

- V. K. CHADHA, G. S. PANDA and H. K. PUJARI, *Indian J. Chem.*, 1971, 9, 910; T. E. ACHARY, G. S. PANDA and A. NAYAK, *J. Indian Chem. Soc.*, 1975, 52, 1065; K. S. L. SRIVASTAVA, *Curr. Sci.*, 1968, 37, 315; J. SAWLEWICZ, K. WISTEROWICZ and H. CIRAB, *Acta Pol. Pharm.*, 1976, 33, 681; S. K. MALLICK, A. R. MARTIN and R. G. LINGARD, *J. Med. Chem.*, 1971, 14, 528; K. O. JOSHI and J. S. GUPTA, *Indian J. Chem.*, 1967, 5, 139.
- M. D. GLOSIER and J. I. PETER, *J. Med. Chem.*, 1970, 13, 368.
- A. W. BAUER and W. M. M. KIRBY, *Am. J. Chem. Pathol.*, 1966, 45, 493.

### A Triterpene from *Salvia leucantha* Cav.

K. S. MUKHERJEE\*, C. K. CHAKRAVORTY,

T. P. CHATTERJEE

and

P. BHATTACHARJEE

Department of Chemistry, Visva-Bharati University,  
Santiniketan-731 235

Manuscript received 12 May 1987, revised 24 March 1988,  
accepted 12 April 1988

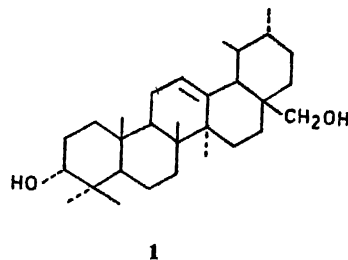
In our previous communications<sup>1,2</sup> we reported the isolation and characterisation of some triterpenes from the whole plant (aerial parts and roots) of *Salvia leucantha* Cav.<sup>3</sup> We report herein the isolation and structure elucidation of a pentacyclic triterpene from the chloroform extract of the whole plant of *S. leucantha*.

The air-dried powdered whole plant (aerial parts and roots) of *S. leucantha* was successively extracted with petroleum ether (b.p. 60–80°), benzene and chloroform. The concentrated chloroform extract was subjected to chromatographic analysis over silica gel, elution being carried out with solvents of increasing polarity. Elution of the column with benzene afforded a solid, C<sub>30</sub>H<sub>50</sub>O<sub>2</sub>, m.p. 205–7°, [α]<sub>D</sub><sup>25</sup> +65° (CHCl<sub>3</sub>), crystallised from chloroform–benzene (1 : 2) mixture which formed an amorphous diacetate, C<sub>34</sub>H<sub>54</sub>O<sub>4</sub> on acetylation with acetic anhydride and pyridine at room temperature. This suggests that both the oxygen atoms in the triterpene are present as hydroxyl functions. The <sup>1</sup>H nmr spectrum (100 MHz, CDCl<sub>3</sub>) of the triterpene showed resonances for five tertiary methyls at δ 0.74 (3H, s), 0.80 (3H, s), 0.96 (9H, s), two secondary methyls as doublets around δ 1.08 (6H, J 6 Hz), two hydroxy methyl (CH<sub>2</sub>OH) at δ 3.25 and 3.60 (each 1H, d, J 10 Hz), one triplet around δ 4.52 (CHOH) and one vinylic proton at δ 5.15 (1H, m). The data suggest that the compound is an ursene type of triterpene with one secondary and one primary hydroxyl group. The mass spectral analysis is also consistent with the above view. The mass fragmentation pattern is typical of urs-12-ene type<sup>4</sup> of pentacyclic triterpene and showed significant peaks at *m/z* 442 (M<sup>+</sup>),

411 (M<sup>+</sup>–CH<sub>2</sub>OH), 234 (base peak), 207 (r.D.A. fragmentation around ring C), 203 (234–CH<sub>2</sub>OH), 189 (207–H<sub>2</sub>O) and 133. From the above fragmentation pattern it is evident that the secondary hydroxyl group of the triterpene is present in the A/B ring portion while the primary hydroxyl group is located in the D/E ring portion.

Finally, conversion of the triterpene to ursonic acid, m.p. 270–74°, [α]<sub>D</sub><sup>25</sup> +75° (CHCl<sub>3</sub>) and methyl ursonate, m.p. 190°, [α]<sub>D</sub><sup>25</sup> +80° (CHCl<sub>3</sub>) by chromic acid oxidation in glacial acetic acid followed by methylation with diazomethane completely elaborates its structure as urs-12-en-3,28-diol. Conclusive evidence in favour of the axial (α) orientation of C<sub>3</sub>-hydroxyl group was obtained from <sup>1</sup>H nmr spectral data. The <sup>1</sup>H nmr spectrum of the triterpene showed a triplet-like signal of a single proton at δ 4.52 which shifts to δ 5.40 with a splitting pattern typical of 3α-acetoxy group<sup>5</sup> in the spectrum of the diacetate.

All the above data as well as the comparison of the physical properties of uvaol (lit. m.p. 232°) and its diacetate (lit. m.p. 157–59°) reveal that the triterpene may be represented as 3-epi uvaol (1)<sup>6</sup>, and incidentally this is the first time isolation of this triterpene from plant origin.



### Acknowledgement

The authors are thankful to R.S.I.C., Bose Institute, Calcutta for spectral analysis and to Dr. P. K. Ghosh for assistance in experimental work. One of the authors (C.K.C.) is also thankful to Visva-Bharati University for the award of a Junior Research Fellowship.

### References

- K. S. MUKHERJEE and P. K. GHOSH, *Curr. Sci.*, 1979, 48, 107.
- K. S. MUKHERJEE and P. K. GHOSH, *Asian J. Pharm. Sci.*, 1980, 2, 57.
- L. H. BAILY, "Manual of Cultivated Plants", Macmillan, New York, 1971, p. 958.
- H. BUDZIEWICZ, J. M. WILSON and C. DJERASSI, *J. Am. Chem. Soc.*, 1963, 85, 8688.
- N. S. BHACCA and D. H. WILLIAMS, "Application of NMR Spectroscopy in Organic Chemistry", Holden-Day, San Francisco, 1964, p. 78.
- S. HUNCK and G. SNATZKE, *Chem. Ber.*, 1965, 98, 120.