peaks at *m/e* 218, 207 and 189 was similar to that of lupane triterpenoids,[2] suggestive of lupeol. Lupeol was further characterized through preparation of its acetate, m.p. 215–216° (lit.[3] m.p. 217–217·5°), benzoate, m.p. 258–259° (lit.[3] m.p. 264–266°), its hydrogenation product, lupanol, m.p. 201° (lit.[4] m.p. 201–202°), and its oxidation product, lupen-3-one, m.p. 167° (lit.[5] m.p. 172–174°). The mass spectrum of the hydrogenation product had a molecular ion peak at *m/e* 428 (428·4017); $C_{30}H_{52}O$ requires formula mass 428·4018. The mass spectral fragmentation pattern of the oxidation product of lupeol was virtually identical to the published pattern for lupen-3-one.[2] Therefore, the first component isolated from the benzene fractions was lupeol.

The second component, m.p. 133–134°, had a mass spectrum characteristic of a 3β-hydroxy steroid[6] [M-H_2O, M-$C_{10}H_{21}$ (side chain)]. This component was compared (IR, NMR, MS) and found identical with an authentic sample of β-sitosterol. β-Sitosterol was further characterized through preparation of its acetate, m.p. 131° (lit.[7] m.p. 125–6°).

Acknowledgements—The authors thank the University of Victoria Research Fund and the National Research Council of Canada for generous financial support, and Mr. C. M. Banks (University of Victoria) for supplying an authentic sample of β-sitosterol.

[2] H. BUDZIKIEWICZ, J. M. WILSON and CARL DJERASSI, *J. Am. Chem. Soc.* **85,** 3688 (1963).
[3] THOMAS FITZGERALD, J. L. BEAL and J. B. LAPIDUS, *J. Pharm. Sci.* **52,** 712 (1963).
[4] T. R. AMES, T. G. HALSALL and E. R. H. JONES, *J. Chem. Soc.* 450 (1951).
[5] R. N. CHAKRAVARTI and M. N. MITRA, *Bull. Calcutta School Trop. Med.* **12,** 21 (1964); *Chem. Abs.* **61,** 10723f (1964).
[6] R. RYHAGE and E. STENHAGEN, *J. Lipid Res.* **1,** 361 (1960)
[7] L. J. SWIFT, *J. Am. Chem. Soc.* **74,** 1099 (1952).

Phytochemistry, 1971, Vol. 10, pp 3308 to 3309 Pergamon Press Printed in England

EUPHORBIACEAE

CONSTITUENTS OF *EXCOECARIA AGALLOCHA*

TAKESHI KAWASHIMA,* TAKASHI TAKAHASHI, YOSHIKO INOUE, MITSUAKI KODAMA and SHÔ ITÔ

Department of Chemistry, Tohoku University, Sendai, Japan

(*Received* 3 *June* 1971)

Plant. Excoecaria agallocha L. *Uses.* Used in Sarawak as an ingredient of dart-poison and as a fish poison.[1] *Previous work.* None.

Wood latex. Chromatographed using SiO_2. *β-Amyrin.* M.p., mixed m.p., superimposable IR spectra. *β-Amyrenone.* Mixed m.p., superimposable IR spectra with authentic specimen prepared from β-amyrin. *3-Epi-β-amyrin.* $C_{30}H_{50}O$, m.p. 228°, acetate, m.p. 120°. Oxidized to β-amyrenone, mixed m.p., superimposable IR spectra. *Cycloartenol.*

* On leave of absence from Kojin Co. Ltd.

[1] F. G. BROUNE, *Forest Tree of Sarawak and Brunei and their Products,* p. 180, Government Printing Office, Kuching, Sarawak, (1955).

M.p., mixed m.p., IR, NMR. *Glycerides of fatty acids.* Acid part consists of C_{24}-C_{32} straight-chain saturated fatty acids. Identified by GLC of methyl esters. *Unidentified compound.* (*A*) $C_{30}H_{50}O$, m.p. ~ 50°, IR ν^{KBr} 3400, 1030, 812 cm^{-1}, NMR $\delta^{TMS}_{CDCl_3}$ 0·75 (3H,s), 0·81 (3H,s), 0·86 (3H,s), 0·88 (3H,d, $J = 6·3$), 0·97 (6H,s), 1·60 (3H,s), 1·68 (3H,s), 3·25 (2H,m), 5·09 (1H,m), 5·25 (1H,m), benzoate, m.p. 144–145°, IR.

Acknowledgements—Thanks are due to Professor Y. Kitahara, Tohoku University, for the sample of cycloartenol.

Phytochemistry, 1971, Vol. 10, pp. 3309 to 3310. Pergamon Press. Printed in England.

LABIATAE

ESSENTIAL OIL FROM THE LEAVES AND INFLORESCENCE OF *OCIMUM GRATISSIMUM*

M. SAINSBURY
School of Chemistry and Chemical Engineering, Bath University, Claverton Down, Bath
and
E. A. SOFOWORA
Department of Pharmacognosy and Drug Research Unit University of Ife, Ile-Ife, Nigeria

(*Received* 28 *May* 1971)

Plant. Ocimum gratissimum L. Indigenous to Nigeria.

Previous studies. Major component of oil from specimens collected in Taiwan has been shown[1] to be eugenol (62%). This compound is the major component of the oil obtained from the leaves of a hybrid between *O. gratissimum* and *O. menthaefolium.*[2] The Nigerian *O. gratissimum* was reported[3,4] to contain thymol, but no eugenol. The remaining components of the oil from the Nigerian plant are reported here.[5]

RESULTS

Composition of oil from leaves (%):—α-pinene (2·6), camphene (4·0), β-pinene (0·6), α-terpinene: Δ^3-carene (4·1), myrcene (1·4), 1,8-cineole (1·1), α-terpinene (6·2), *p*-cymene (16·2) limonene (1·8) camphor (0·6), linalool (0·2), α-terpineol (2·4), $C_{10}H_{22}O$ (2·3), thymol (47·6), methyleugenol (1·7), methylisoeugenol (trace), caryophyllene (2·1), humulene (0·5), β-selinene (1·6), longifoline (3·0), clovene (trace). Oil from the flowers has essentially the same composition except the proportion of camphene is reduced.

[1] PING-HSIEN YEH, *Perfumery Essent. Oil Record.* **51,** 611 (1960).
[2] O. K. MADALSKA, C. BANKOWSKI and J. KUDUK, *Acta. Polon. Pharm.* **21,** 387 (1964).
[3] F. EL-SAID, E. A. SOFOWORA, S. A. MALCOLM and A. HOFER, *Planta Med.* **17,** 195 (1969).
[4] E. A. SOFOWORA, *Planta Med.* **18,** 173 (1970).
[5] M. QUDRAT-I-KHUDA, M. ERFAN ALI, A. KHALIQUE and L. A. M. SHAMSUZZAMAN, *Sci. Res.* (Dacca, Pakistan) **1,** 217 (1964).