was comparable to the colour intensity of 0·5 to 1·0 $\mu$g tyramine standards under the same conditions. Bioassay of 1 $\mu$g of tyramine gave an average value for cardiotonic activity for ten assays on the isolated cat papillary muscle of 203% $\pm$ 40, while the assay of 250 $\mu$g of extract before chromatography gave a result of 245% $\pm$ 47 for five assays, the results being expressed as mean $\pm$ standard error. Noradrenaline, adrenaline, dopamine, isoprenaline, histamine, aldosterone, 5-hydroxytryptamine and phenylalanine were also chromatographed in the same systems but none had the same or similar Rf values to the extract in all the systems. These findings suggest that all the cardiotonic activity of the extract is accountable for on the basis of its tyramine content. The extracts were inactive when assayed on muscle preparations from reserpinized cats, confirming the indirectly-acting nature of the extracts. No noradrenaline, adrenaline or dopamine were detected by the ferricyanide spot tests, but a ninhydrin-reacting constituent corresponding in Rf to histamine was detected in the extracts occasionally.

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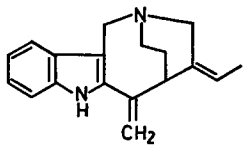
# The isolation and identification of (–)-apparicine from *Tabernamontana cumminsii*

Conopharyngine, the major alkaloidal component (Thomas & Starmer, 1963; see also Renner, Prins & Stoll, 1959), jollyanine (conopharyngine hydroxyindolenine) (Crooks & Robinson, 1970) and 2-ethyl-3-[2-(3-ethylpiperidino)-ethyl] indole (Crooks, Robinson & Smith, 1968) have already been isolated from the ether-soluble bases obtained from the leaves of *T. cumminsii*. We have now identified a fourth alkaloid, m.p. 188–191°, $[\alpha]_D^{22} = -170 \pm 10°$ (in $CHCl_3$), whose isolation from this source we have already reported (Crooks & Robinson, 1970).

The high resolution mass spectrum of the alkaloid showed a molecular ion at m/e = 264·162387 which indicated a molecular formula $C_{18}H_{20}N_2$ (calculated 264·162641). Apart from the molecular ion, which was also the base peak, the mass spectrum had other significant peaks at m/e = 249, 235, 222, 208, 194, 180, 167, 154, 130 and 128. The ultraviolet spectrum in ethanol had $\lambda_{max}$ 303–305 nm (log $\epsilon$ = 4·65), $\lambda_{infl}$ 309–312 nm (log $\epsilon$ = 4·60), $\lambda_{min}$ 268 nm (log $\epsilon$ = 3·78) which did not change upon acidification.

The above data are in agreement with those reported (Joule, Monteiro & others, 1965) for (−)-apparicine (I). The identity of the alkaloid at present under investigation was confirmed as (−)-apparicine (I) by comparison (TLC behaviour and ultraviolet and mass spectra) with an authentic sample of (−)-apparicine (supplied by Dr. R. T. Brown of the Department of Chemistry, University of Manchester).




I

(−)-Apparicine, the biosynthesis of which from tryptophan via stemmadenine has recently (Kutney, Nelson & Wigfield, 1969) been demonstrated, has previously been isolated from several species of the genus *Aspidosperma* (Arndt & Djerassi, 1965; Gilbert, Duarte & others, 1965) and its enantiomer has been isolated from one such species (Joule, Ohashi & others, 1965). Under the synonyms (Monteiro, 1966) tabernoschizine and pericalline, (−)-apparicine has also been isolated from *Schizozygia caffaeoides* (Renner & Kernweisz, 1963) and from *Catharanthus lanceus* (Blomster, Martello & others, 1964) and *roseus* (Svoboda, 1963) respectively, and the un-named alkaloid, m.p. 186–188° (no rotation given) isolated from *Aspidosperma australe* (Ondetti & Deulofeu, 1961) is also probably apparicine. The present studies represent the first isolation of the alkaloid from the genus *Conopharyngia*.

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