

SHORT COMMUNICATION

STEROLS AND FLAVONOLS OF *FICUS BENGALENSIS*

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Abstract—The tiglic acid ester of ψ -taraxasterol has been isolated in 0.4% yield from the heartwood of *Ficus bengalensis*. The flavonols of the leaves have been identified as quercetin 3-galactoside and rutin.

Plant. *Ficus bengalensis* L.¹—Moraceae.

Source. Pondicherry.

Uses. Medicinal,¹⁻³ nutritional.⁴

Previous work. On bark;^{5,6} on sister species.^{1,7}

Present work. Heartwood and leaves.

Heartwood. The material coarsely powdered extracted with hot C₆H₆, Me₂CO and EtOH in succession.

C₆H₆ extract. ψ -Taraxasteryl ester.⁷ C₃₅H₅₈O₂, m.p. 236–238°, [α]_D²⁸ + 88.5° (CHCl₃). I.r. bands (KBr pellet) at 2940, 1730, 1455, 1375, 1245, 1025, 980, 873 and 655 cm⁻¹. Alkaline hydrolysis (C₆H₆ medium) gave ψ -taraxasterol⁸ (m.p. 215–216°, [α]_D²⁸ + 48.6°, acetyl, m.p. 240–242°, [α]_D²⁸ + 53.2°, benzoate, m.p. 270–274°) and tiglic acid⁸ (m.p. and mixed m.p. 62–64°, colour reactions and co-chromatography with authentic sample obtained from croton oil). The terpenoid thus identified as the tiglic acid ester of ψ -taraxasterol. β -Sito-sterol (column chromatography over alumina of the waxy residue after separation of the ester, colour reactions, m.p. and mixed m.p.).

Acetone extract. Dark-coloured furocoumarins⁷ and a little more of the ester (total yield, 0.4%).

EtOH extract. No crystalline component.

Leaves. Fresh tender leaves minced in a Waring blender with 70% alc. and extracted thrice. Concentrate treated with C₆H₆, Et₂O and EtOAc. C₆H₆ and Et₂O did not yield any crystalline compound. EtOAc extract yielded two flavonol glycosides identified as quercetin 3-galactoside (major) and rutin (minor) (m.p. and mixed m.p., *R_f*, co-chromatography and acid hydrolysis).

Comment. An ester of ψ -taraxasterol had been earlier isolated from the leaves of *F. carica*⁷ and the acid provisionally identified as tiglic acid. The identity of the ester now isolated from *F. bengalensis* as the tiglic acid ester of ψ -taraxasterol is based on a direct comparison of the

¹ ANON., *Wealth of India, Raw Materials*, Vol. IV, p. 24, C.S.I.R., New Delhi (1956).

² R. N. CHOPRA, I. C. CHOPRA, K. L. HANDA and L. D. KAPUR, *Chopra's Indigenous Drugs of India*, p. 508, U. N. Dhur, Calcutta (1958).

³ O. P. SHUKLA and C. R. KRISHNAMURTI, *J. Sci. Ind. Res., India* **20C**, 225 (1961).

⁴ W. H. MIA, B. SAHAI, B. M. MAJUMDAR and N. D. KEHAR, *Indian J. Dairy Sci.* **13**, 1 (1960).

⁵ D. S. SHROTRI and R. AIMAN, *Indian J. Med. Res.* **48**, 162 (1960).

⁶ H. D. BRAHMACHARI and K. T. AUGUSTI, *J. Pharm. Pharmacol.* **13**, 381 (1961).

⁷ I. E. EL-KHOLY and M. A. M. SHABAN, *J. Chem. Soc. (C)*, 1141 (1966).

⁸ G. HARRIS, *Dictionary of Organic Compounds*, Vol. V, p. 2942, Vol. IV, p. 2161, and Vol. III, p. 1433, Eyre & Spottiswoode, London (1965).

acid with tiglic acid. Chemical and physical data, including i.r. absorption bands, for both compounds are the same. It is quite likely that ficoceryl alcohol⁸ (m.p. 198°) and ficocerylic acid⁸ (m.p. 57°) isolated (after hydrolysis) from *F. ceriflua* are impure samples of ψ -taraxasterol and tiglic acid present as the ester in the plant. The leaves of *F. carica*⁷ contained only rutin while it is minor in *F. bengalensis*, the major pigment being quercetin 3-galactoside.

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