

## CHLOROPHYLL CONTENT AS AN INDEX FOR SELECTION IN *RAUWOLFIA* SPP.

There is a renewed interest, world wide, in herbal medicines. The genus *Rauwolfia* belongs to this group, the dried roots of which are used for the treatment of hypertension, mental disorder and snake bite. The medicinal property of *Rauwolfia* roots is due to the presence of a number of alkaloids in them (Sahu, 1979).

The cultivation of medicinal plants is now gaining momentum. The selection of superior types of *Rauwolfia* having higher root yield and alkaloid content, is essential for the profitable cultivation. The estimation of the root alkaloid content is a tedious, time consuming and expensive process in *Rauwolfia* and this is an important obstacle in the screening for the superior types.

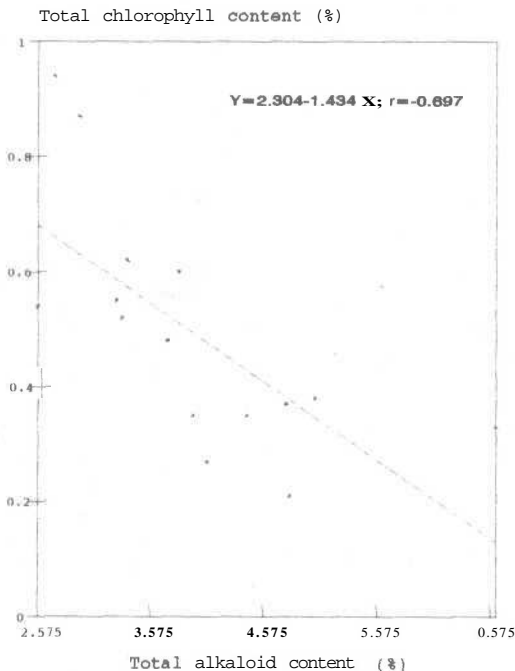


Fig 1. Relationship between total root alkaloid and total chlorophyll content of aerial parts in *Rauwolfia* spp.

Production of alkaloids which are generally considered to be secondary metabolites

depends on the primary process of photosynthesis. Hence the chlorophyll content of the species has a direct bearing on the productivity of the alkaloids. Estimation of the chlorophyll content is relatively easier compared to the estimation of the total alkaloids. Moreover, by estimating the chlorophyll content, the screening for the root alkaloid content can be done without uprooting the plants and at the early stages of growth itself evaluation can be done without destroying the plants. This reduces the cost of selection trials considerably.

Hence an attempt is made to formulate the relationship between the total root alkaloid content and chlorophyll content of the aerial parts in *Rauwolfia* spp. by the regression equation  $Y = a + bx$ .

The study was conducted at the College of Horticulture, Kerala Agricultural University, Vellanikkara, Trichur during 1991-93. Four species of one year old *Rauwolfia* plants from ten geographical locations of Kerala were taken for the study. The total alkaloid content in the roots was estimated following the procedure of Cromwell (1955) and Sahu (1983). The estimation of the total chlorophyll content was done according to Witham *et al.* (1971). Mean value of three samples from each specimen was taken for regression analysis.

Results (Table 1) indicates that the highest content of the total root alkaloid is in the species *Rauwolfia beddomei* (1.77%) and the lowest in *R. tetraphylla* (1.16%). The highest content of the chlorophyll was observed in the species *R. tetraphylla* (0.73%) and the lowest in *R. beddomei* (0.35%).

The pooled regression analysis (Fig. 1) showed that the total alkaloid content of the roots and chlorophyll content of the aerial parts are negatively correlated with the correlation coefficient of -0.697. The regression equation of  $Y = (2.304) + (-1.434) X_1$ , was found to be

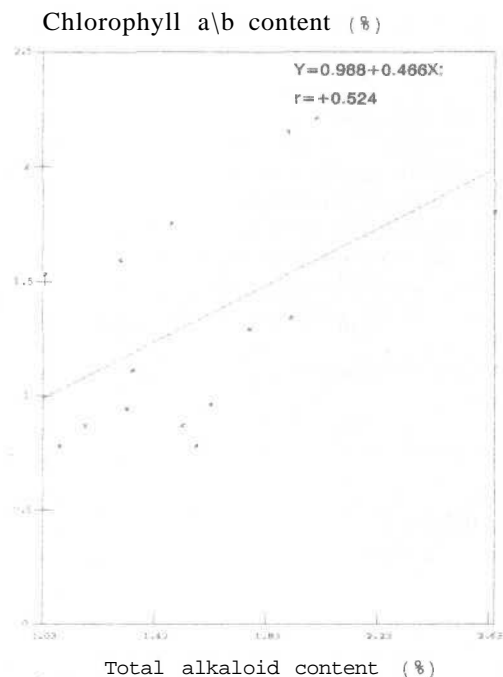


Fig 2. Relationship between total root alkaloid and a/b ratio of chlorophyll in *Rauwolfia* spp.

suites, where  $Y$  = total root alkaloid content,  $X_1$  = Total chlorophyll content of aerial parts, which is significant at the level of  $P = 0.003$ .

Table 1 also shows that the a/b ratio of chlorophyll is the highest in *Rauwolfia densiflora* (1.75) and the lowest in *R. tetraphylla* (1.07). The regression analysis (Fig. 2) showed that the total root alkaloid content is correlated positively to the a/b ratio of chlorophyll, with the correlation coefficient of +0.524. The regression equation of  $Y = (+0.988) + (+0.466) X_1$ , was found to be fit where  $Y$  = total root alkaloid content,  $X_2$  = a/b ratio of chlorophyll which is significant at  $P = 0.037$ .

These relationships can be effectively utilised in the evaluation studies and selection trials of the genus *Rauwolfia* for the total root alkaloid content.

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Table 1. Variations in the total root alkaloid content, total chlorophyll content of aerial parts and a/b ratio of chlorophyll in *Rauwolfia* spp. (% on dry weight basis)

District	Locality	Total alkaloid content of roots, %	Total chlorophyll content of aerial parts, %	a/b ratio of chlorophyll
I. <i>Rauwolfia tetraphylla</i>				
Thrissur	Peechi	1.09	0.94	0.78
Thrissur	Vellanikkara	1.03	0.54	1.53
Palakkad	Kanhirappuzha	1.35	0.62	1.11
Malappuram	Malappuram	1.18	0.87	0.87
Mean		1.16	0.73	1.07
II. <i>Rauwolfia serpentina</i>				
Wynad	Thirunelli	2.65	0.33	1.80
Kannur	Alakkod	1.33	0.52	0.94
Malappuram	Munderi	1.58	0.35	0.78
Malappuram	Edapal	1.63	0.27	0.96

Table I (contd..)

Palakkad	Kanhirappuzha	1.31	0.55	1.59
Palakkad	Mannarghat	1.91	0.37	2.15
Thrissur	Peechi	1.92	0.21	1.34
Thrissur	Vellanikkara	2.01	0.38	2.21
Trivandrum	Palode	1.53	0.60	0.87
Mean		1.76	0.40	1.40
III. <i>Rauwolfia densiflora</i>		1.49	0.48	1.75
IV. <i>Rauwolfia beddomei</i>		1.77	0.35	1.29

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