product on silica gel plates afforded a 17% yield of racemic cryptosporiopsin[7], whose identity was established by comparison of IR- (CCl_4), 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 *Phythophthora infestans*[8] 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 dihydrocryptosporiopsine synthétique.

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Canada Department of Fisheries and Forestry, Forest Research Laboratory, P.O. Box 4000, Fredericton (New Brunswick, Canada), 20 April 1970.

[7] The yield was 20% based on unrecovered starting material.

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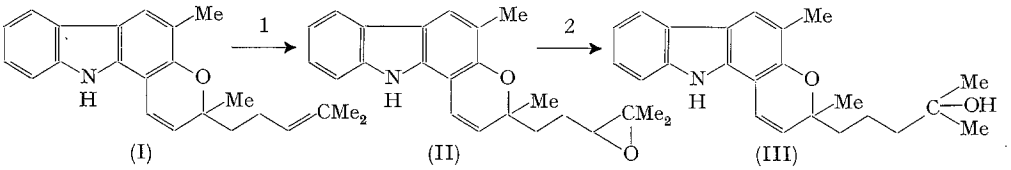
Terpenoid Alkaloids from *Murraya koenigii* Spreng. IV[1] Structure and Synthesis of Mahanimbinine[2]

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



Reagents: 1, *m*-Chloroperbenzoic acid. 2, $LiAlH_4$

The alkaloid named mahanimbinine, $C_{23}H_{27}NO_2$ (M^+, 349), mp 179°; ν_{max} ($CHCl_3$) 3580 (OH), 3450 (NH), 1630 and 1600 cm^{-1} (unsaturation and aromatic system) had an UV-spectrum, λ_{max} (EtOH), 238, 288, 329, 344, and 359 nm (log ε 4.64, 4.61, 3.83, 3.87, and 3.82 respectively). The NMR-spectrum ($CDCl_3$) showed the following signals: τ 8.80, *s*, 6, $-O-C(CH_3)_2$; 8.59, *s*, 3, $-O-\underset{|}{C}-CH_3$; 7.67, *s*, 3, ar. CH_3; 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 τ.

The mass spectrum of the base showed, apart from the molecular ion peak, M^+ 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[10] (I), the absence of olefinic protons in the side-chain, the presence of a –OH group in the IR-spectrum and the M^+ 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 $LiAlH_4$ 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, apart from its partial racemic nature, with the natural product. Since the synthesis of mahanimbine has already been reported[1], 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.

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

S. P. Kureel, R. S. Kapil and S. P. Popli

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

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