Present work. The fractions with polarity of 4,4-dimethylsterols and 4-monomethylsterols were isolated from non-saponifiable lipids of 10-day-old *Cucumis sativus* cv. Wisconsin seedlings by Al_2O_3 column chromatography and subsequent TLC purification. Both fractions were acetylated and their components separated by $AgNO_3$-silica gel TLC. Pure cycloartenol acetate, 24-methylenecycloartanol acetate and 24-ethylidenelophenol acetate (4·1, 2·0 and 2·3 mg/100 g of dry plant material respectively) were obtained and characterized by m.p., TLC, GLC (SE-30 and OV-17) and MS [6,7]. Cycloeucalenol acetate, 24-methylenelophenol acetate and obtusifoliol acetate (3·6, 0·9 and 0·4 mg/100 g of dry plants) were isolated as not quite homogeneous fractions and identified by TLC, GLC and MS of whole fractions. Only two minor components (less than 5% of sterol precursor fraction) could not be identified. Therefore, we were able to identify in *C. sativus* only typical sterol precursors isolated previously from a number of higher plants [4,6,7]. Additionally a mixture of pentacyclic triterpenic monoalcohols; β- and α-amyrin (20·5 and 1·5 mg per 100 g of dry plants respectively) was isolated and characterized by TLC, GLC and MS. We were unable to prove the occurrence of parkeol in *C. sativus*.

REFERENCES

1. Sucrow, W. and Reimerdes, A. (1968) *Z. Naturforsch.* **23b,** 42.
2. Kintia, P. K. and Wojciechowski, Z. A. (1974) *Phytochemistry* In press.
3. Enslin, P. R. (1954) *J. Sci. Food Agr.* **5,** 410.
4. Goad, L. J. (1972) *The Biosynthesis of Plant Sterols in Progress in Phytochemistry* (Reinhold, L. and Liwschitz, Y., eds.), 3, p. 113, Interscience, London.
5. Zander, J. M. and Wigfield, D. C. (1970) *Chem. Commun.* 1599.
6. Nagasampagi, B. A., Rowe, J. W., Simpson, R. and Goad, L. J. (1971) *Phytochemistry* **10,** 1101.
7. Evans, F. J. (1973) *J. Pharm. Pharmac.* **25,** 156.

Phytochemistry, 1975, Vol. 14, pp. 297–298. Pergamon Press. Printed in England.

THE IDENTIFICATION OF ACETYLRAMOSIN C AS TETRA-ACETYLSWERTIAMAROSIDE

K. JEWERS and M. J. NAGLER,

Tropical Products Institute, 56–62, Gray's Inn Road, London, WC1X 8LU

S. F. HUSSAIN and G. MIANA,

PCSIR Laboratories, PO Peshawar University, Peshawar, Pakistan

(*Received* 20 *May* 1974)

Key Word Index—*Erythraea ramosissima*; Gentianaceae; Acetylramosin C; Tetra-acetylswertiamaroside.

One of us reported [1] the isolation of three glycosides, acetylramosins *A*, *B* and *C*, from the Pakistan medicinal plant *Erythraea ramosissima* Pers. (Gentianaceae). We wish now to present evidence which shows that acetylramosin *C* is identical with tetra-acetylswertiamaroside.

Acetylramosin *C*, m.p. 191°, $[\alpha]_D$ − 110° (*c*, 0·4; $CHCl_3$) analysed for C_{24} H_{30-32} O_{14} [1]. Its IR spectrum showed strong absorptions at 1750 and 1220 cm^{-1} (acetoxy groups), 1705 and 1625 cm^{-1} (α, β-unsaturated δ-lactone), and 905 cm^{-1} (vinyl group); and its UV spectrum exhibited a λ_{max} 236 nm (ε 8750), characteristic of an α, β-unsaturated δ-lactone moiety [2]. Strong ions in the MS at *m/e* 331, 271, 211, 169 (base peak), 127 and 109 indicated the presence of a tetra-acetoxyglucosyl moiety, and an ion at *m/e* 195 showed that acetylramosin *C* had a molecular formula C_{24} H_{30} O_{14}. The loss of 18 amu from the ion *m/e* 195 showed that it contained a hydroxyl group on the terpenoid moiety.

