

ALKALOIDS OF *DATURA PRUINOSA*

WILLIAM C EVANS and PETER G. TREAGUST*

Department of Pharmacy, University of Nottingham NG7 2RD

(Received 10 April 1973 Accepted 1 May 1973)

Key Word Index—*Datura pruinosa*, Solanaceae, tropane alkaloids, atropine, tigloyl esters, cuscohygrine

Plant Datura pruinosa (Greenm.) A Mexican species of limited distribution, it resembles *D. leichhardtii* both in its general morphology and in its chromosomal characteristics¹ but is readily distinguished from the latter by a pubescence which covers all the aerial parts of the plant. Together these 2 species differ from the other members of Safford's² section *Dutra* by the smaller sizes of their flowers, leaves, capsules and general habit. *Uses and previous work* None reported. *Authenticity of plant material* Original seed (Ref 54117) obtained in 1959 from the Blakeslee Collection, Amherst College, Mass through the courtesy of Mr A G Avery.

Identification of alkaloids Alkaloids obtained by chromatographic fractionation of the ether extract of the dried plant material are recorded below, characterization is indicated as follows. P, m p and m m p of picrates, IRP, comparison of IR spectrum of picrate with that of authentic compound, MSP, MS of picrate, C, co-chromatography (C1–C4, TLC), C1, alumina (Et₂O), C2, alumina (Et₂O–EtOH, 1:1), both visualized with I₂ in CCl₄, C3, silica gel (CHCl₃–NH₄Et₂, 9:1), C4, silica gel (acetone–NH₄OH, 4:1), both visualized with iodoplatinate reagent, C5, paper (light petrol b.p. 60–80°–amyl alcohol–HOAc–H₂O, 1:3:3:3) visualized with modified Dragendorff's reagent, CT, co-chromatography of the tigloyl esters of the bases.

Aerial parts Total alkaloid, 0.16% (dry wt) as atropine. *Atropine* (principal alkaloid, 0.06%). C2, C3, P, IRP. *Apoatropine* C1, C2, P, IRP, MSP. *Noratropine* C2, C3, P, IRP. *Hyoscine* (0.02%) C2, P, IRP. *Norhyoscine* C2, P, IRP. *Apoxyhyoscine* C1, C2. *Littorine* C2, C3. *Tigloidine* C1, C2. *3α-Tigloyloxytropine* C2, P. *Meteloidine* C2, C3, P, IRP. *Tropine* C2, C3, C4, C5, CT. *ψ-Tropine* C2, C3, C4, C5, CT.

Roots Total alkaloid, 0.46% (dry wt) as atropine. *Atropine* (principal alkaloid, 0.18%). C2, C3, P, IRP. *Norhyoscyamine* C2, C3, P, IRP. *Hyoscine* (0.01%) C2, P, IRP. *Littorine* C2, C3. *Tigloidine* C1, C2, P, IRP. *3α-Tigloyloxytropine* C2, C3, P, IRP. *Meteloidine* C2, C3, P, IRP. *3α-6β-Ditigloyloxytropine* C1, C2, P, IRP. *3α, 6β-Ditigloyloxytropine-7β-ol* C1, C2, P, IRP. *Tropine* C2, C3, C4, C5, CT. *ψ-Tropine* C2, C3, C4, C5, CT. *Cuscohygrine* C2, C3, C4, C5, P, IRP.

The spectrum of alkaloids contained in *Datura pruinosa* is similar to that found in other species of this genus. Atropine, or hyoscyamine, as distinct from hyoscine, as the principal alkaloid of the aerial parts is a feature of a limited number only of *Datura* species and in this

* Present address. Beecham Research Laboratories, Worthing, Sussex.

