Saponin of *Aesculus punduana* Leaves

DHAN PRAKASH and S. K. NIGAM

National Botanical Research Institute, Lucknow-226 001

Manuscript received 4 May 1982, accepted 30 May 1983

AESCULUS Linn. is a genus of Hippocastanaceae family comprising 25 species of trees and shrubs distributed in Asia, Europe and America. *A. indica* and *A. punduana* Wall. (syn. *A. assamica* Griff.) are the two species found in India. The 50% ethanolic extract of the fruits of *A. indica* is reported to possess diuretic activity[1] and the oil from the seeds is used in rheumatism. The fruits and bark of *A. hippocastanum* are useful in the treatment of fevers and as antiperiodic[2].

The reported diuretic activity and effect on cardiovascular system[1] of the ethanolic extract of *A. punduana*, together with the medicinal uses and the interesting compounds reported[3] from the genus prompted us to take up a detailed chemical investigation of the plant.

Experimental

Concentrated ethanolic extract of dried and powdered leaves (900 g) of *A. punduana* was successively macerated with petroleum ether (4×250 ml), benzene (4×200 ml) and ethylacetate (4×200 ml) and the residual alcoholic extract was processed for saponin by the usual process to yield amorphous powder (12 g). The saponin (8 g) was acid hydrolysed and the sapogenins (5.3 g) thus obtained were subjected to column chromatography over silica gel (400 g) affording the following compounds.

The $CHCl_3$–MeOH (19 : 1) elution of the column gave an LB positive white compound (50 mg), m.p., 325-326°, $(\alpha)_D$+29.5° (pyridine), M^+, 490, analysed for $C_{30}H_{50}O_5$; ν_{max}^{KBr} 3370 (OH) and 1645 cm^{-1} (double bond) ; MS m/e 490 (M^+), 282, 264, 246, 215, 207, 197 and 189 ; penta acetate m.p. 152-155°. These spectral data suggested its identity as barringtogenol-C[3] confirmed by comparison with an authentic sample.

Further elution of the column with the same solvent gave another LB positive white compound (150 mg), m.p. 262-265°, $(\alpha)_D$+9.2°, M^+, 572, $C_{35}H_{56}O_6$; ν_{max}^{KBr} 3390 (OH), 1695 (CO), 1640 and 1265 cm^{-1} ; MS m/e 572 (3%, M^+), 364(5), 282(3), 246(3.5), 215(16), 207(35), 197(5), 189(32) and 83(100). On acetylation with C_5H_5N–Ac_2O at room temperature it gave triacetyl derivative m.p., 280-282°, $(\alpha)_D$+19.5°, $C_{41}H_{62}O_9$. On alkaline hydrolysis the compound gave barringtogenol-C, m.p. 325-326°, M^+, 490 and tiglic acid (glc). The close resemblance of its m.p. and spectral data suggested its identity with 21-tiglate barringtogenol-C[4].

The final elution of the column afforded LB positive white compound needles from MeOH, m.p. 241-245° ; M^+, 588, $C_{35}H_{56}O_7$; ν_{max}^{KBr} 3400 (OH), 1700 (CO) and 1645 cm^{-1} (double bond) ; MS m/e 588 (M^+), 364, 282, 246, 223, 215, 207, 197, 175 and 83 (base peak). On alkaline hydrolysis it gave protoaescigenin and tiglic acid. These data suggested its identity as protoaescigenin-21-tiglate[3].

In the aqueous hydrolysate of the saponin, glucuronic acid, glucose and galactose were identified as sugars (co-pc).

The petroleum ether soluble fraction (15 g) of the alcoholic extract of *A. punduana* leaves was chromatographed over silica gel (500 g). Elution of the column with *n*-hexane-benzene (3 : 1) afforded crystalline product, m.p. 84-85° which was identified as *n*-hentriacontanol by comparison with an authentic sample.

Further elution of the column with the same solvent gave an LB positive crystalline compound, m.p. 190-192°, $(\alpha)_D$+90°, M^+, 426, analysed for $C_{30}H_{50}O$; ν_{max}^{KB} 3350 (OH), 825 and 813 cm^{-1} (trisubstituted double bond), monoacetate, m.p. 232-235°. On the basis of spectral studies the compound was identified as β-amyrin and was confirmed by comparison with an authentic sample.

References

1. D. S. BHAKUNI, M. L. DHAR, B. N. DHAWAN, B S. GUPTA and R. C. SHRIMAL, *Indian J. Expt. Biol.*, 1971, 9, 91.
2. "The Wealth of India, Raw Materials", C.S.I.R., New Delhi, 1957, Vol. I, p. 35.
3. D. PRAKASH, G. MISRA and S. K. NIGAM, *Fitoterapia*, 1980, 51, 285.
4. T. HAYASHI, C. KOSHIRO, T. ADACHI, I. YOSIOKA and I. KITAGAWA, *Tetrahedron Lett.*, 1967, 2353.

O,O-Diethyl Phosphono/Phosphonothioyl N,N-Dialkyldithiocarbamates

G. S. SODHI and N. K. KAUSHIK*

Department of Chemistry, University of Delhi, Delhi-110 007

Manuscript received 12 April 1982, revised 8 May 1983, accepted 19 July 1983

THE dithiocarbamate derivatives find their use as fungicides and pesticides[1]. Besides their biological significance, the dithiocarbamate ligands possess a structural importance too. They can form either monodentate or bidentate metal complexes. In earlier communications[2-5] we reported a number of organometallic compounds of N,N-dialkyl and N,N-alkylcyclohexyl dithiocarbamates. In all these compounds, the dithiocarbamate ligands are bidentate. In continuation, we report the study of a set

* Author for correspondence.