

## INTERSPECIFIC VARIATION IN LEAF PHENOLICS OF SIX *PROSOPIS* SPECIES

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### ABSTRACT

Phenolics in leaf extracts of six *Prosopis* species viz. *P. juliflora*, *P. tamarugo*, *P. chilensis*, *P. alba*, *P. siliquastrum* and *P. cineraria* were studied using two dimensional thin layer chromatography. Each species had a characteristic phenolic pattern. Maximum number of phenolic spots (16) was recorded in *P. chilensis* and *P. siliquastrum* and minimum number (9) was observed in *P. cineraria*. In total, there were 37 spots in all the species. The degree of similarity as indicated by number of common spots among different species was in close agreement with their classification based on morphological criteria and geographical distribution.

### INTRODUCTION

In recent years, many biochemicals like flavonoids, enzymes, terpenoids, nucleic acids, etc. have been used in genetic studies of tree species. On account of their universal presence, chemical complexity variable occurrence among species and easy detection in plant extracts, phenolic compounds have been extensively studied. Phenolic patterns have been used for verification of species (Hanover and Wilkinson, 1970), races (Frost et al., 1977) and cultivars (Grant, 1973). Genus *Prosopis* has been classified into 44 species using morphological criteria (Burkart, 1976). Present study deals with biochemical variation and interrelationship among six *Prosopis* species belonging to different geographical areas.

### MATERIAL AND METHODS

Leaves of six *Prosopis* species viz. *P. juliflora*, *P. tamarugo*, *P. chilensis*, *P. alba*, *P. siliquastrum* and *P. cineraria* were collected, dried at 70°C for 24 h and ground to fine powder. Phenolics were extracted at room temperature in acidified methanol (methanol containing 1% conc. HCl). Leaf extracts were applied on chromatographic plates (12 x 16 cm, with 350  $\mu$  thick cellulose-MN 300 coating). Two dimensional thin layer chromatography was carried out using 2% formic acid in water and isoamyl alcohol : conc. acetic acid : water :: 10 : 6 : 5. The chromatograms were dried, sprayed with 1% NaOH in methanol and examined under UV (366 m $\mu$ ). Five plates of each sample were run.

## RESULTS AND DISCUSSION

Two dimensional chromatography revealed varying combinations of a total of 37 spots in different species (Fig. 1). The number of spots was maximum (16) in *P. chilensis* and *P. siliquestrum*, and minimum (9) in *P. cineraria*. The color reactions, Rf values and distribution of spots in different species are given in Table 1. Yellow, blue and green spots were most frequent in different species and represented various types of phenolics like flavones, flavonoids, isoflavones, phenolic acids, etc. Besides these, a characteristic orange spot (No. 6) was present in *P. cineraria*. Variations in phenolic pattern of other *Prosopis* species have also been reported by Solbrig et al. (1977) and different species of a genus are known to have different flavonoid patterns (Harborne, 1975).

Maximum number of common spots (thirteen) was in *P. chilensis* and *P. juliflora*, species Burkart (1976) grouped these two under one section - Algarobia. *Prosopis tamarugo* had eight spots common with *P. juliflora* and *P. chilensis*. Even though *P. tamarugo* was assigned to a different section (Strombocarpa) by Burkart (1976), natural geographic areas of development of these three species suggest that these belong to a common (Tropical Andean) Region.

*Prosopis alba* and *P. siliquestrum* with ten spots in common had a low degree of similarity with other species. *P. alba* was somewhat related to *P. tamarugo* with six spots in common.

Phenolic pattern of *P. cineraria* was distinctly different from all other species and had very low similarity of phenolic spots with other species. Burkart (1976) assigned this species to the section *Prosopis*. It has totally different geographical distribution (South-west Asia) as compared to other species.

Good agreement between flavonoids pattern and classification of genus *Pinus* into sub genera and sections based on conventional morphological characters was reported by Harbone (1975). There is ample interspecific variation in phenolics and degree of similarity in phenolic patterns is mostly in accordance with classification based on morphological characters and geographical distribution of *Prosopis* species. Data on phenolic pattern of other *Prosopis* species may help in biochemical characterisation of these species and can serve as a supplementary criterion to confirm or revise the existing classification of this genus.

