

*Plant.* *Achras sapota* L. (Voucher specimen No. 5/72 deposited at JIPMER) (syn. *Mimusops manilkara* Don.) *Uses.* Edible fruit.<sup>4</sup> *Previous work.* Polyphenols of immature fruits,<sup>5</sup> sterol and triterpenes of fruit,<sup>6</sup> triterpenoids of leaves;<sup>7</sup> no work on flavonols.

*Present work.* Isolation of myricetin and myricetin-3-O-L-rhamnoside (0.1 %) from fresh leaves. Quercetin also identified. Working up and identification as in the case of *M. indica* above.

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<sup>4</sup> *Wealth of India, Raw Materials*, Vol. I, p. 23, C.S.I.R., New Delhi (1948).

<sup>5</sup> A. G. MATHEW and S. LAKSHMI NARAYANA, *Phytochem.* **8**, 507 (1969).

<sup>6</sup> G. MISRA and C. R. MITRA, *Phytochem.* **8**, 249 (1969).

<sup>7</sup> G. MISRA, S. K. NIGRAM and C. R. MITRA, *Phytochem.* **8**, 2255 (1969).

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## SOLANACEAE

### ANTHRAQUINONES AND OTHER CONSTITUENTS OF *FABIANA IMBRICATA*

J. E. KNAPP, N. R. FARNSWORTH\*, M. THEINER† and P. L. SCHIFF, JR.

Department of Pharmacognosy, School of Pharmacy, University of Pittsburgh, Pittsburgh, PA 15213, U.S.A.

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**Key Word Index**—*Fabiana imbricata*; Solanaceae; *n*-alkanes; fatty acids; erythroglauicin; physcion; aceto-vanillone.

*Plant.* *Fabiana imbricata* Ruiz and Pavon. *Source.* S. B. Penick & Co., New York, Lot No. 913-BJM-1. *Uses.* A medicinal<sup>1</sup> in South America, where the plant is commonly known as Pichi-Pichi. *Previous work.* On twigs,<sup>2</sup> on twigs and terminal branchlets,<sup>3</sup> on tops and twigs,<sup>4,5</sup> on *F. denudata*,<sup>6</sup> on *F. squamata*.<sup>7</sup>

\* Professor and Chairman, Department of Pharmacognosy and Pharmacology, College of Pharmacy, University of Illinois at the Medical Center, Chicago, IL 60680, U.S.A.

† Department of Biochemistry, School of Dental Medicine, University of Pittsburgh, Pittsburgh, PA 15213, U.S.A.

<sup>1</sup> *Homeopathic Pharmacopeia of the U.S.*, 6th Edition, p. 281, Boericke & Tofel, Philadelphia (1941).

<sup>2</sup> G. R. EDWARDS and H. ROGERSON, *Biochem. J.* **21**, 1010 (1927).

<sup>3</sup> O. E. EDWARDS and N. F. ELMORE, *Can. J. Chem.* **40**, 256 (1962).

<sup>4</sup> M. SILVA, R. STUCK and P. MANCINELLI, *Biol. Soc. Chilena Quim.* **12**, 29 (1962).

<sup>5</sup> N. K. RICHTMYER, *Carbohydr. Res.* **12**, 233 (1970).

<sup>6</sup> L. FLORIANI, *Rev. Centro Estud. Farm. Bioquim.* **25**, 60 (1934); *Chem. Abs.* **30**, 6784 (1936).

<sup>7</sup> G. B. MARINI-BETTÒLO, *Ann. Chim. Applicata* **38**, 305 (1948); *Chem. Abs.* **46**, 6854 (1951).

