

STUDIES ON THE ALKALOIDS OF PACHYSANDRA TERMINALIS
SIEB. ET ZUCC. (8)¹⁾: STRUCTURE OF EPIPACHYSANDRINE-A

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In the previous communications, we reported isolation and structural elucidation of a number of new steroidal alkaloids from *Pachysandra terminalis* SIEB. et ZUCC.. Subsequent investigations have made additions to the list of *Pachysandra* Alkaloids.

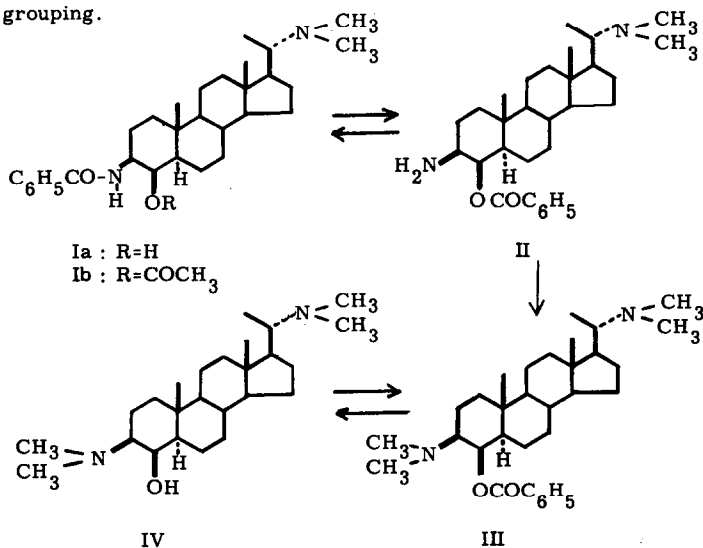
Epipachysandrine-A (Ia), m.p. > 295°²⁾, $[\alpha]_D^{20} + 12^\circ$ (50% CHCl₃-MeOH)³⁾, is a minor alkaloid, newly isolated from the weakly basic alkaloid fraction of the plant. It analysed for C₃₀H₄₆O₂N₂⁴⁾, and showed an amide band at 1630 cm⁻¹ in the IR spectrum (nujol).

Acetylation of epipachysandrine-A (Ia) afforded an O-acetate (Ib), C₃₂H₄₈O₃N₂ (molecular ion peak at m/e 508 in the Mass Spectrum⁵⁾), m.p. 280 - 285°, $[\alpha]_D^{20} + 21^\circ$, which showed IR $\nu_{\max}^{\text{CHCl}_3}$ 1735 (OAc), 1660 cm⁻¹ (N-benzoyl) and NMR signals⁶⁾ at 2.1-3.0 (5H, phenyl), 4.73 (1H, CH-OH), 7.82 (6H, N-(CH₃)₂), 7.89 (3H, O-Ac), 8.99, 9.33 (6H, two tert. CH₃), 9.12 τ (3H, doublet, J 6 c.p.s., sec. CH₃).

Treatment of Ia with hydrochloric acid in acetic acid caused the

$N \rightarrow O$ acyl migration to afford an O -acyl compound (II), IR $\nu_{\max}^{\text{CHCl}_3}$ 1715, 1600, 1580 cm^{-1} , which returned to Ia upon base treatment.

Therefore epipachysandrine-A must have a vicinal hydroxy-acylamino grouping.



N -methylation of the above O -acyl compound (II) with formic acid-formalin gave an N -dimethyl compound (III), m.p. 162 - 167°. $[\alpha]_{\text{D}}^{25} + 45^\circ$, IR $\nu_{\max}^{\text{CHCl}_3}$ 1710 (ester), 1600, 1580 cm^{-1} (phenyl); NMR : 7.70, 7.82 τ (12H, two singlet, two $N-(\text{CH}_3)_2$), which was then converted to the hydroxy compound (IV) by reduction with lithium aluminum hydride. The latter compound (IV), m.p. 172 - 178°, $[\alpha]_{\text{D}}^{25} + 35^\circ$, was found to be identical with an authentic sample of 3β , 20α -bisdimethylamino- 4β -hydroxy- 5α -pregnane

(IV), reported previously⁷⁾, by mixed m.p. determination and IR (KBr) comparison.

The presence of the N-benzoyl group in epipachysandrine-A, suggested by the spectral data, was demonstrated by the fact that the above mentioned N-dimethyl-O-acyl compound (III) was identified by direct comparison (mixed m.p. determination and IR (KBr)) with the O-benzoate III, m.p. 160 - 165°, $[\alpha]_D + 36^\circ$, derived from the authentic $3\beta, 20\alpha$ -bis-dimethylamino- 4β -hydroxy- 5α -pregnane (IV)⁷⁾.

As a result, the structure of epipachysandrine-A is represented by the formula Ia.

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REFERENCES

- 1) Part (7), T. Kikuchi and S. Uyeo, Jr., Tetrahedron Letters, No. 39, pp. 3487 - 3490, (1965).
- 2) All the melting points are uncorrected.
- 3) All the optical rotations reported in this communication were taken in CHCl_3 solution at 10 - 20°, unless otherwise specified.
- 4) All the compounds with cited empirical formulas gave satisfactory

elemental analyses.

- 5) Mass spectrum was taken with a Hitachi Mass Spectrometer Model RMU-6C. using an all glass inlet system.
- 6) All NMR spectra were determined on a Varian Associates recording spectrometer (A-60) at 60 Mc. in CDCl_3 . Chemical shifts are reported in τ values, using tetramethylsilane as the internal reference.
- 7) T. Kikuchi and S. Uyeo, Jr., Tetrahedron Letters, No. 39, pp. 3476, (1965).