Phytochemistry, 1969, Vol. 8, pp. 2255 to 2256. Pergamon Press. Printed in England.

SHORT COMMUNICATION

CONSTITUENTS OF *MIMUSOPS MANILKARA* LEAVES AND SAPONINS OF *MIMUSOPS* SEED KERNELS

G. MISRA, S. K. NIGAM and C. R. MITRA

Utilization Research Laboratory, National Botanic Gardens, Lucknow, India

(*Received* 15 *May* 1969)

Plant. Mimusops manilkara syn. *Achras sapota*—N.O. Sapotaceae.

Uses. Edible fruit,[1] medicinal.[2]

Previous work. Fruit pulp,[3] seed kernel[3,4] and testa.[3] On other species *M. hexandra*[5–7] and *M. elengi.*[7–9]

Leaves. Extr. EtOH; hexane soluble fraction: *Hentriacontane*, $C_{31}H_{64}$, m.p., mxd. m.p., ν_{max}^{KBr} 722 and 732 cm^{-1} (alkane chain).[10] *α-Amyrin acetate*, $C_{32}H_{52}O_2$, m.p., mxd. m.p., $(\alpha)_D$, i.r., NMR,[11] co-TLC; alkali hydrolysis to α-amyrin, $C_{30}H_{50}O$, m.p., mxd. m.p., $(\alpha)_D$, i.r., acetate, m.p., mxd. m.p., $(\alpha)_D$, i.r. and to acetic acid, lanthanum nitrate–iodine[12] positive. *β-Amyrin acetate*, $C_{32}H_{52}O_2$, m.p., mxd. m.p., $(\alpha)_D$, i.r., NMR,[11] co-TLC; alkali hydrolysis to β-amyrin, $C_{30}H_{50}O$, m.p., mxd. m.p., $(\alpha)_D$, i.r., acetate, m.p., mxd. m.p. and to acetic acid; SeO_2 oxidation to heteroannular $\Delta^{11,13(18)}$-diene, u.v. *Taraxeryl acetate*, $C_{32}H_{52}O_2$, m.p., mxd. m.p., $(\alpha)_D$, i.r.; alkali hydrolysis to taraxerol and to acetic acid. *Taraxerol*, $C_{30}H_{50}O$, m.p., mxd. m.p., $(\alpha)_D$, i.r.; acid (HCl) isomerization[14] to β-amyrin; benzoate, $C_{37}H_{54}O_2$, m.p., mxd. m.p. and $(\alpha)_D$.

Acidic constituent of the hexane-soluble fraction: *Ursolic acid*, $C_{30}H_{48}O_3$, m.p., mxd.[9] m.p., $(\alpha)_D$, i.r.,[15] methylester acetate, $C_{33}H_{52}O_4$, m.p., mxd.[9] m.p., $(\alpha)_D$ and i.r.

Hexane-insoluble middle layer: *β-D-Glucoside of β-sitosterol*, $C_{35}H_{60}O_6$, m.p., mxd. m.p., $(\alpha)_D$, i.r., tetra-acetate and tetra-benzoate, m.p., mxd. m.p., $(\alpha)_D$; acid hydrolysis to glucose and β-sitosterol, m.p., mxd. m.p., $(\alpha)_D$, i.r. and acetate.

[1] *The Wealth of India, Raw materials*, Vol. 1, p. 23, CSIR, New Delhi, India (1948).
[2] W. DYMOCK, *Pharmacographia Indica*, Vol. 2, p. 365, Kegan Paul, Trench, Trübner, London (1891).
[3] G. MISRA and C. R. MITRA, *Phytochem.* **8**, 249 (1969).
[4] N. L. VIDYARTHI and M. V. MALLYA, *J. Indian Chem. Soc.* **16**, 443 (1939).
[5] C. R. MITRA and G. MISRA, *Phytochem.* **4**, 345 (1965).
[6] G. MISRA and C. R. MITRA, *Phytochem.* **5**, 535 (1966); **7**, 2173 (1968).
[7] A. W. VAN DER HAAR, *Rec. Trav. Chim.* **41**, 784 (1922); **49**, 1155 (1929); *Chem. Abstr.* **24**, 857 (1930).
[8] B. J. HEYWOOD and G. A. R. KON, *J. Chem. Soc.* 713 (1940); *Chem. Abstr.* **34**, 6637 (1940); B. J. HEYWOOD, G. A. R. KON and L. L. WARE, *J. Chem. Soc.* 1124 (1939).
[9] G. MISRA and C. R. MITRA, *Phytochem.* **6**, 453, 1309 (1967); **7**, 501 (1968).
[10] L. J. BELLAMY, *The Infra-red Spectra of Complex Molecules*, pp. 27–28, Methuen, London (1962).
[11] M. SHAMMA, R. E. GLICK and O. R. MUMMA, *J. Org. Chem.* **27**, 451 (1962); H. M. ALVES V. H. ARNDT, W. D. OLLIS, W. B. EYTON, O. R. GOTTLIEB and M. T. MAGALHAES, *Phytochem.* **5**, 1327 (1966).
[12] F. FEIGL, *Spot Tests*, Vol. 2, p. 247, Elsevier, London (1954).
[13] J. SIMONSEN and W. C. J. ROSS, *The Terpenes*, Vol. 4, p. 196, Cambridge University Press, London (1957).
[14] J. M. BEATON, F. S. SPRING, R. STEVENSON and J. L. STEWART, *Chem. & Ind.* 1454 (1954); *J. Chem. Soc.* 2131 (1955).
[15] G. SNATZKE, F. LAMPERT and R. TSCHECHE, *Tetrahedron* **18**, 1417 (1962).

Aqueous alcoholic fraction: *Glucose* and *quercitol*, $C_6H_{12}O_5$, m.p., mxd. m.p., $(\alpha)_D$, penta-benzoate, m.p., mxd. m.p. and $(\alpha)_D$.

It is interesting from the biogenetic as well as chemotaxonomic consideration that among the various constituents present in the leaves of the three species of *Mimusops*, viz., *M. hexandra*, *M. elengi* and *M. manilkara*, acetates of taraxerol, α- and β-amyrins, ursolic acid and β-D-glucoside of β-sitosterol have been isolated only from that of *M. manilkara*. Quercitol, hentriacontane and taraxerol[16] are common to the leaves of all three plants. A terpenic hydrocarbon, a terpenic ketone and cinnamic acid are present only in *M. hexandra* leaf, while β-carotene was obtained only from that of *M. elengi*.

Seed Kernel Saponins

It has been observed during the present investigation that the saponins, m.p. 230–235°. from all the three plants of the genus *Mimusops*, on hydrolysis, gave the same sapogenins and sugars.[3,5,9] The sapogenins on TLC in CH_2Cl_2–hexane–MeOH–HOAc (40:120:10:1) showed the presence of six aglycones as against the earlier report of bassic acid[7,8,17] alone, On co-TLC, two of the spots corresponded to oleanolic acid and hederagenin, apart from the one corresponding to bassic acid the major aglycone in all three cases.

Acknowledgements—The authors' thanks are due to Mr. J. Saran for microanalyses and to the Director, National Botanic Gardens, Lucknow, for his interest in the work.

[16] C. P. BAHAL, A. BANERJEE and T. R. SESHADRI, *Current Sci.* **37**, 1 (1968).
[17] T. J. KING and J. P. YARDLEY, *Proc. Chem. Soc.* 393 (1959); *J. Chem. Soc.* 4308 (1961).