The NMR spectrum revealed the presence of four acetoxy groups (δ 2·01–2·10); an olefinic proton on a carbon atom bearing oxygen (δ 2·55; 1H, *s*; H_3); an allylic proton (δ 2·92; 1H, *m*; H_9) which collapsed to singlet on irradiation at δ 5·33; a proton on a carbon atom bearing two oxygen atoms (δ 5·46; 1H, *d*, *J* 1·5 Hz; H_1) which collapsed to a

singlet on irradiation at δ 2·92; methylene protons (δ 1·78; 2H, *m*; C_6) which collapsed to a broad singlet on irradiation at δ 4·82; methylene protons at δ 4·47 (1H, *m*; H_7) and δ 4·92 (1H, *m*; H_7) which collapsed to an *AB* quartet ($J \simeq 5{\cdot}00$ Hz) an irradiation at δ 1·78; and a tertiary hydroxyl group (δ 3·75; 1H, *s*).

The above spectroscopic data suggested that acetylramosin *C* was tetra-acetylswertiamaroside [2]. This was confirmed by direct comparison of the IR and NMR spectra of the two compounds and a mixed m.p. determination.

EXPERIMENTAL

The IR spectrum was measured as a KBr disc, the UV spectrum in EtOH, and the NMR spectrum in $CDCl_3$. The MS was recorded on a Hitachi Perkin Elmer RMU 6 single focussing spectrometer, and the optical rotation on a Perkin Elmer 141 MC polarimeter.

Acknowledgements—We wish to thank Professor M. Koch, University of Paris, for the sample of tetra-acetylswertiamaroside, and Mr. J. Dougan for the MS.

REFERENCES

1. Hussain, S. F., Khattak, M. I. and Warsi, S. A. (1968) *Pak. J. Sci. Ind. Res.* **11**, 352.
2. Koch, M., Platt, M. and Le Men, J. (1964) *Bull. Soc. Chim., France* 403.

Phytochemistry, 1975, Vol. 14, pp. 298–299. Pergamon Press. Printed in England.

XANTHONES FROM THE HEARTWOOD OF CALOPHYLLUM RAMIFLORUM*

SUBRAMANIAM BHANU and FEODOR SCHEINMANN

The Ramage Laboratories, Department of Chemistry and Applied Chemistry, University of Salford, Salford M5 4WT, England

and

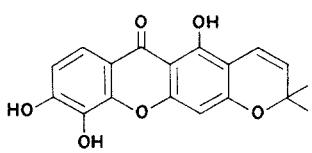
ALAN JEFFERSON

Department of Chemistry, Western Australia Institute of Technology, Bentley 6102, Perth, W. Australia

(*Received* 14 *May* 1974)

Key Word Index—*Calophyllum ramiflorum*; Guttiferae; xanthones; jacareubin; 2-(3-methylbut-2-enyl)-1-hydroxy-3,5,6-trimethoxyxanthone; euxanthone; 1,7-dihydroxyxanthone; 1-hydroxy-6,7-dimethoxyxanthone; chemotaxonomy.

Plant. Calophyllum ramiflorum Schwarz, Guttiferea. *Source.* W. Australia, identified by N. Byrnes, Botanist, Primary Industries Branch, Northern Territory Administration, Darwin, and confirmed by the Royal Botanic Gardens and National Herbarium of South Yarra, S.E.1, Victoria. *Previous work.* None on this species, but previous studies on the pigments from Guttiferae heartwoods [1,2] identify largely xanthones, biflavanoids [3] and coumarins [4]. *Calophyllum* species, apart from the Indian variety [5], contain jacareubin (**1**).



1

Present work. It has previously been suggested [2,6] that the presence of jacareubin (**1**) and/or the putative isoprenyl precursor 2-(3-methyl-2-butenyl)-1,3,5,6-tetrahydroxyxanthone (**2**) may be of taxonomic value in identifying *Calophyllum* species. Only in the Indian variety of *C. inophyllum* L. are these metabolites absent [5]. Further *Calophyllum* species are under examination for the presence of jacareubin (**1**) since this metabolite is required as a synthetic relay in the preparation of morellin analogues [7].

Extraction of the powdered heartwood of *Calophyllum ramiflorum* Schwartz with hot $CHCl_3$ and concentration of the extract gave a solid which contained largely jacareubin. Removal of the solvent from the filtrate gave a mixture which was washed with light petroleum to remove sitosterol, oils and waxes and the residue then chromatographed on silica. Elution $CHCl_3$–EtOAc led to isolation of 1,7-dihydroxyxanthone (euxanthone) and jacareubin (**1**) and a mixture of xanthones which were separated by methylation and further chromatography. Jacareubin dimethyl ether, 2-(3-methylbut-2-enyl)-1-hydroxy-3,5,6-trimethoxyxanthone and 1-hydroxy-6,7-dimethoxy-xanthone were identified by isolation and comparison with authentic specimens.

* Part XXVII in the series "Extractives from Guttiferae". For Part XXVI see Ref. 1.