

product on silica gel plates afforded a 17% yield of racemic cryptosporiopsin<sup>7</sup>, whose identity was established by comparison of IR- (CCl<sub>4</sub>), UV-, NMR- and mass-spectra, as well as TLC behavior, with those of natural cryptosporiopsin.

The synthetic racemic antibiotic was assayed for its activity against sporangial germination of *Phytophthora infestans*<sup>8</sup> in aqueous solution. Germination was almost completely prevented at a concentration of 12.5 µg/ml. Natural (dextrorotatory) cryptosporiopsin showed about the same degree of inhibition at 6.25 µg/ml. (Control; 70% germination.) These results suggest that the dextrorotatory enantiomer alone is responsible for the observed inhibition of sporangial germination.

*Résumé.* L'antibiotique cryptosporiopsine, produit métabolique de *Sporormia affinis* ainsi que d'une espèce de *Cryptosporiopsis* a été synthétisé à partir de la dihydro-cryptosporiopsine synthétique.

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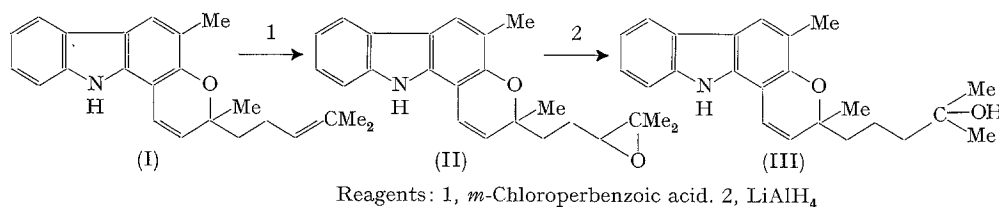
<sup>7</sup> The yield was 20% based on unrecovered starting material.

<sup>8</sup> M. A. STILLWELL and W. A. HODGSON, Can. J. Microbiol. 14, 807 (1968). We thank Mr. M. A. STILLWELL for this determination.

### Terpenoid Alkaloids from *Murraya koenigii* Spreng. IV<sup>1</sup> Structure and Synthesis of Mahanimbinine<sup>2</sup>

*Murraya koenigii* Spreng. has proved to be a rich source of terpenoid carbazole alkaloids. Up to date 12 of these have already been reported<sup>3-11</sup>. The present communication describes the structure and synthesis of one more base – a congener of mahanimbine (I) from the leaves of this plant.

apart from its partial racemic nature, with the natural product. Since the synthesis of mahanimbine has already been reported<sup>1</sup>, this constitutes the total synthesis of the new base. The partial racemization of this base as well as of some other members in this series will be discussed in a subsequent communication.



The alkaloid named mahanimbinine, C<sub>22</sub>H<sub>27</sub>NO<sub>2</sub> (M<sup>+</sup>, 349), mp 179°;  $\nu_{max}$  (CHCl<sub>3</sub>) 3580 (OH), 3450 (NH), 1630 and 1600 cm<sup>-1</sup> (unsaturation and aromatic system) had an UV-spectrum,  $\lambda_{max}$  (EtOH), 238, 288, 329, 344, and 359 nm (log  $\epsilon$  4.64, 4.61, 3.83, 3.87, and 3.82 respectively). The NMR-spectrum (CDCl<sub>3</sub>) showed the following signals:

$\tau$  8.80, s, 6,  $-\text{O}-\text{C}(\text{CH}_3)_2$ ; 8.59, s, 3,  $-\text{O}-\text{C}-\text{CH}_3$ ; 7.67, s, 3, ar. CH<sub>3</sub>; 8.14–8.65, m, 6, methylene protons; 4.42, d (J 10 Hz), 1, olefinic H; 3.40, d (J 10 Hz), 1, benzylic methine H; 2.35, s, 1, 4-H; 2.07, m, 1, 5-H. There were 3 more aromatic protons in the region 2.55–2.94  $\tau$ .

The mass spectrum of the base showed, apart from the molecular ion peak, M<sup>+</sup> 349, abundant ions at *m/e* 334, 331, 330, 316, 276, 275, 261, 260, 249, 248 (base peak), 247, 234, 218, 210, 204, and 180. The combined data and particularly the correspondence of the base peak with that obtained from mahanimbine<sup>10</sup> (I), the absence of olefinic protons in the side-chain, the presence of a –OH group in the IR-spectrum and the M<sup>+</sup> at *m/e* 349 (18 units higher than that of mahanimbine) led to constitution (III) for mahanimbinine.

This was confirmed by its synthesis as follows: (+)-mahanimbine (I) stirred 3 h at room-temperature with *m*-chloroperbenzoic acid in dry ether gave the epoxy compound (II) as the major product. Reduction of (II) with LiAlH<sub>4</sub> followed by purification of the product on silica-gel column gave a compound in 30% yield, mp 148° (benzene) which on the basis of elemental analysis, TLC, UV-, IR- and NMR-spectra, was identical,

*Zusammenfassung.* Die Struktur (III) des Mahanimbinins, eines Verwandten des Mahanimbins aus den Blättern von *Murraya koenigii* Spreng., ist spektroskopisch und durch Synthese aufgeklärt worden.

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Central Drug Research Institute,  
Lucknow (India), 20 April 1970.

<sup>1</sup> Part III. S. P. KUREEL, R. S. KAPIL and S. P. POPLI, Chem. Commun. (1969), 1120.

<sup>2</sup> Communication No. 1505 from the Central Drug Research Institute, Lucknow.

<sup>3</sup> D. P. CHAKRABORTY and B. K. CHOWDHURY, J. org. Chem. 33, 1265 (1968).

<sup>4</sup> D. P. CHAKRABORTY and K. C. DAS, Chem. Commun. (1968), 967.

<sup>5</sup> N. S. NARASIMHAN, M. V. PARADKAR and V. P. CHITGUPPI, Tetrahedron Lett. (1968), 5501.

<sup>6</sup> B. K. CHOWDHURY and D. P. CHAKRABORTY, Chem. Ind. (1969), 549.

<sup>7</sup> D. P. CHAKRABORTY, B. K. BARMAN and P. K. BOSE, Sci. Cult. 30, 445 (1964). – N. L. DUTTA and C. QUASIM, Ind. J. Chem. 7, 307 (1969).

<sup>8</sup> S. P. KUREEL, R. S. KAPIL and S. P. POPLI, Experientia 25, 790 (1969).

<sup>9</sup> S. P. KUREEL, R. S. KAPIL and S. P. POPLI, Tetrahedron Lett. (1969), 3857.

<sup>10</sup> S. P. KUREEL, R. S. KAPIL and S. P. POPLI, unpublished work.

<sup>11</sup> N. L. DUTTA, C. QUASIM and M. S. WADIA, Ind. J. Chem. 7, 1061 (1969).