

NOTE

Chemical Investigation of *Sansevieria zeylanica* leaves

M.K. GEETHA NAMBIAR and P. MOHAMED SHAFI*

*Department of Chemistry
Calicut University, Kerala-673 635, India*

Chemical investigation on the leaves of *Sansevieria zeylanica* has resulted in the isolation and identification of hentriacontane, tritriacontane, tetratriacontane, pentatriacontane, tetratriacontanol, dotriacontanol, triacontanol, nonacosanol and β -sitosterol. Two long chain esters have also been isolated and identified. In addition two cycloartan derivatives also were isolated but not fully characterised.

*Sansevieria zeylanica*¹ wild (Liliaceae) which grows in India is a genus of erect, stiff-leaved, perennial herb with short thick rhizomes native of tropical Asia and Africa. Its fibres were used in bowstrings.² This plant is used in folk medicine³ for the treatment of heat of blood, gonorrhoea, heart disease, itch, leprosy, fever, rheumatism, glandular enlargements and other ailments. The root of *S. zeylanica* has been useful for the treatment of coughs, tuberculosis and also to counteract snake bite⁴. In the earlier works^{3, 5} aconitic acid, salicylic acid, reducing sugars, inorganic salts and an alkaloid, sensevierine have been reported. In the present work finely powdered leaves (2 kg) of *S. zeylanica* were extracted with petroleum ether (3 \times 6 L, 60–80°C). The combined petroleum ether extract was concentrated under reduced pressure. The viscous residue thus obtained was chromatographed over silica gel. The column was eluted with cyclohexane, petroleum ether, petroleum ether benzene (1:1) and benzene-ethyl acetate mixtures (4:1 and 3:1). Five components S₁, S₂, S₃, S₄ and S₅ were isolated from cyclohexane, petroleum ether, petroleum ether-benzene (1:1) and benzene-ethyl acetate extracts (4:1 and 3:1) respectively. The leaf powder left behind after extraction with petroleum ether was extracted with ethyl acetate (3 \times 2 L). The combined extract was concentrated under reduced pressure and the residue was chromatographed over silica gel and eluted with benzene and ethyl acetate. Evaporation of the benzene eluate afforded a white crystalline compound S₆.

The component S₁ was a white crystalline solid (4 g) which after crystallisation from acetone melted at 58°C. Its IR spectrum showed absorptions due to C—H stretching and bending (2957.2, 2849.2, 1473.8, 1464.1 cm⁻¹) and absorptions characteristic of long chain alkane (729 and 719.2 cm⁻¹). The ¹H NMR spectrum showed absorption in the region δ 0.85–1.32 and ¹³C NMR had absorptions at δ 14.09, 22.6, 29.4, 29.6 and 32.1. All these data are characteristic of straight chain alkanes. The mass spectrum showed highest m/z at 492.8 and base peak at

$m/z = 57$. The fragmentation pattern with a regular difference of 14 mass units showed S_1 to be pentatriacontane ($C_{35}H_{72}$). However the high resolution mass spectrum of S_1 showed significant peaks at m/z 436, 464, 478 and 492 corresponding to molecular formulae $C_{31}H_{64}$ (hentriacontane), $C_{33}H_{68}$ (trtriacontane), $C_{34}H_{70}$ (tettriacontane) and $C_{35}H_{72}$ (pentatriacontane) respectively, confirming it to be a mixture of these four alkanes.

The component S_2 was obtained on evaporation of the petroleum ether eluate (4 g) which after crystallisation from acetone gave a powdery white substance melting at 66°C . Its IR spectrum showed a significant peak at 1736.1 cm^{-1} (characteristic of ester carbonyl) and absorption due to C—H stretching and bending (2918.7 , 2849.2 , 1462.2 and 1473.8 cm^{-1}) and absorption characteristic of long chain alkane (792.2 and 719.5 cm^{-1}) and another peak at 1061 cm^{-1} (C—O stretching). Its mass spectrum had M^+ at m/z 704 and two other significant peaks at m/z 257 and m/z 285. So the component S_1 represents a mixture of long chain esters with the main component $C_{48}H_{96}O_2$ giving the M^+ ion at m/z 704. The peaks at m/z 257 and m/z 285 are due to a double hydrogen transfer and leads to ions of the structure $R-C=OH(OH)$, $[C_{17}H_{35}-C=OH(OH)]$ and $C_{15}H_{31}-C=OH(OH)$.

Evaporation of the petroleum ether-benzene (1:1) eluate yielded S_3 (400 mg) melting at 292°C . It gave a positive test with Liebermann-Burchard reagent indicating it to be a triterpenoid. Its ^1H NMR spectrum showed an absorption at low δ value, which is characteristic of cycloartan derivative. The compound S_4 obtained on evaporation of benzene-ethyl acetate (4:1) eluate melted at 236°C . It also gave a positive test with Liebermann-Burchard reagent. The presence of a cyclopropane ring was evident from its ^1H NMR spectrum (absorption at low δ value). Thus the two components S_3 and S_4 were identified to be cycloartans, but the actual structures could not be identified due to paucity of sample.

The compound S_5 obtained from benzene-ethyl acetate (3:1) eluate melted at 137°C . It gave a play of colours with Liebermann-Burchard reagent, indicating it to be a sterol. Its mass spectrum had the highest m/z value at 414 (M^+) corresponding to β -sitosterol. The IR spectrum showed the presence of hydroxyl group (broad absorption with maximum at 3457 cm^{-1}) and absorption due to *gem* dimethyl groups (1383.1 and 1386 cm^{-1}). Mixed melting point of S_5 with an authentic sample of β -sitosterol was undepressed.

The component S_6 , obtained from ethyl acetate extract (300 mg) melted at 82°C . Apart from C—H stretching and bending absorptions its IR spectrum showed a broad peak with its maximum at 3451 cm^{-1} (O—H stretching), 1061 cm^{-1} (C—O stretching), 729.2 and 719.8 cm^{-1} (long chain alkyl group). The presence of a primary alcoholic group was evident from the ^1H NMR absorption of a triplet (2H) at δ 3.68 and ^{13}C peak at δ 63.12. The high resolution mass spectrum of S_6 had peaks at m/z 476, 448, 420 and 406. These correspond to $[M-H_2O]^+$ of $C_{34}H_{69}OH$ (tettriacontanol), $C_{32}H_{65}OH$ (dotriacontanol), $C_{30}H_{61}OH$ (triacontanol) and $C_{29}H_{59}OH$ (nonacosanol). Thus S_6 was proved to be mixture of the four alcohols mentioned above.

REFERENCES

1. The Wealth of India, Raw Materials, Publ. and Information Directorate, CSIR, New Delhi, Vol. IX, p. 205 (1976).
2. J. Wiesner, Die Rohstoffe des Pflanzenreiches, 4th edn., Engelmann, Leipzig, Vol. 1, p. 451 (1927).
3. W.M. Dymock, G.J.H. Warden and D. Hooper, Pharmacographia Indica, Kegan Paul, Trench, Truner & Co., London, Part 6, p. 493 (1893).
4. W.M. Dymock, Vegetable Materia Medica of Western India, Trubner & Co., London, p. 842 (1885).
5. S. Scheindlin and A.A. Dodge, *Amer. J. Pharm.*, 233 (1947).

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Correspondence address:

V.M. BHATNAGAR

Alena Chemicals of Canada

P.O. Box-1779, Cornwall, Ontario K6H 5V7

Canada (613) 932-7702.