portions extracted successively with light petrol. (60–80°) and EtOH. EtOH extract fractionated by standard methods into neutral, phenolic and basic fractions. Basic fraction was not investigated.

Phenolic fraction. Quercetin (identified by m.p., and m.p. and m.m.p. of pentaacetate). Chromatography on silica gel gave 5,7-dihydroxy 2-methylchromone (noreugenin) $C_{10}H_8O_4$, m.p. 288–291° identified by m.p., NMR and MS: NMR (d_5-pyridine); τ 7·98 (3H, *s*), 3·98 (1H, *s*), 3·50, 3·38 (2H, *AB*-quartet, *J* 2 Hz): (d_6-DMSO); τ −2·78 (2H, *s*) exchangeable with D_2O. τ 3·98 peak broadened by weak coupling with methyl protons, confirmed by double irradiation. MS: *m/e* 192 (M^+), 164 (M-CO), 163, 152 ($M-C_3H_4$), 124, 96 and an unidentified flavone as yellow needles, m.p. 220–225°, IR (KBr) ν_{max} 1647, 1600 cm^{-1}, UV (MeOH) λ_{max} 245, 292, 335 nm, M^+ *m/e* 302, R_f 0·63 [Whatman No. 1, BAW (4:1:5)]. Acetate m.p. 101–105°. This is the first report of isolation of noreugenin from Ericaceae and only for the second time it has been isolated as a natural product.[4]

Neutral fraction.[5] Sitosterol (identified by m.p. and m.m.p.).

Acknowledgement—We thank Professor Sultan Ahmad of Government College, Lahore for identification of the plant.

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[4] E. FUGITA, T. FUGITA and T. ZUZUKI, *Chem. Pharm. Bull. Tokyo* **15**, 1682 (1967).

[5] A number of other compounds have been isolated from this fraction, the chemistry of which will be described later.

Phytochemistry, 1973, Vol. 12, pp. 728 to 729. Pergamon Press. Printed in England.

FLAVONOIDS OF *SWERTIA PURPURASCENS*

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(*Received* 9 *October* 1972. *Accepted* 18 *October* 1972)

Key Word Index—*Swertia purpurascens*; Gentianaceae; oleanolic acid; swertisin; swertiamarin.

Plant. Swertia purpurascens Wall. *Uses.* Medicinal, used in Pakistan as substitute for *S. chirata*[1] as bitter tonic, stomachic, febrifuge and laxative. *Previous work.* None, but on many sister species.[2]

Present work. The whole plant including roots has been examined. The dried plant material was extracted with MeOH in a Soxhlet apparatus and the methanolic extract concentrated *in vacuo*. The concentrate dissolved in H_2O and extracted with C_6H_6, $CHCl_3$ and *n*-butanol.

Benzene extract. Column chromatography over alumina and elution with C_6H_6 gave *sitosterol*, $C_{29}C_{50}O$, m.p. 137° (m.m.p., acetate, m.p. and m.m.p. 129°). Elution with C_6H_6–MeOH (99:1) gave *oleanolic acid*, $C_{30}H_{48}O_3$, m.p. 305° (I.R., MS, TLC, m.p. of acetate) (Found: C, 78·74; H, 10·57. Calc. for $C_{30}H_{48}O_3$: C, 78·9; H, 10·50%).

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[1] R. N. CHOPRA, S. L. NAYAR and I. C. CHOPRA, *Glossary of Indian Medicinal Plants*, p. 237, Council of Scientific and Industrial Research, New Delhi (1956).

[2] M. KOMATSU, T. TOMIMORI, Y. MAKIGUCHI and K. ASANO, *Yakugaku Zasshi* **88**, 832 (1968).

Chloroform extract. This mostly contains xanthones, work on their identification is in progress. However, a yellow crystalline mass separated at the interface of $CHCl_3$ and H_2O layers during extraction procedure. This was separated and crystallized from MeOH to give pale yellow needles, m.p. 243° (dec), $C_{22}H_{22}O_{10}$. (Found: C, 59·61; H, 5·09. Calc. for $C_{22}H_{22}O_{10}$ C, 59·19; H, 4·97%). It gave greenish-brown color with $FeCl_3$ and the reduction tests for (Mg–HCl and Zn–HCl) flavonoids were positive. The UV spectrum showed λ_{max} at 273 and 336 nm (log ϵ 4·24 and 4·32). Acetylation gave a hexaacetate, $C_{34}H_{34}O_{16}$, m.p. 156–158°. These properties indicated the flavonoid to be the known compound *swertisin*, previously isolated from *S. japonica.*[3] Direct comparison with an authentic sample confirmed the identification (m.m.p.; superimposable IR, UV spectra of the compound and derivative).

n-*Butanol extract.* This fraction contains a number of glucosides; only one glucoside could be isolated in pure form by fractional crystallization of the crude mixture, which crystallized from EtOH to give *swertiamarin,*[4] $C_{16}H_{20}O_{10}$, m.p. 113–114°, $[\alpha]_D$ −12°. Tetraacetate, $C_{24}H_{30}O_{14}$, m.p. 190–191° (Found: C, 52·78; H, 5·64. Calc. for $C_{24}H_{30}O_{14}$: C, 52·94; H, 5·80%) (m.m.p., IR, UV and NMR).

Acknowledgements—We are thankful to Mr. A. M. Salaria, Chief Conservator of Forests, Azad Kashmir, Muzzafarabad, for the collection of Plant material. Thanks are also due to Dr. F. W. Bachelor, Department of Chemistry, The University of Calgary for running IR, UV, NMR and MS of the compounds.

[3] M. KOMATSU, T. TOMIMORI and M. ITO, *Chem. Pharm. Bull. Japan* **15,** 263 (1967).
[4] H. INOUYE, S. UEDA and Y. NAKAMURA, *Chem. Pharm. Bull. Japan* **18,** 1856 (1970).

Phytochemistry, 1973, Vol. 12, pp. 729 to 730. Pergamon Press. Printed in England.

ALKALOIDS AND TERPENOIDS OF *ZANTHOXYLUM OVALIFOLIUM*

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(*Received* 9 *October* 1972. *Accepted* 21 *October* 1972)

Key Word Index—*Zanthoxylum ovalifolium*; Rutaceae; 6-canthinone; aurapten; isopimpinellin; β-amyrin; sitosterol.

The genus *Zanthoxylum* comprises of some 200 species distributed over the world, many of which have been chemically explored because of the occurrence of compounds covering a wide range of skeletal patterns in the Rutaceae. This particular genus belonging to the subfamily Rutoideae,[1] is noted for its febrifuge, sudorific and diuretic properties.[2]

A chemically uninvestigated species of this genus, *Zanthoxylum ovalifolium*, was collected from an altitude of nearly 8000–9000 ft from the Darjeeling District in the Himalayan Ranges. The plant is mainly distributed in the hilly regions of North and South India (Nilgiri hilly regions). It is a shrub with short prickles, leaves obtuse, emarginate with elliptic-oblong or obovate genulate tips. The leaves of North Indian plants are usually larger than those of South Indian ones.[3]

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[1] J. R. PRICE, in *Chemical Plant Taxonomy* (edited by T. SWAIN), p. 429, Academic Press, New York (1963).
[2] K. R. KIRTIKAR and B. D. BASU, *Indian Medicinal Plants,* Vol. 1, p. 459, The Indian Press, Allahabad, India (1935).
[3] J. D. HOOKER, *The Flora of British India,* Vol. I, p. 492, Reeve, London (1875).