combined with information on palatability and digestibility, a fair estimate can be made of the utility of a plant as a forage.

Compared to the grasses of Kala Chitta, Thal and Cholistan (3, 4, 5) the various nutritive components ranged as follows in the material under study:

Component		Range %	
		Tree and shrub foliage studied	Grasses of Kala Chitta, Thal and Cholistan
Mineral ash	..	7.0—22.8	4.9—24.0
Fats	..	2.0— 9.3	0.3— 4.7
Proteins		11.3—16.8	4.3—24.3
Carbohydrates	..	37.1—62.1	22.2—61.6
Fibers	..	4.4—24.2	15.2—50.7

Thus, compared to grasses, the foliage of the trees and shrubs tested is generally high in mineral ash, fats, proteins and carbohydrates and low in fibers.

Using the method of Aiyer (1), the nutritive ratio of the foliage of trees and shrubs was worked out as follows:

Name of plant	Nutritive ratio (proteins/carbohydrates + fats)
<i>Acacia arabica</i>	1:5
<i>Amorpha fruticosa</i>	1:3
<i>Atriplex canescens</i>	1:3
<i>Atriplex halinus</i>	1:3
<i>Bauhenia purpurea</i>	1:4
<i>Bauhenia variegata</i>	1:4
<i>Celtis australis</i>	1:5
<i>Ficus glauca</i>	1:5
<i>Gleditsia triacanthos</i>	1:6
<i>Milletia ovalifolia</i>	1:4
<i>Pongamia glabra</i>	1:3
<i>Putrunjiva roxburghii</i>	1:4
<i>Zizyphus mauritiana</i>	1:6

Since most of these ratios are quite narrow, the foliage of the species is suitable as fodder for calves and cows in milk.



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