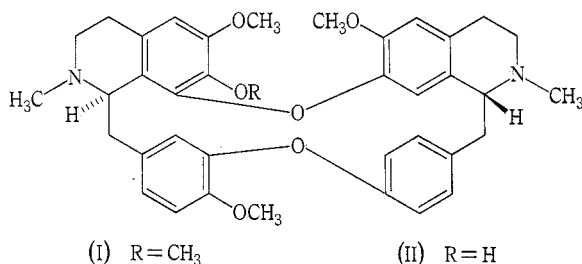


ALKALOIDS OF A *PHAEANTHUS* SPECIES FROM NEW GUINEA. ISOLATION OF PHAEANTHINE AND LIMACINE*

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Very strongly positive tests for alkaloids were given by both the leaves and bark of a *Phaeanthus* species (family Anonaceae) that occurs as small shrubby trees in the New Guinea rain forest. Some uncertainty is attached to the identification of this species which is considered to be *Phaeanthus macropodus* (Miq.) Diels, but with a possibility that it may be a new species. Both the leaf alkaloids (isolated in 1.13% yield) and the bark alkaloids (1.12% yield) afforded the same two major constituents which have been identified as the known bisbenzylisoquinoline alkaloids phaeanthine (I) and limacine (II).



Phaeanthine (I) was previously isolated from *Phaeanthus ebracteolatus*¹ and from *Gyrocarpus americanus*.² Limacine was previously isolated from *Limacia cuspidata* (Miers) Hook. f. & Thom.³ (family Menispermaceae), and shown to be the (–)-form of the alkaloid fangchinoline, the structure of which is the optical antipode of (II). The relationship of limacine to phaeanthine was confirmed by the formation of phaeanthine on methylation of limacine with diazomethane. The discrepancy between the observed melting point of limacine and that reported for fangchinoline is attributed (Furukawa, H., personal communication) to the existence of different crystalline forms.

Experimental

Bark and leaves of *Phaeanthus* (?)*macropodus* were collected near the Bumbu River, approximately 7 miles north of Lae, and at Oomsis Creek, 18 miles west of Lae. Reference herbarium specimens (TGH9833, TGH9945, and TGH11321) have been stored at the Herbarium, Lae, New Guinea.

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¹ Santos, A. C., *J. Philipp. pharm. Ass.*, 1932, **4**, 118.

² McKenzie, A. W., and Price, J. R., *Aust. J. Chem.*, 1953, **6**, 180.

³ Tomita, M., and Furukawa, H., *Tetrahedron Lett.*, 1966, 4293.

Leaf and bark samples were extracted by the general method previously described⁴ and on a 1-kg scale gave yields of crude alkaloids amounting to 1.13 and 1.12% respectively. When crude leaf alkaloids (1.75 g) were chromatographed on neutral alumina, benzene eluted phaeanthine (0.4 g), which on crystallization from acetone or methanol gave colourless crystals, m.p. 220–222°, $[\alpha]_D -280^\circ$ (c, 0.18 in CHCl_3). There was no depression of melting point on mixing with a sample of phaeanthine previously isolated from *Gyrocarpus americanus*,² and the i.r. and n.m.r. spectra of the two samples were identical.

After elution of phaeanthine, the other major constituent limacine was eluted by chloroform. Crystalline fractions totalling 0.61 g were combined and crystallized from benzene to give limacine as colourless crystals, m.p. 155–156°, $[\alpha]_D -251^\circ$ (c, 0.20 in CHCl_3). The physical constants and n.m.r. spectrum of the alkaloid suggested its identity with limacine, and Dr H. Furukawa found the i.r. spectrum to be identical with that of authentic limacine. Methylation of limacine with diazomethane in methanol–diethyl ether solution gave phaeanthine, m.p. and mixed m.p. 220–221°. From the bark alkaloids, phaeanthine and limacine were separated in approximately the same yield and in almost the same proportion as in the leaves.

Acknowledgments

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⁴ Johns, S. R., Lamberton, J. A., and Sioumis, A. A., *Aust. J. Chem.*, 1966, **19**, 2331.