

Chemical Examination of the Fruits of *Ficus glomerata* Roxb.

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THE root, root bark, fruits, leaves and milky juice of *Ficus glomerata* Roxb. (Syn. *Ficus racemosa*, Linn.), a medicinal plant, are used in indigenous system of medicine^{1,2}. Its root bark³, leaves⁴ and stem bark⁵ have been studied chemically while its fruits remain chemically uninvestigated so far. Therefore, in the present investigation, the chemical constituents of the fruits were studied, and the compounds isolated were identified by direct comparison with the respective authentic samples.

The filtered hot ethanolic extract of the crushed fresh fruits of *Ficus glomerata* furnished hentriacontane, m.p. 67-68°, when kept overnight. The mother liquor was then concentrated to a semi-solid mass and extracted with petroleum ether (60-80°) several times in cold. The combined petroleum ether extract after usual processing yielded tiglic acid ester of taraxasterol⁶ having m.p. 236-38°

Mother liquor, after separation of tiglic acid ester of taraxasterol, yielded two more compounds of m.p. 135-37° and 182-84° on crystallisation and recrystallisation. The former compound was identified as β -sitosterol through its acetyl derivative preparation and m.m.p. determination with an authentic sample.

The compound having m.p. 182-84° was soluble in petroleum ether, ether, chloroform and carbon tetrachloride. It gave positive tests for triterpenes. Its I.R. spectra showed peaks at 1380 and 1370 cm^{-1} (gem-dimethyl function) and at 1460 cm^{-1} (methylene group) which confirms its triterpenoid nature. The absorption peaks at 1740 and 1250 cm^{-1} indicated the presence of ester group; no peak was observed in free hydroxyl region. The compound from m.p. and I.R. spectra appears to be gluanol acetate⁴. It was deacetylated in usual manner and the compound so obtained was found to be gluanol. Its I.R. absorption spectra showed peaks at 3340, 2930, 2860, 1460, 1380, 1030 and 890 cm^{-1} .

The alcoholic extract, after petroleum ether extraction, gave tests for free sugars. On paper chromatography, glucose was identified. This was confirmed by co-chromatography with an authentic sample of glucose.

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Chemical Constituents of *Jacaranda mimosifolia* Wood

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EARLIER examination of the seed oil of *Jacaranda mimosifolia* revealed the presence of *cis*-8-*trans*-10-*cis*-12-octadecatrienoic acid¹ and its flowers contained delphinidin-3, 5-diglucoside². The present report deals with the isolation of long chain esters of cinnamic acid derivatives and spinosterone from the wood.

Experimental

The dry powdered wood (2 kg) was exhaustively extracted with benzene and chromatographed over silica gel to yield four compounds A, B, C and D.

Compound-A, m.p. 89-90°; $\nu_{\text{max}}^{\text{KBr}}$ 3480 (O-H), 1695 (ester carbonyl), 1615 (aromatic), 1261 (C-O) and 719 cm^{-1} [$-(\text{CH}_2)_x-$]. It formed an acetate m.p., 85-86°. NMR(δ , CDCl_3): 0.89 (m, 3H, $-\text{H}_\alpha\text{C}-\text{CH}_3$), 1.35 [s, 44H, $-(\text{CH}_2)_{22}-$], 2.40 (s, 3H, $-\text{O}-\text{C}-\text{CH}_3$), 3.93 (3,3H, $-\text{OCH}_3$), 6.26 (d, $J=18$ cps, 1 H, $\text{Ar}-\text{CH}=\text{CH}-$), 7.18 (m, 3H, aromatic protons), 7.64 (d, $J=18$ cps, 1H, $\text{Ar}-\text{CH}=\text{CH}$) m/e : 558(M^+), 543, 529, 502, 194, 177 (base peak), 150, 145, 137, 125, 115. Thus the mass spectrum of the acetate besides confirming the presence of ferulic acid moiety (m/e 194,177) indicated the compound to be a mixture of C_{18} , C_{21} and C_{23} homologues. Also the alcoholic KOH hydrolysis of compound A gave a crystalline solid, m.p. 167-68°, identified as ferulic acid by direct comparison with an authentic sample.

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Compound-B, m.p. 179-80°. It analysed for $C_{29}H_{48}O$ (M^+410); $\nu_{\max}^{KBr}$ 1718 ($>C=O$), 1445, 1370, 1351 and 971 cm^{-1} ; NMR (δ , $CDCl_3$): 0.45 (s, 3H, 18- CH_3), 0.80-1.00 (m, 15H), 2.28 (s, 4H), two methylene α -carbonyl, 5.10-5.15 (m, 3H, $-CH=CH-$, $-C=CH-$): m/e : 410 (M^+), 397, 298, 271, 269 (base peak) 229, 147, 123 and 81. On reduction with KBH_4 it gave an alcohol m.p. 166-67°, $[\alpha]_D +2.2^\circ$ ($CHCl_3$), found to be identical with α -spinosterol 3% (m.m.p. Co. TLC and superimposable IR) confirming the identity of Compound B as spinosterone.

Compound-C, m.p. 99-100°; $\nu_{\max}^{KBr}$ 3500 (O-H), 1681 (ester carbonyl), 1605 (aromatic), 1267 (C-O), 719 cm^{-1} [$-(CH_2)_4-$]. It formed diacetate m.p. 81-82°; NMR (δ , $CDCl_3$): 0.98 (m, 3H, $-CH_3$, $-CH_3$), 1.31 [s, 44H, $-(CH_2)_{22}-$], 2.31 (s, 6H, O
 $\parallel$
 $2X-O-C-CH_3$), 6.34 (d, $J=18$ cps, 1H, $-CH=CH-Ar$), 7.20 (d, $J=8$ cps, 2H), 7.32 (s, 1H), 7.64 (d, $J=18$ cps, 1H, $-CH=CH-Ar$). Alcoholic KOH hydrolysis yielded a white solid m.p. 198-99°, identified as caffeic acid by direct comparison with an authentic sample. Thus the compound C is ester of caffeic acid with C_{28} side chain.

Compound-D, m.p. 93-94°; $\nu_{\max}^{KBr}$ 3485 (O-H), 1695 (ester carbonyl), 1626 (aromatic), 1264 (C-O) and 720 cm^{-1} , m/e : 6000 (M^+), 586, 540, 524, 194,

177 (base peak), 150, 145, 137 and 115. It formed an acetate m.p. 85-86°; NMR (δ , $CDCl_3$): 0.87 (m, 3H, $-CH_2-CH_3$), 1.22 [s, 56H, $-(CH_2)_{28}-$], 2.29 O
 $\parallel$
 $(s, 3H, -O-C-CH_3)$, 3.84 (s, 3H, $-OCH_3$), 6.36 (d, $J=18$ cps, 1H, $Ar-CH=CH-$), 7.20 (m, 3H, 2, 5, 6-protons), 7.66 (d, $J=18$ cps, 1H, $Ar-CH=CH-$).

Alcoholic KOH hydrolysis gave a crystalline compound m.p. 167-68°, identified as ferulic acid by direct comparison with an authentic sample. Mass spectrum of Compound D besides confirming ferulic acid moiety (194-177) indicated the compound to be a mixture of homologues with C_{29} , C_{28} side chains.

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