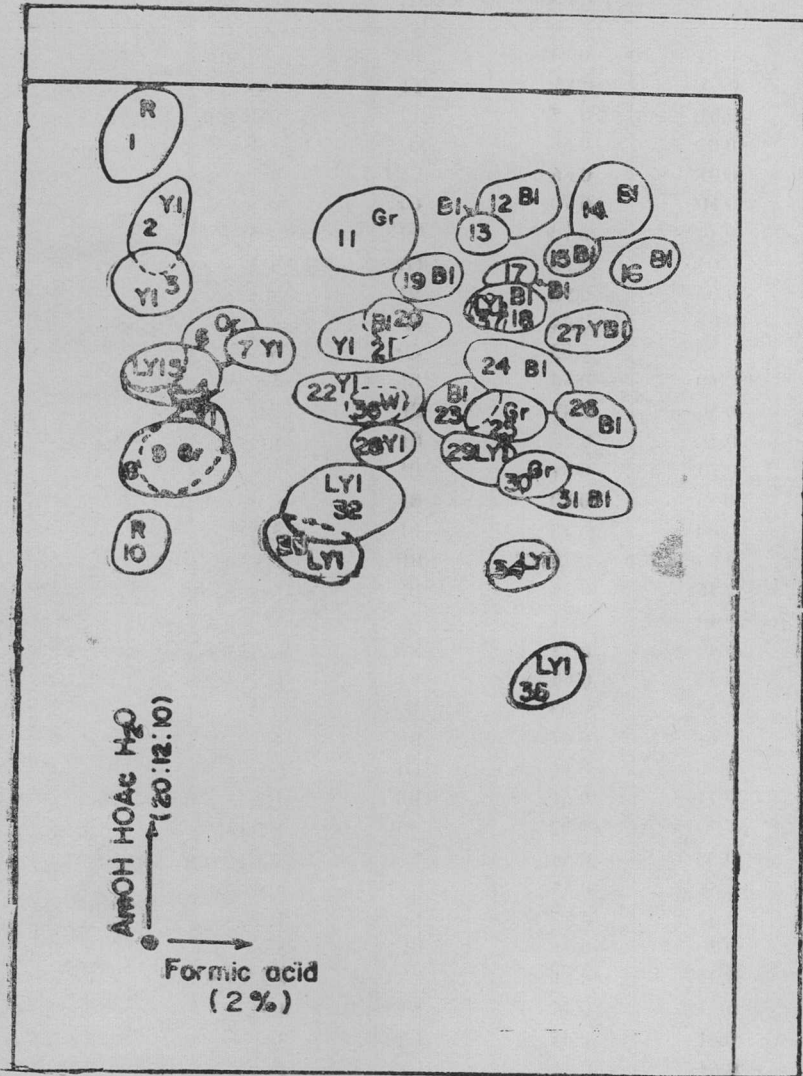


Fig. 1. Diagrammatic representation of different flavonoid spots obtained in six *Prosopis* species by two dimensional thin layer chromatography

Table 1. Rf values, colour reactions and distribution of phenolic spots in six *Prosopis* species  
 1 -*P. juliflora*, 2 -*P. tamarugo*, 3 -*P. chilensis*, 4 -*P. alba*, 5 -*P. siliquastrum*, and 6 -*P. cineraria*

Spot No.	Rf value in		Colour in UV + NaOH	Spot present in ( <i>Prosopis</i> spp. No.)
	2% formic acid	Am OH:AcOH:H <sub>2</sub> O (10:6:5)		
1	0.01	0.94	R	All spp.
2	0.01	0.83	Yl	4,5
3	0.01	0.77	Yl	All spp.
4	0.02	0.66	Gr	1,2,3,
5	0.01	0.66	LYl	4,5
6	0.10	0.70	Or	6
7	0.17	0.70	Yl	2,5
8	0.03	0.56	Gr	1,3
9	0.03	0.56	Yl	4,5
10	0.01	0.46	R	6
11	0.36	0.83	Gr	6
12	0.60	0.86	Bl	4,5
13	0.56	0.83	Bl	2,4
14	0.78	0.86	Bl	5,6
15	0.70	0.81	Bl	3,5
16	0.83	0.80	Bl	1,3
17	0.60	0.78	Bl	3,5
18	0.60	0.75	Bl	1,3
19	0.46	0.78	Bl	1
20	0.40	0.73	Bl	4
21	0.40	0.72	Yl	1,2,3,4,6
22	0.33	0.64	Yl	1,2,3,4,5
23	0.52	0.63	Bl	4
24	0.61	0.67	Bl	4
25	0.60	0.61	Gr	1,3
26	0.74	0.61	Bl	1,2,3
27	0.73	0.72	YBl	1,2,3
28	0.38	0.58	Yl	2
29	0.56	0.58	LYl	4,5
30	0.64	0.55	Gr	1,3
31	0.70	0.53	Bl	5
32	0.31	0.51	LYl	1,2,3,4,5
33	0.27	0.46	LYl	4,5
34	0.61	0.45	LYl	3
35	0.67	0.31	LYl	4
36	0.38	0.63	W	6
37	0.56	0.74	LYl	6

Yl = Yellow; Gr = Green; R = Red, Or = Orange, Bl = Blue, LYl = Light yellow, YBl = Yellow blue, W = Whitish.

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