FOLIAR CONSTITUENTS OF SECONDARY FOOD PLANTS OF TASAR SILK WORM *ANTHERAEA MYLITTA* D.

By

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Introduction

It is a well known fact that quality of leaves based on the estimations of moisture, nitrogen, proteins, minerals, fibre and sugars etc. play significant role for the healthy development of silkworm to produce cocoons (Kohli *et al.* 1969 ; Sinha and Jolly, 1971). As per the existing practice *Shorea robusta* (Sal), *Terminalia arjuna* (Arjun) and *Terminalia alata* (Asan) are the main food plants for the rearing of Tasar Silk worm (*Antheraea mylitta*) in tropical zone but some other secondary food plants like, *Lagerstroemia indica* (Saoni), *Terminalia paniculata* (Kinjal), *Careya arborea* (Kumbhi), *Lagerstroemia speciosa* (Sidha) and *Dalbergia sissoo* (Shisham) are being utilised in tasar tracts for rearing where Sal, Asan and Arjun are not available.

In order to assess the economic value of these secondary plants, their comparative efficacy as well as their suitability, an experiment was initiated by the authors to analyse the foliar constituents of above five secondary food plants, Heterogeneity correlationship has also been determined in primary and secondary plants.

Materials and Methods

Pooled samples of tender, medium and mature leaves of five food plants were collected separately from CTRS Experimental field laboratory, Nagri (Ranchi) for chemical analysis.

Constituents viz., Moisture, crude fibre, total minerals, reducing sugar, total sugar and starch were estimated by A.O.A.C. method (1950). Nitrogen content estimated by Kjeldahl process was multiplied by 6.25 to calculate the crude protein. Each observation was replicated thrice and the data were statistically analysed.

Results and Discussion

Before embarking upon the statistical analysis the original data was transformed to degrees by $\sin^{-1} \sqrt{P}$, so as to make the application of ANOVA method possible. The results of the statistical analysis are presented in Table 1.

Table 1

Foliar constituents of Tasar Food Plants

(Percentage on dry oven basis)

Sl. No.	Food plants	Moisture		Total nitrogen (%)		Crude protein (%)		Total minerals (%)		Crude fibres (%)		Reducing sugar (%)		Total sugar (%)		Starch (%)	
1.	*Lagerstroemia indica* (Saoni)	60.0		1.58		9.97		8.66		6.80		2.54		11.22		14.11	
		55.0	58.3	1.52	1.55	9.50	9.7	8.20	8.29	6.90	6.87	2.78	2.69	11.09	10.79	14.78	14.40
		60.0		1.54		9.62		8.00		6.90		2.76		10.08		14.33	
2.	*Dalbergia sissoo* (Shisham)	67.0		2.50		15.62		11.3		11.9		2.60		12.01		9.69	
		65.0	66.3	2.50	2.48	15.62	15.5	11.6	11.36	13.2	12.7	2.67	2.65	11.74	11.92	9.21	9.42
		67.0		2.44		15.25		11.2		13.0		2.57		12.01		9.35	
3.	*Terminalia paniculata* (Kinjal)	65.0		1.33		8.31		8.3		10.0		2.60		8.02		12.32	
		65.0	64.3	1.35	1.34	8.44	8.37	8.7	8.73	9.50	9.80	2.57	2.56	7.75	7.93	12.20	12.19
		63.0		1.33		8.31		9.2		9.90		2.51		8.02		12.06	
4.	*Lagerstroemia speciosa* (Sidha)	75.0		2.13		13.31		6.00		9.90		1.46		5.56		10.10	
		71.0	73.0	2.17	2.14	13.56	13.95	5.90	6.06	11.20	11.07	1.50	1.51	5.29	5.47	9.88	10.03
		73.0		2.13		13.31		6.24		12.10		1.56		5.56		10.10	
5.	*Careya arborea* (Kumbhi)	72.0		1.35		8.44		4.6		15.50		1.14		5.85		9.55	
		72.0	72.3	1.31	1.32	8.19	8.27	4.8	4.77	15.30	15.48	1.24	1.18	6.20	6.08	9.88	9.74
		73.0		1.31		8.19		4.9		15.64		1.17		6.20		9.78	

Results of Analysis of Variance Mean sum of squares

Sources of variation	d. f.								
Between food plants	4	40.7519***	3.7015***	25.6128***	22.6336***	26.5410***	6.7027***	25.8209***	10.6597***
Replication	2	2.3848	0.0004	0.0325	0.0364	0.04850	0.0321	0.0244	0.0030
Residual error	8	0.7948	0.0071	0.0186	0.1052	0.2497	0.0164	0.1138	0.0465

***Significant at 0.001 level

The results indicate significant differences between the food plants for each constituent. The moisture content is highest (73.0%) in *Lagerstroemia speciosa* followed by *Careya arborea* (73.3%). Lowest moisture was found in *Lagerstroemia indica* (58.3%).

