6-(3-Methylbuta-1,3-dienyl)indole from *Monodora tenuifolia*

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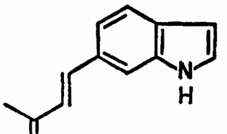
Summary The title compound has been isolated from the seed of *Monodora tenuifolia*, and identified by analysis and by comparison of the spectra with those of the isomeric monomethyl indoles.

THE seed of *Monodora tenuifolia* (Benth.), Annonaceae, are mildly fragrant, and used as a food flavouring in West Africa. The main petroleum extract (*ca.* 0·3%) was a crystalline solid, $C_{13}H_{13}N$,† m.p. 124—127°; λ_{max} 225 (infl.), 264, and 310 nm (ϵ 10,100, 16,100, and 19,000). The n.m.r. spectrum showed bands attributable to an isoprenyl residue: δ 1·96 (3H, s, Me), 5·06 (2H, m, $=CH_2$), 6·70 and 6·80 (2H, vinyl-H, multiplicity undetermined), and aromatic resonances: 7·57 (1H, d, *J* 9 Hz), *ca.* 7 (3H, complex), and *ca.* 6·47 p.p.m. (1H, complex). Hydrogenation in ethanol over palladium gave a liquid tetrahydro-derivative, in which the isoprenyl bands had disappeared and were replaced by isopentyl bands: δ 0·92 (6H, d, *J* 5 Hz, 2 × Me), 1·53 (3H, m), and 2·72 p.p.m. (2H, m, Ar-CH_2). The aromatic hydrogen resonances in the tetrahydro-derivative formed a pattern closely similar to that of a synthetic sample of 6-methylindole, but different from that of any of the other monomethyl-indoles; the natural product is therefore 6-(3-methylbuta-1,3-dienyl)indole (**1**). The recognition as a 6-substituted indole was aided by the i.r. absorption frequency of the aromatic hydrogens (805 and 765 cm^{-1}, 2 adjacent H). Further, a synthetic sample of 4-methylindole lacks the downfield resonance at δ *ca.* 7·5 p.p.m. Since this is present in the spectra of all the other monomethyl-indoles, it is presumably due to 4-H, and since it is a clear doublet (*J* 9 Hz) in the natural product, it follows that C-6 must be substituted.



(1)

So far as we are aware, this is the first isoprenyl-indole to be reported, although similar derivatives of oxygen heterocycles are well known. The biosynthesis may possibly follow the pattern suggested by Plieninger[1] for 4-dimethylallyltryptophan, an intermediate in lysergic acid biosynthesis. Alternatively, it may be a product of substitution of indole by dimethylallyl pyrophosphate or a similar reagent, or the isoprenyl group may be introduced before the hetero-ring is formed.

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† Satisfactory analyses for C, H, and N were obtained.

[1] H. Plieninger, R. Fischer, and V. Liede, *Annalen*, 1964, **672**, 223.