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SHORT COMMUNICATION

FLAVONOIDS OF SOME ASCLEPIADACEOUS PLANTS

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Abstract—The distribution of flavonoid glycosides in some South Indian plants belonging to the Asclepiadaceae has been studied and is found to be significantly in favour of quercetin; kaempferol is present in traces only and flavone was absent from all of the plants examined. Rutin has been isolated from the leaves of *Hemidesmus indicus* and from the pericarp of the follicles of *Leptadenia reticulata* in significant amounts. The seeds of *L. reticulata* are rich in hyperoside.

IN RECENT years, a number of investigators have been interested in the study of comparative biochemistry of flavonoids, and the distribution pattern of these pigments in certain plant orders has been considered to have some chemotaxonomical value.[1] Little work has been recorded[2] on the flavonoid glycosides of plants belonging to the family Asclepiadaceae, though kaempferol and quercetin are known[3] to occur in some members of this family. In continuation of our earlier work[4] on the survey of flavonoids in South Indian plants and in view of the fact that a number of plants of this family are valued in the Indian indigenous system of medicine,[5] we have systematically examined different parts of some Asclepiadaceae plants which are commonly found in South India.[6] Our results are summarized in Table 1.

Leptadenia reticulata does not produce any milky latex in the stems or leaves, but fresh follicles, on plucking or cutting with a sharp blade, yield a thick yellow latex which coagulates in a few minutes. This observation of ours prompted us to study the pigment of the latex as well as the pericarp and the seeds. Another interesting observation made by us relates to the occurrence of brownish-yellow pubiscent hairs on the follicles (especially the immature ones) of *Marsdenia volubilis*. *Hemidesmus indicus* known as Indian Sarasaparilla is reputed for its diuretic value; the leaves of this plant do not seem to have been examined earlier.

EXPERIMENTAL

The following procedure, in brief, was adopted for the identification of flavonoids in the plant material; in the case of *Marsdenia volubilis*, the entire follicles were extracted by cold maceration with methanol, when the hairs got dislodged and the pigment was easily extracted. Fresh plant material was extracted with cold methanol by repeated mincing in a Waring blender till the last extract had practically no yellow colour. The

[1] E. C. BATE-SMITH, in *Chemical Plant Taxonomy* (edited by T. SWAIN), p. 127, Academic Press, London (1963).
[2] J. B. HARBORNE, *Comparative Biochemistry of the Flavonoids*, p. 209, Academic Press, London (1967).
[3] E. C. BATE-SMITH, *J. Linn. Soc.* (*Botany*) **58**, 39 (1962).
[4] S. SANKARA SUBRAMANIAN and A. G. R. NAIR, *Indian J. Chem.* **1**, 450 (1963).
[5] K. R. KIRTIKAR and B. D. BASU, *Indian Medicinal Plants*, Vol. 3, pp. 1596–1635. Lalit Mohan Basu, India (1933).
[6] J. S. GAMBLE, *Flora of the Presidency of Madras*, Vol. 2, pp. 578–598. Botanical Survey of India, Calcutta (1957).

TABLE 1. FLAVONOL GLYCOSIDES OF THE ASCLEPIADACEAE

Plant species	Parts examined	Flavonol glycosides identified‡	Aglycones after hydrolysis (total ethyl acetate extract)
Leptadenia reticulata W. & A.	Latex	Hyperoside	Quercetin
	Follicle, pericarp	Isoquercitrin Rutin*	Kaempferol†
	Seeds	Hyperoside*	
Marsdenia volubilis T. Cook	Follicle, hairs (Rich in free quercetin)	Hyperoside* Rutin	Quercetin
	Stem and leaves[7]	Kaempferol Glycoside	Kaempferol
Hemidesmus indicus R. Br.	Flowers	Hyperoside Isoquercitrin Rutin	Quercetin
	Leaves	Hyperoside Rutin*	Quercetin
Calotropis gigantea R. Br.	Flowers	Hyperoside Rutin	Quercetin Kaempferol†
	Seeds	Hyperoside	Quercetin
Telosma minor Craib	Flowers	Hyperoside Isoquercitrin	Quercetin
Daemia extensa R. Br. (*Pergularia extensa* N.E. Br.)	Stem	Hyperoside	Quercetin Kaempferol†
Heterostemma tanjorense W. & A.	Stem Follicle, pericarp	Rutin	Quercetin

* Indicates isolation of the glycosides.

† Indicates the pigment in traces.

‡ Hyperoside = quercetin 3-galactoside; rutin = quercetin 3-rhamnosylglucoside; isoquercitrin = quercetin 3-glucoside.

combined extracts were concentrated *in vacuo* till all the organic solvent was removed. The aqueous concentrate was repeatedly shaken with petrol. ether, 60–80°, ether and ethyl acetate in succession. The residues from the ether and ethyl acetate layers were studied by paper chromatography in five solvent systems, and the colour of spots on the chromatogram observed by exposure to ammonia and under u.v. light.

In cases where a fair concentration of glycoside was indicated in the ethyl acetate extract, the concentrate was taken into the minimum amount of aqueous alcohol, layered with ether and left in an ice-chest for about a week, when there was separation of the major glycosidic pigment. The isolated glycoside in each case was fully characterized by colour reactions, spectral properties, R_f values, including co-chromatography, and mixed m.p. with authentic samples, as well as hydrolysis by 7 per cent H_2SO_4 in aqu. EtOH to yield the flavonol (quercetin) and sugars which were characterized by paper chromatography and comparison with authentic samples.

In cases where the proportion of the flavonol glycosides in the ethyl acetate concentrate was low, they were separated by preparative paper chromatography (Whatman No. 3, *n*-butanol:27 per cent acetic acid, 1:1) and the zones developed eluted with methanol. The properties (colour reactions, R_f in PC and TLC) of the eluted pigments were compared with those of authentic samples of the compounds.

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[7] D. VENKATA RAO, E. VENKATA RAO and V. VISWANATHAM, *Current Sci. (India)* **36**, 421 (1967).
[8] A. G. R. NAIR and S. SANKARA SUBRAMANIAN, *Current Sci. (India)* **33**, 211 (1964).