

# SHORT COMMUNICATION

## ANTHRAQUINONES IN *MAESOPSIS EMINII*

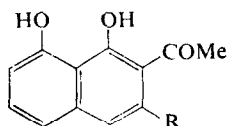
A. M. CUMMING and R. H. THOMSON

Department of Chemistry, University of Aberdeen, Scotland

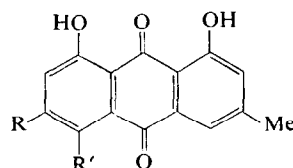
(Received 25 February 1970)

**Abstract**—Five anthraquinones, chrysophanol, physcion, xanthorin, islandicin and cynodontin, have been isolated from the heartwood of *Maesopsis eminii*.

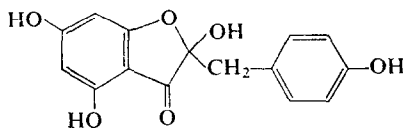
BY EXTRACTION of the heartwood of *Maesopsis eminii* Engl. (Rhamnaceae) with light petroleum, Lovell *et al.*<sup>1</sup> obtained a red powder containing the yellow acetonephthone, musizin (I; R = Me), and by further extraction with acetone the coumaranone, maesopsin (II), was isolated.<sup>2</sup> As musizin (= dianellidin = neopodin) is also found in *Dianella*,<sup>3</sup> (Liliaceae) which contain naphthaquinones,<sup>4</sup> and in *Rumex*<sup>5</sup> (Polygonaceae), which elaborate anthraquinones,<sup>6</sup> it was of interest to examine the residual pigments in the red powder. We identified five anthraquinones, namely chrysophanol (III; R = R' = H), physcion (III; R = OMe, R' = H), xanthorin (III; R = OMe, R' = HO), islandicin (IV; R = H) and cynodontin (IV; R = HO). Several other pigments were present in trace amounts. While the presence of naphthaquinones cannot be excluded, the pattern is clearly similar to that in *Rumex* and



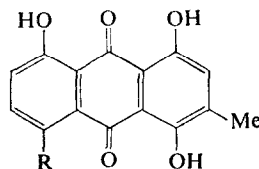
(I)



(III)



(II)



(IV)

<sup>1</sup> C. J. LOVELL, F. E. KING and J. W. W. MORGAN, *J. Chem. Soc.* 702 (1961).

<sup>2</sup> N. F. JANES, F. E. KING and J. W. W. MORGAN, *J. Chem. Soc.* 1356 (1963).

<sup>3</sup> T. BATTERHAM, R. G. COOKE, H. DUEWELL and L. G. SPARROW, *Australian J. Chem.* **14**, 637 (1961).

<sup>4</sup> R. G. COOKE and L. G. SPARROW, *Australian J. Chem.* **18**, 218 (1965).

<sup>5</sup> T. MURAKAMI and A. MATSUSHIMA, *Chem. Pharm. Bull. Tokyo* **9**, 654 (1961); R. E. BOWMAN, C. P.

FALSHAW, C. S. FRANKLIN, A. W. JOHNSON and T. J. KING, *J. Chem. Soc.* 1340 (1963).

<sup>6</sup> R. HEGNAUER, *Chemotaxonomie der Pflanze*, Vol. 5, p. 363, Birkhäuser, Basel (1969).

parallel to the situation in *Rhamnus frangula* (Rhamnaceae) which contains the acetoneaphthone (I; R = H)<sup>7</sup> and anthraquinones<sup>8</sup> of type III. Of the five quinones identified, cynodontin<sup>8</sup> was only known hitherto as a fungal pigment and xanthorin<sup>9</sup> as a lichen metabolite.

### EXPERIMENTAL

Chipped heartwood (150 g) was extracted (Soxhlet) with light petroleum (b.p. 60–80°) for 24 hr and evaporated, leaving a dark red-brown residue (0.5 g). The acidic fraction of this was then chromatographed (PLC) on silica gel/3 % oxalic acid plates in benzene–CCl<sub>4</sub> (1:1). The five major bands were eluted and rechromatographed (TLC) on silica gel plates in suitable solvents. (Musizin was not detected in this wood sample.) The original<sup>1</sup> red powder was fractionated in the same way. Homogeneous components were finally crystallized and identified (u.v., i.r., *R<sub>f</sub>*, mixed m.p.) by direct comparison with authentic specimens. Chrysophanol (208 mg), physcion (112 mg), islandicin (33 mg) and cynodontin (42 mg) were identified chiefly by their i.r. and u.v. characteristics, and for xanthorin (<1 mg) additional evidence was obtained from its NMR and m.s. (Found: M, 300.0629. Calc. for C<sub>16</sub>H<sub>12</sub>O<sub>6</sub>: 300.0634.)

*Acknowledgements*—We are indebted to Dr. J. W. W. Morgan for suggesting this problem and for supplying *M. eminii* wood and some of the original extract. We also thank Drs. J. D. Bu'Lock and W. Steglich for samples of islandicin and xanthorin, respectively, and the Physico-chemical Measurements Unit, Aldermaston Station, for the mass spectrum.

<sup>7</sup> M. PAILER, K. JENTZSCH, W. KUMP and L. FUCHS, *Monatsheft*, **89**, 540 (1958).

<sup>8</sup> R. H. THOMSON, *Naturally Occurring Quinones*, 2nd edit., in press.

<sup>9</sup> W. STEGLICH, W. LÖSEL and W. REININGER, *Tetrahedron Letters* 4719 (1967); K.-E. STENSIÖ and C. A. WACHTMEISTER, *Acta Chem. Scand.* **23**, 144 (1969).