# Alkaloids of *Voacanga schweinfurthii* Stapf: voacorine and voacangine

SIR,—In a previous communication (Fish, Newcombe & Poisson, 1960), the isolation of voacamine and vobtusine from the stem bark of *V. schweinfurthii* was described. Modification of the extraction procedure has yielded several other alkaloids of which one, voacorine, has been isolated and characterised and a second, voacangine, has been identified by its chromatographic properties and ultra-violet spectrum.

The total alkaloidal fraction of the bark was obtained by cold percolation with 70% ethanol, concentration of the percolate, adjustment to pH 9·0 and extraction with ethyl acetate. The extract was purified by shaking with 5% acetic acid, basifying the acid extract with solution of ammonia and then re-extracting with ethyl acetate. This solution was evaporated to dryness and the residue, dissolved in benzene, chromatographed on alumina. Elution with ether separated several alkaloidal fractions which were analysed by comparison with known alkaloids on circular chromatograms using Whatman No. 1 paper discs, 24 cm diameter, buffered to pH 4·7 with potassium hydrogen phthalate solution; development was with ether saturated with buffer solution. Ether eluted from the alumina column a mixture of voacangine and an unidentified alkaloid, then voacamine and, finally, a mixture of vobtusine and voacorine.

Voacangine and the unknown alkaloid were separated by thin layer chromatography using a modification of the method of Demole (1958), employing silicic acid bound with tragacanth and developing with a mixture of ether and chloroform (2:1). Neither alkaloid was obtained in crystalline form but their ultra-violet spectra were determined on solutions in ethanol. Voacangine showed absorption maxima at 225 and 287 m$\mu$ and although no values for log $\epsilon$ could be obtained, the maxima were of the same relative proportions as published (Janot & Goutarel, 1955). The other alkaloid showed a single sharp peak at 220 m$\mu$ possibly indicative of a $\psi$ indoxyl chromophore (Scott, 1964) which thus distinguishes it from all other alkaloids so far separated from *Voacanga* species.

Concentration of the vobtusine–voacorine fraction precipitated the vobtusine and further concentration of the mother liquor yielded voacorine as rosettes of white, feathery crystals which were recrystallised from methanol and then from acetone.

*Voacorine.* Uncorrected m.p. 271° (decomp.), $\lambda_{max}$(EtOH) 225 m$\mu$ (log $\epsilon$ 4·66), 286 (4·20), and 295 (4·21) agreed with published figures (Goutarel & Janot, 1956; La Barre & Gillo, 1956). Infra-red spectrum coincided with that described by Goutarel & Janot (1956) and with that obtained using authentic voacorine. Found: C, 70·25; H, 7·4; N, 8·1, $C_{43}H_{52}N_4O_6$ requires C, 71·6; H, 7·3; N, 7·7%. This most recent formula was given by Budzikiewicz & others (1963) on interpretation of the mass spectrum of voacorine.

Our investigations have revealed a marked similarity between the alkaloidal constituents of the stem barks of *V. schweinfurthii* and *V. africana* Stapf, species which are very closely related taxonomically (Pichon, 1947).

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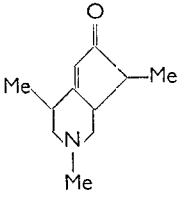
## References

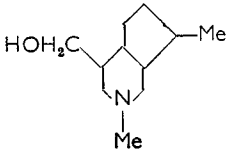
Budzikiewicz, H., Djerassi, C., Puisieux, F., Percheron, F. & Poisson, J. (1963). *Bull. Soc. chim. Fr.*, 1899–1904.
Demole, E. (1958). *J. Chromatog.*, **1**, 24–34.
Fish, F., Newcombe, F. & Poisson, J. (1960). *J. Pharm. Pharmacol.*, **12**, 41*T*–44*T*.
Goutarel, R. & Janot, M.-M. (1956). *C. R. Acad. Sci., Paris*, **242**, 2981–2983.
Janot, M.-M. & Goutarel, R. (1955). *Ibid.*, **240**, 1800–1801.
La Barre, J. & Gillo, L. (1956). *C. R. Soc. Biol., Paris*, **150**, 1628–1630.
Pichon, H. (1947). *Bull. Mus. Hist. nat. Paris*, **19**, 409–416.
Scott, A. I. (1964). *Interpretation of the Ultraviolet Spectra of Natural Products*, pp. 175, 298, Oxford: Pergamon Press.

## Hypoglycaemic properties of tecomine and tecostanine

SIR,—Tecomine (I) and tecostanine (II) are two alkaloids isolated by Hammouda & Motawi (1959) and Hammouda, Plat & Le Men (1963a) from the leaves of *Tecoma stans* (Juss.). The leaves of the various species of *Tecoma*




Tecomine (I)




Tecostanine (II)

have long been used orally by the natives of Mexico as antidiabetic remedies (Colin, 1926; 1927). The structures of the two alkaloids have also been elucidated (Hammouda, Plat & Le Men, 1963b; Jones, Fales & Wildman, 1963).

The present communication describes the biological assay for hypoglycaemic properties of the two alkaloids compared with tolbutamide. Normal healthy albino rabbits weighing 1·5–2 kg fasted for 12 hr were injected with tecomine and tecostanine salt solutions in isotonic saline. Their hypoglycaemic potency was calculated and related to that of tolbutamide given orally and measured by the procedure outlined by Marks (1926) for the biological assay of insulin. Blood sugar was determined by the method of Nelson (1944).

The results (Table 1) show tecomine and tecostanine to be potent hypoglycaemic agents when given intravenously. The average lethal dose was found to be 300 mg/kg in mice.

TABLE 1. HYPOGLYCAEMIC ACTION OF THE ALKALOIDS

| Substance administered | Dose mg/kg | Route | Blood sugar response mg/100 ml | | Time of maximal response hour : min | Mean reduction % | Hypoglycaemic potency of tolbutamide % |
|---|---|---|---|---|---|---|---|
| | | | Initial† | Maximal† | | | |
| Tolbutamide .. .. | 250 | Oral | 100·1 | 73·7 | 3 : 50 | 26 ± 2 | — |
| Tecomine citrate .. | 20* | i.v. | 98·3 | 52·3 | 3 : 14 | 47 ± 3·5 | 179 |
| Tecostanine hydrochloride .. .. | 20* | i.v. | 104·9 | 48·6 | 3 : 23 | 49 ± 3 | 186 |

† Average of four rabbits.
* Calculated as the free base.