*Plant part examined.* The dried, ground tops (40 kg) were extracted via percolation with EtOH. After removal of the solvent *in vacuo* at 40°, the residue (5.6 kg) was partitioned between HCl (1 %) and CHCl<sub>3</sub>. The CHCl<sub>3</sub> layer was evaporated *in vacuo* to afford a dark residue (1.7 kg). Chromatography of a portion (100 g) of this residue over silicic acid (300 g) with light petrol. and light petrol-CHCl<sub>3</sub> mixtures yielded the following compounds:

*Alkanes.* 800 mg; m.p. 57–58° (EtOAc);  $\nu_{\max}^{\text{KBr}}$  2930, 2860, 1460, 725 and 715 cm<sup>-1</sup>. GLC on a 160 cm column of 0.8 % OV-17 on Gas Chrom Q (80–100 mesh) showed the mixture to be composed primarily of *n*-tricosane (C<sub>23</sub>), *n*-pentacosane (C<sub>25</sub>), *n*-heptacosane (C<sub>27</sub>), and *n*-nonacosane (C<sub>29</sub>) with smaller amounts of *n*-tetracosane (C<sub>24</sub>), *n*-hexacosane (C<sub>26</sub>), *n*-octacosane (C<sub>28</sub>), and *n*-hentriacontane (C<sub>31</sub>). The identity was confirmed by GLC-MS. The spectra were consistent for *n*-alkanes and showed no peaks characteristic of isoalkanes.

*Fatty acids.* 1.90 g; m.p. 73–74° (EtOAc);  $\nu_{\max}^{\text{KBr}}$  2930, 2860, 1700, 1460, 725 and 715 cm<sup>-1</sup>. GLC of the Me esters on a 160 cm column of 0.8 % OV-17 on Gas Chrom Q (80–100 mesh) showed the mixture to be composed primarily of docosanoic acid (C<sub>22</sub>), tetra-  
cosanoic acid (C<sub>24</sub>), hexacosanoic acid (C<sub>26</sub>), octacosanoic acid (C<sub>28</sub>), and triacontanoic acid (C<sub>30</sub>) with smaller amounts of tricosanoic acid (C<sub>23</sub>), pentacosanoic acid (C<sub>25</sub>), heptacosanoic acid (C<sub>27</sub>) and nonacosanoic acid (C<sub>29</sub>). The identity was confirmed by GLC-MS.

*Erythroglaucin* (1,4,8-trihydroxy-3-methyl-6-methoxyanthraquinone). 8 mg; m.p. 201° (light petrol.);  $\lambda_{\max}^{\text{MeOH}}$  232 nm (log  $\epsilon$  4.35), 256 (4.06), 277 (4.03), 306 (3.81), 458 (sh) (3.87), 475 (sh) (3.95), 490 (3.99) 510 (sh) (3.88) and 520 (3.82);  $\nu_{\max}^{\text{KBr}}$  1595 cm<sup>-1</sup>; M<sup>+</sup> 300 (100%); identified by m.p., m.m.p., UV, IR, MS with an authentic sample and TLC co-chromatography in 3 solvent systems.

*Physcion* (1,8-dihydroxy-3-methyl-6-methoxyanthraquinone). 12 mg; m.p. 204° (light petrol.);  $\lambda_{\max}^{\text{MeOH}}$  223 nm (log  $\epsilon$  4.60), 230 (sh) (4.39), 257 (sh) (4.29), 267 (4.32), 288 (4.31) and 434 (4.17);  $\nu_{\max}^{\text{KBr}}$  1675 and 1625 cm<sup>-1</sup>; M<sup>+</sup> 284 (100%); identified by m.p., m.m.p., UV, IR, MS with an authentic sample and TLC co-chromatography in 3 solvent systems.

*Acetovanillone.* 120 mg; m.p. 113.5–114.5° (MeOH);  $\lambda_{\max}^{\text{MeOH}}$  208 nm (log  $\epsilon$  4.07), 228 (4.17), 275 (4.01) and 303 (3.92);  $\nu_{\max}^{\text{KBr}}$  1655 cm<sup>-1</sup>; M<sup>+</sup> 166 (49%), 151 (100%); identified by m.p., m.m.p., UV, IR and MS with an authentic sample.

The previously isolated compounds scopoletin<sup>2</sup> and oleanolic acid<sup>3</sup> were re-isolated and identified by m.p., m.m.p., UV, IR, MS and optical rotation.

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