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NOTE

Chemical Investigation of the Seeds of *Adenanthera pavonina* Linn.

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The reducing sugars present in the seeds of *Adenanthera pavonina* Linn are 3.16 per cent (as glucose) containing D-arabinose, D-glucose, D-rhamnose and D-xylose. The percentages of various amino acids present in the crude protein (4.5%) were found to be: alanine (6.96%), aspartic acid (14.17%), cystine (4.64%), glutamic acid (20.33%), glycine (4.64%), leucine (11.49%), methionine (6.50%), proline (8.25%), serine (7.66%) and tyrosine (6.74%).

Key Words: Chemical, Analysis, Seeds, *Adenanthera pavonina* linn.

Adenanthera pavonina Linn. belongs to the family Leguminosae and is a small unarmed tree. It is known as Barigumchi in Hindi, Rakta-Kamal in Bengali, Thorligunj in Marathi and Gurivenda in Telugu. It is widely distributed in Bengal, Burma, Western Peninsula, Ceylon, Malay Islands, Timor, China and the Philippines[1, 2]. The powered seeds make a useful external application hastening suppuration. A decoction is made from the leaves in South India and given as a remedy for chronic rheumatism and gout. Its decoction is said to be useful in haemorrhage from the bowels and haematuria. The plant is also used as a cure for sore throat.

Analysis of reducing sugars: The seeds of the plant were collected from Pratap Nursery and Seed Stores, Dehradun (U.P.). 10 g of seed powder was refluxed with small quantity of calcium carbonate and 100 mL of distilled water for 1 h. The aqueous extract was separated by decantation and the powder was further refluxed thrice with 50 mL of distilled water each time. The aqueous filtrates were combined and 10 per cent solution of lead acetate was added till the precipitation was complete. It was filtered and the filtrate was neutralized with ammonia. This neutral solution was concentrated on a water bath till the volume became 100 mL.

Identification of reducing sugars: For identification of sugars the spots of the concentrated test mixture and authentic samples were developed in an *n*-butanol : acetic acid : water (4 : 1 : 5 upper layer) solvent system. After developing the chromatogram was sprayed with anisaldehyde sulphuric acid reagent.

The identity of test sugars has been confirmed by comparison of their R_f values with those of authentic sugars in Table-1. The amounts of reducing sugars were estimated (as glucose) by Fehling's method using methylene blue as indicator. Thus the percentage of reducing sugars as found to be present in the solution is 3.16 per cent (as glucose).

TABLE-1

Name of reducing sugar	R_f	
	Reported	Observed
D-arabinose	0.27	0.27
D-glucose	0.18	0.16
D-Rhamnose	0.39	0.41
D-xylose	0.30	0.31

Isolation of Crude Protein

Identification of amino acids: 100 g of defatted seed powder was macerated overnight with 10 per cent brine solution. The protein was precipitated from saline extract by adding dilute hydrochloric acid and filtered off and dried; 100 g of the defatted seeds thus gave 4.5 g of the crude protein.

Acid hydrolysis of crude protein: 1.0 g of crude protein was hydrolyzed by refluxing with 100 mL of 6 N hydrochlorid acid for 20 h at 105–110°C. The solution was decolorized by animal charcoal and filtered. The filtrate was transferred to an evaporating dish and the excess of hydrochloric acid was removed by evaporation on a steam bath. The hydrolyzate was dissolved in 30 mL of water, filtered and again evaporated to dryness. The procedure of dissolving in water and evaporation was repeated twice to remove the excess of acid. Finally dry the hydrolyzate was dissolved in 10 per cent isopropanol and the solution was subjected to descending paper chromatography[3, 4] developed in *n*-butanol : glacial acetic acid : water (4 : 1 : 5, upper layer) solvent system and sprayed with ninhydrin in 95 per cent butanol containing 5 per cent to 2 N acetic acid. Amino acids were identified by co-chromatography with authentic samples. R_f values have been reported in Table-2.

Quantitative estimation of amino acids: The modified spectrophotometric method suggested by Moore and Stein[5] has been used for the quantitative estimation of amino acids. Standard solutions of 0.05, 0.15, 0.20 and 0.25 per cent of glycine in 10 per cent isopropanol were applied on Whatmann No. 1 filter paper and developed in *n*-butanol : acetic acid : water (4 : 1 : 5) solvent system. The paper was sprayed with ninhydrin solution. The spots were eluted with 5 mL of 10 per cent isopropanol. The optical densities of known amino acid solutions were measured by UV at maximum wavelength (around 250 nm). A graph was plotted between optical density and concentration of glycine. The concentration of amino acids present in seed protein was obtained from the graph of glycine by interpolating their optical densities. The amino acid percentages calculated from their concentration have been presented in Table-2.

TABLE-2

S. No.	Amino acid	R_f reported	R_f observed	Optical density	Amino acids (%)
1.	Alanine	0.60	0.59	0.0500	6.96
2.	Aspartic acid	0.40	0.40	0.0112	14.17
3.	Cysteine	0.30	0.32	0.0040	4.64
4.	Glutamic acid	0.52	0.51	0.0185	20.33
5.	Glycine	0.55	0.55	0.0110	12.77
6.	Leucine and isoleucine	0.76	0.75	0.0095	11.49
7.	Methionine	0.69	0.68	0.0055	6.50
8.	Proline	0.62	0.62	0.0070	8.25
9.	Serine	0.39	0.38	0.0066	7.66
10.	Tyrosine	0.65	0.65	0.0058	6.74

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