¹ AVERY, A G, SATINA, S and RIETSEMA, J (1959) *Blakeslee. The Genus Datura*, Ronald Press, New York² SAFFORD, W E (1921) *J Wash Acad Sci* 11, 173

respect the close affinity of *D. prunosa* and *D. leichhardtii*³ is substantiated 3 α -Tigloyloxytropine has been reported previously from the roots only of *Datura* although it is a known constituent of the aerial parts of some *Scopolia*,⁴ *Solandra*,⁵ *Duboisia*⁶ and *Anthocercis*⁷ species. The isolation of littorine and cuscohygrine is consistent with their recently reported⁸ occurrence throughout the genus.

EXPERIMENTAL

Cultivation Seedlings raised under glass, Nottingham, and subsequently transferred to open land. Collection at the flowering and fruiting stage.

Extraction of alkaloids Powdered plant material, Ca(OH)₂ and H₂O (5:1:2) allowed to stand for 1 hr and then exhausted with Et₂O, solvent removed from extract.

Fractionation of alkaloids Aerial parts. The basic residue from the extraction was submitted, in Et₂O, to kieselguhr supporting N-H₂SO₄ (2:1). Pigments were eluted with Et₂O, CHCl₃-soluble alkaloidal sulphates with CHCl₃, and other bases were recovered in CHCl₃ from the extruded column made alkaline with NH₄OH. Subsequent fractionation of bases was effected on kieselguhr at pH 6.8 (typically kieselguhr 25 g, 0.5 M-phosphate buffer solution 12.5 ml) with light petrol b.p. 40–60° (elution of apohyoscyne, tigloidine, apoatropine), Et₂O (elution of hyoscyne, norhyoscyne and 3 α -tigloyloxytropine), CHCl₃ (elution of littorine, atropine and noratropine) and ammoniacal CHCl₃ (elution of tropine and ψ -tropine) as eluants. Repeated chromatography was often necessary to purify individual alkaloids. Roots. The ether extract was fractionated (kieselguhr 10 g, 0.5 M-phosphate buffer solution, pH 6.8, 5 ml) and the alkaloids eluted as above, 3 α ,6 β -ditigloyloxytropine and 3 α ,6 β -ditigloyloxytropan-7 β -ol were obtained in the initial light petrol eluate and were separated on kieselguhr at pH 5.6. Cuscohygrine was isolated from the ammoniacal CHCl₃ fraction.

³ EVANS, W. C. and STEVENSON, N. A. (1962) *J. Pharm. Pharmacol.* **14**, 107 T.

⁴ GHANI, A. (1971) Ph.D. Thesis, University of Nottingham.

⁵ EVANS, W. C., GHANI, A. and WOOLLEY, V. A. (1972) *Phytochemistry* **11**, 470.

⁶ COULSEN, J. F. and GRIFFIN, W. J. (1967) *Planta Med.* **15**, 459.

⁷ EVANS, W. C. and TREAGUST, P. G. (1973) *Phytochemistry* **12**, in press.

⁸ EVANS, W. C., GHANI, A. and WOOLLEY, V. A. (1972) *Phytochemistry* **11**, 2527.

Phytochemistry, 1973, Vol. 12, pp. 2078 to 2079. Pergamon Press. Printed in England.

(24S)-ETHYLCHOLESTA-5,22,25-TRIENE-3 β -OL FROM FOUR *CLERODENDRON* SPECIES

STHANUSUBRAMANIA SANKARA SUBRAMANIAN, ARAKUZHA GOPALAN RAMACHANDRAN NAIR
and TIRUMALAI NALLAN CHAKRAVARTI VEDANTHAM

Department of Chemistry, Jawaharlal Institute of Postgraduate Medical Education and Research,
Pondicherry-605006, India

(Received 27 February 1973 Accepted 1 March 1973)

Key Word Index—*Clerodendron* sp., Verbenaceae, (24S)-ethylcholesta-5,22,25-triene-3 β -ol

Plants *Clerodendrum indicum* L. (Syn. *Clerodendron siphonanthus* R. Br.), *C. infortunatum* L., *C. phlomides* L. and *C. nerifolium* Wall. (voucher specimen Nos. 14/72, 15/72, 2/72 and