

(2.3 g) was crystallized 1 × from C<sub>6</sub>H<sub>6</sub> and 2 × EtOAc m.p. 258–260°,  $[\alpha]_D^{20} + 73^\circ$  (CHCl<sub>3</sub>). The IR and NMR spectra were identical to those of a pure sample of oleanolic acid acetate.

**Oleanolic acid lactone** The mother liquors from the crystallization of oleanolic acid acetate were adsorbed on a column of silica-alumina prepared in hexane. Elution with hexane-EtOAc (24:1) afforded the lactone immediately, whereas the acid was retained much more strongly by the active adsorbent. The lactone (22 mg) crystallized from MeOH m.p. 293–294°,  $[\alpha]_D^{20} + 12^\circ$  (CHCl<sub>3</sub>). The IR spectrum was identical to that of a sample of oleanolic acid lactone acetate obtained from the oleanolic acid acetate reaction with HCl in CCl<sub>4</sub> as described by Barton.<sup>5</sup>

**Maslinic acid**<sup>6</sup> Identified as its diacetate or diacetate methyl ester. Maslinic acid acetate closely followed oleanolic acid acetate in the chromatographic elution described above. Repeated crystallization from MeOH yielded silky needles (1.2 g) m.p. 235–236°,  $[\alpha]_D^{20} + 30^\circ$  (CHCl<sub>3</sub>). IR: Snatzke's<sup>7</sup> A' and 'B' zones showed the characteristic bands of a triterpenoid of the oleanolic series [AUI 1391 cm<sup>-1</sup>, AUII 1381 cm<sup>-1</sup>, AUIII 1362 cm<sup>-1</sup>, BUI 1308 cm<sup>-1</sup>, BUII 1270 cm<sup>-1</sup>, BUIII 1244 cm<sup>-1</sup> (sh)]. The compound after methanolic KOH hydrolysis of the two acetic groups gave an acetyl derivative. The IR spectra of the diacetate or diacetate methyl ester derivatives of the natural compound were identical to those of authentic samples of equivalent maslinic acid derivatives.

**Acknowledgements**—We wish to thank Professor B. Granetti of the Institute of Botany of the University of Perugia for supplying us with the dried plant.

<sup>5</sup> BARTON, D. H. R. and HOLNESS, N. J. (1952) *J. Chem. Soc.* 78.

<sup>6</sup> CAGLIOTI, L. and CAINELLI, G. (1961) *Gazz. Chim. Ital.* **91**, 1387.

<sup>7</sup> SNATZKE, G., LAMPERT, F. and TSCHFSCHE, R. (1962) *Tetrahedron* **18**, 1417.

## PHENYLPHENALENONES FROM *WACHENDORFIA* SPECIES

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**Key Word Index**—*Wachendorfia paniculata*, *W. thyrsiflora*, Haemorodaceae, 9-phenylphenalenones.

*Plants* *Wachendorfia paniculata*<sup>1</sup> and *W. thyrsiflora*<sup>2</sup> *Berm. Uses* Ornamental. *Previous Work* None. *Part examined* Roots. TLC analysis (polyamide, MeOH, acid washed SiO<sub>2</sub>, EtOAc–C<sub>6</sub>H<sub>6</sub>, 1:1) of the CHCl<sub>3</sub> soluble compounds present in the root systems of *W. paniculata* and *W. thyrsiflora* showed the presence of several 2-hydroxyphenalenone pigments (colors purple to orange, turning blue to green on exposure to NH<sub>3</sub>).

Chromatography of the extracts (cellulose–C<sub>6</sub>H<sub>6</sub>) resulted in the isolation of the following phenalenones, previously isolated from other species of the family, all identical (NMR,

<sup>1</sup> We are grateful to Professor G. W. Perold, University of the Witwatersrand, South Africa, for obtaining this plant material.

<sup>2</sup> Grown from seed at Storrs, Connecticut.

IR, formation of isomeric methyl ethers, and TLC) with authentic compounds *W. paniculata* lachnanthocarpone (2,6-dihydroxy-9-phenylphenalenone), m p 212–214° (lit <sup>3</sup> 208–212°), MW *m/e* 288 0763 Calc for C<sub>19</sub>H<sub>12</sub>O<sub>3</sub>, 288 0772 Lachnanthoside aglycone (2,5,6-trihydroxy-9-phenylphenalenone), m p 220–223° (lit <sup>4</sup> 217–222°), MW *m/e* 304 0735 Calc for C<sub>19</sub>H<sub>12</sub>O<sub>4</sub>, 304 0732 *W. thyrsiflora* lachnanthoside aglycone, and haemocorin aglycone (2,6-dihydroxy-5-methoxy-9-phenylphenalenone), m p 230–232° (C<sub>6</sub>H<sub>6</sub>) [lit <sup>5</sup> 277–278° (acetone)],  $\delta$ , 8 75 (d, *J* 8Hz, 1H), 7 70 (s, 1H), 7 60 (d, *J* 8Hz, 1H), 7 56 (s, 5H), 7 20 (s, 1H), 4 10 (s, 3H), MW *m/e* 318 0893 Calc for C<sub>20</sub>H<sub>14</sub>O<sub>4</sub>, 318 0888

Phenalenone pigments have so far been isolated from *Haemodorum*, *Wachendorfia*, and *Lachnanthes* spp., and the accumulated evidence (3/14 genera positive) suggests that this aromatic system may characterize members of the family Haemodaceae

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<sup>4</sup> EDWARDS, J M and WEISS, U (1974) *Phytochemistry* **13**, to be published

<sup>5</sup> COOKE, R G and SEGAL, W (1955) *Australian J Chem* **8**, 107 We are indebted to Professor R Thomas, Surrey University, England, for a sample of haemocorin aglycone

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## DEMETHYLHOMOPTEROCARPIN AN ANTIFUNGAL COMPOUND IN *CANAVALLIA ENSIFORMIS* AND *VIGNA UNGUICULATA* FOLLOWING INFECTION

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**Key Word Index**—*Canavalia ensiformis*, *Vigna unguiculata*, Leguminosae, jack bean, cowpea, pterocarpin, demethylhomopterocarpin

*Plants Canavalia ensiformis* (cv large white), *Vigna unguiculata* (cvs IVu57 and IVu76) grain legumes grown from seed supplied by the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria *Previous work* Antifungal activity <sup>1–3</sup>

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<sup>1</sup> SMITH, I M (1971) *Physiol Plant Pathol* **1**, 85

<sup>2</sup> KEEN, N T (1972) *Phytopathology* **62**, 1365

<sup>3</sup> BAILEY, J A (1973) *J Gen Microbiol* **75**, 119