

4.40–4.64 (2H, *dd*, *J* 12 Hz, H-2 and H-3), 7.68 (3H, *s*), 7.75 (9H, *s*), 8.00 (3H, *s*). The UV values are the same as those reported in the lit.⁷ *Astilbin*,⁸ m.p. 179–180° (lit.⁸ 180°), $[\alpha]_D^{20}$ –18° (*c* 1.0, EtOH), M^+ 450 ($C_{21}H_{22}O_{11}$). Acid hydrolysis under standard conditions afforded rhamnose and taxifolin. *Quercitrin*,⁹ m.p. 185–187°, (lit.⁹ m.p. 182–185°), identical to an authentic sample. It gave an acetate, m.p. 198–199°; acid hydrolysis afforded rhamnose and quercetin.

Anti-tumour properties. Assay of taxifolin against the KB and P388 test systems showed it to be inactive against the KB test but active against the P388 system, with a T/C ratio of 140 at 150 mg/kg and 137 at 100 mg/kg.

Acknowledgements—We thank Dr. Lydia Rodriguez-Hahn for an authentic sample of cryptomeridiol.

⁷ MABRY, T. J., MARKHAM, K. R. and THOMAS, M. B. (1970) *The Systematic Identification of Flavonoids*, p. 224, Springer, New York.

⁸ HAYASHI, K. and OUCHI, H. (1950) *Misc. Reps. Research Inst. Nat. Resources (Tokyo)* **17–18**, 19; (1952) **26**, 22.

⁹ GEISSMAN, T. A. (ed.) (1962) *The Chemistry of Flavanoid Compounds*, p. 336, Macmillan, New York.

Phytochemistry, 1973, Vol. 12, pp. 2550 to 2551. Pergamon Press. Printed in England.

LACTONIC LIGNANS OF *POLYGALA CHINENSIS*

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Key Word Index—*Polygala chinensis*; Polygalaceae; suchilactone; chisulactone; helioxanthin.

Plant. *Polygala chinensis* L.¹ *Source.* Several parts of India.² *Uses.* As a substitute for *Polygala senega* as an expectorant. *Previous work.* On the whole plant reported to contain saponins,³ but their nature was not determined.

Present work. The dried and powdered whole plant (5.8 kg) was first extracted in a Soxhlet with petrol. (60–80°) followed by EtOH, 16 hr each. Each of these extracts were examined separately.

Petrol. extract. The extractives crystallized from EtOH as needles (4.3 g). *Suchilactone.* The analytical TLC showed two spots and the components were separated by preparative TLC. The major compound, suchilactone, was identified as 2-piperonylidene-3-veratryl-3S- γ -butyrolactone (m.p., $[\alpha]_D$, UV, IR, PMR, MS). It was previously reported as a degradation product of helianthoidin.⁴ The diol, $C_{21}H_{24}O_6$ (M^+ , 372), from the $LiAlH_4$ reduction of suchilactone had m.p. 118°; λ_{max}^{EtOH} 208, 255–260 nm; v_{max} (mineral oil)

¹ SHAH, C. S., VYAS, L. S. and AGHARA, L. P. (1957) *Indian J. Pharm.* **19**, 10.

² The plant material was collected from Varanasi and the identity was confirmed by Dr. C. S. P. Rao, Department of Botany, Banaras Hindu University. A voucher specimen has been preserved at the Department of Pharmaceutics.

³ WAHID, M. and SAMIULLAH, A. (1960) *Pakistan J. Sci. Ind. Res.* **3**, 228; (1963) *Chem. Abstr.* **58**, 1301.

⁴ BURDEN, R. S., CROMBIE, L. and WHITING, D. A. (1969) *J. Chem. Soc. C*, 693.

3260, 1025 (OH), 1595 (Ar-C=C). Oxidation of suchilactone with alkaline KMnO_4 furnished piperonylic and veratric acids. This is the first demonstration of the natural occurrence of this lactonic lignan.

Chisulactone. The second lignan, obtained as a minor entity (57 mg) from the preparative TLC, had m.p. 108–110°, $\text{C}_{21}\text{H}_{22}\text{O}_6$ (two OMe, one methylenedioxy, no C-CMe or active H); $[\alpha]_D^{25} -72.6^\circ$ (c 0.58, CHCl_3); it showed colour reactions, UV, IR and PMR spectra similar to those of suchilactone; significant difference was observed in the MS: m/e 368 (M^+ , 4%), fragment ion peaks at m/e 233 (9%, from the loss of piperonyl moiety from the molecular ion), 203 (12%, loss of CH_2O from the fragment ion m/e 233), m/e 174 (17%), and the dominant peak at m/e 135 (100%). The compound seems to be a new lactonic lignan and the structure will be the subject of a later communication.

EtOH extract. The EtOH extract was concentrated to a small volume and then worked up following a method described⁵ for oxygenated xanthenes. The product obtained from the CHCl_3 -soluble acetates was chromatographed over neutral alumina (activity ca. III) and eluted with C_6H_6 , $\text{C}_6\text{H}_6\text{-CHCl}_3$ (1:1), and CHCl_3 . Evaporation of the $\text{C}_6\text{H}_6\text{-CHCl}_3$ eluates followed by crystallization from MeOH-CHCl_3 afforded yellow needles (32 mg.) identified as *helioxanthin*⁴ (m.p., colour reactions, UV, IR, PMR, MS). The co-occurrence of the unsaturated acyclic lignans suchilactone and chisulactone with their cyclic analogue, helioxanthin, in *P. chinensis* is biogenetically significant since acyclic unsaturated lignans are regarded as the precursors of aryltetralins and aryl-naphthalenes.

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⁵ CHAUDHURI, R. K. and GHOSAL, S. (1971) *Phytochemistry* **10**, 2425.

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LYONISIDE AND AUCUPARINS FROM WOOD OF NORTH AMERICAN *SORBUS* SPECIES*

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Key Word Index—*Sorbus scopulina*; *S. americana*; Rosaceae; lyoniside; dimethoxy isolariciresinol; aucuparin; methoxyaucuparin.

Lyoniside ((+)-dimethoxy isolariciresinol xyloside), aucuparin, and methoxyaucuparin isolated previously from the wood of the showy mountain ash, *Sorbus decora* (Sarg.)

* NRCC No. 13384.