

SHORT COMMUNICATION

CHEMICAL STUDIES ON LICHENS—III.*

THE PIGMENTS OF *THELOCARPON EPIBOLUM*, *T. LAURERI* AND *AHLESIA LICHENICOLA*

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THE lichen genus *Thelocarpon* consists of fifteen to twenty species, all more or less spherical with radii in the range 0.05–0.15 mm, usually growing on earth, wood or other lichens. Due to the small size—the specimens are hardly visible to the naked eye—the distribution is poorly known.¹ *Ahlesia lichenicola* Fuck. is a fungus, in many respects very similar to *Thelocarpon*, but for the algal symbiont.

By means of thin-layer chromatography we have investigated the yellow pigments of *T. epibolum* Nyl., *T. laureri* (Flot.) Nyl. and *A. lichenicola* Fuck. For each chromatogram, an acetone extract of approximately 1–5 μ g of the plant material was used and pulvic acid and two of its derivatives have been identified with reasonable certainty (Table 1). Due to the small amounts of substance (less than 100 ng), identification was effected by co-chromatography with authentic samples.

TABLE 1

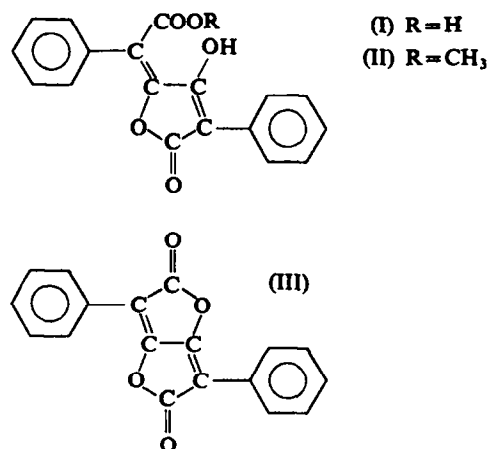
Species	Pulvic acid (I)	Pulvic dilactone (III)	Vulpinic acid (II)
<i>Thelocarpon epibolum</i>	traces*	+	+
<i>T. laureri</i>	+	+	traces
<i>Ahlesia lichenicola</i>	+	—	traces

* The possibility that these traces are due to hydrolysis of the pulvic dilactone during the extraction cannot be excluded. In view of the occurrence of pulvic acid in the other two species investigated, however, it seems unlikely.

If one regards the presence or absence of an algal symbiont as the distinguishing criterion between lichens and fungi respectively, this is, to our knowledge, the first time pulvic acid or a derivative thereof has been found in a fungus. The finding of pulvic acid in *A. lichenicola* thus represents an extension of the known occurrence of this group of compounds into the non-lichenized fungi.

* Part II: *Acta Chem. Scand.* **20**, 1181 (1966).

¹ A. H. MAGNUSSON, In *Rabenhorst: Kryptogamen-Flora* (2nd Ed.), Vol. 9:5:1, p. 286 Leipzig (1935).



The assumed precursors of pulvic acid derivatives (e.g. polyporic acid and atromentin)² are known to occur in a number of fungi. It seems reasonable to assume, therefore, that pulvic acid and its derivatives may occur also in fungi other than *A. lichenicola*.

EXPERIMENTAL

Plant material. Quotation specimens are to be found in the herbarium of Uppsala Botanical Museum. *Thelocarpon epibolum* from Varanger, Norway, collected in 1966 by J. Santesson; *T. laureri*, Oxford, Ohio, U.S.A., 1910, B. Fink; *Ahlesia lichenicola*, Dalsland, Sweden, 27.VI.1938, A. H. Magnusson, Västergötland, Sweden, 1928, A. H. Magnusson, Nieder-Osterreich, Austria, 1896, Strasser.

Extraction. Two to ten specimens were used for each extraction. The dry specimens were placed in a micro test tube, covered with acetone (2–4 μ l) and kept at 45–50° for 0.5 hr. The extract was taken up in a capillary.

Chromatography. Thin-layer chromatography was carried out using Eastman Kodak's "Chromagram" (silica gel, 0.1 mm thick) as adsorbant and toluene–hexane 8:1 (v/v), benzene–chloroform 3:1 (v/v) and toluene–acetic acid 4:1 (v/v) (in the case of pulvic acid) as solvents. The spots were detected by their intense yellow fluorescence in u.v. light (365 nm). Using an extremely thin capillary, the extracts were applied as dots with a radius less than 0.5 mm. The development was carried out in the ordinary manner. The compounds listed in Table 1 were identified by co-chromatography with authentic synthetic samples.

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² K. MOSBACH, *Studies on the Biosynthesis of Aromatic Compounds in Fungi and Lichens*. Lund (1964).