Total nitrogen and crude protein are present in highest percentage in *Dalbergia sissoo* (2.48 and 15.50% respectively) followed by *L. speciosa* (2.14 and 13.39% respectively) while they are comparatively low in *Careya arborea* and *Terminalia paniculata*.

Crude fibre is lowest is *L. indica* (6.87%) and highest in *Careya arborea* (15.48%) followed by *Dalbergia sissoo* (12.7%).

As regards the percentage of minerals, *Careya arborea* indicates the minimum (4.77%) and *Dalbergia sissoo* the maximium (11.36%).

The food plants, *Dalbergia sissoo* and *L. indica* are rich in total sugar (11.9 and 10.8% respectively). It is lowest in *L. speciosa* (5.45%).

In respect of starch it is observed that *L. indica* has the highest value (14.4%) followed by *Terminalia paniculata* (12.2%).

Heterogeneity correlationship

The analysis for heterogeneity of constituents in these plants was examined and the value of x^2 for all the constituents found are given in Table 2.

Table 2

X^2 value for heterogeneity in five secondary food plants

Constituents	Moisture	Nitrogen	Crude protein	Total minerals	Crude fibre	Reduc-ing sugar	Total sugar	Starch
Value of X^2	2.199	0.216	1.403	1.894	0.515	0.654	2.515	2.113
Probability heterogeneity more than	0.30	—	0.10	0.20	0.025	0.025	0.30	0.20

The analysis shows that the moisture is very significantly different in the five plants. Crude protein, total minerals, total sugar and starch are also significantly different and have probability more than 0.05. Crude fibre and reducing sugar are having probability more than 0.025 but the difference in nitrogen is not significant even at probability 0.01.

Now if these values are compared with the data of primary food plants viz., Sal. Asan and Arjun (Kohli *et al.*, 1969) (Table 3), it is seen that the difference of crude fibre has probability more than 0.50 while in reducing sugar the probability difference is more than 0.40 whereas moisture and starch indicate probability 0.10. The probability difference in crude protein and total sugar is at the level of 0.05. The study indicates that crude fibre plays a very important

role in the feeding of larvae. A negative correlation exists between crude fibre and feeding of larvae showing that lesser the percentage of crude fibre, better will be the rearing results. This contention is supported by Roeder (1953) who reported that the silk worms have the ability to digest. Crude fibre to the extent of 0.7% as against 74% by the animals.

Table 3

X^2 Value for heterogeneity in primary food plants

Constituents	Moisture	Nitrogen	Crude protein	Total minerals	Crude fibre	Reducing sugar	Total sugar	Starch
Value of X^2	0.4221	0.0363	0.1161	0.0702	3.2337	0.5998	0.1731	0.3011
Probability of heterogeneity more than	0.10	NS	0.05	NS	0.50	0.40	0.05	0.10

The feeding behavior of tasar larvae on these secondary food plants has been given in Table 4.

Table 4

Feeding behaviour of tasar silk worm on secondary food plants

Food plants Characters	*Lagerstroemia indica*	*Terminalia paniculata*	*Careva arborea*	*Lagerstroemia speciosa*	*Dalbergia sissoo*
E.R.R. (%)	40.0	34.4	10.0	Total mortality	Total mortality
Mature larval weight (g)	36.6	37.0	36.7	—	—
Cocoon weight (g)	11.8	10.8	13.6	—	—

Considering the importance of these secondary food plants, the study reveals that *Lagerstroemia indica* and *Terminalia paniculata* which have low percentage of fibre along with high percentage of sugar, starch, reducing sugar and minerals, contribute good nutritional value since tasar silk worm gives better rearing results on these two plants.

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