

# THE ISOLATION OF INTEGERRIMINE FROM *SENECIO MAGNIFICUS* F. MUELL.\*

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The isolation of senecionine from *Senecio magnificus* F. Muell., collected near Alice Springs, Northern Territory, and the presence of two other unidentified alkaloids have been reported by Culvenor.<sup>1</sup> We have investigated the constituents of an extract of *S. magnificus* from which the major portion of senecionine was removed.§ One of these alkaloids has been isolated and identified as integerrimine or as it is also known squalidine, since the identity of integerrimine with squalidine has been established (Šantavý *et al.*<sup>2</sup>).

Senecionine has always been found in plants containing integerrimine which differs from senecionine only in having integerrinecic acid, the *trans*-isomer of senecic acid as its esterifying necic acid.

## Experimental

All melting points are uncorrected. Microanalyses were carried out by Dr. E. Challen, The University of New South Wales.

*Isolation of Integerrimine.*—The gum containing the alkaloids was dissolved in 2N acetic acid and extracted with chloroform. The chloroform solution was concentrated to a brown gum and extracted with ether. The ether solution was then extracted with 2N acetic acid. On neutralizing the acid solution, integerrimine precipitated as an amorphous solid which crystallized from ethanol as colourless needles, m.p. 171–172°,  $[\alpha]_D^{23} -22.1^\circ$  (*c*, 5.12 in  $\text{CHCl}_3$ ) (Found: C, 64.4; H, 7.6; N, 4.3%. Calc. for  $\text{C}_{18}\text{H}_{25}\text{O}_5\text{N}$ : C, 64.5; H, 7.5; N, 4.2%). Its identity has been confirmed by preparation of its picrate, methiodide, and aurichloride, and by hydrolysis to retronecine and integerrinecic acid according to the method described for senecionine by Culvenor and Smith.<sup>3</sup>

Retronecine crystallized from acetone to give rectangular crystals, m.p. 119° (Found: C, 61.8; H, 8.4; N, 8.8%. Calc. for  $\text{C}_8\text{H}_{13}\text{O}_2\text{N}$ : C, 61.9; H, 8.4; N, 9.0%). Neither the base nor its hydrochloride gave any depression in m.p. when mixed with an authentic specimen.

Integerrinecic acid crystallized as needles from ethyl acetate, m.p. 147–148°,  $[\alpha]_D^{24} +16.9$  (*c*, 3.7 in ethanol) (Found: C, 55.4; H, 7.3%. Calc. for  $\text{C}_{10}\text{H}_{16}\text{O}_5$ : C, 55.5; H, 7.4%). Integerrinecic acid lactone was prepared by evaporation with hydrochloric acid (Culvenor and Geissman<sup>4</sup>), m.p. 155–156°, which gave no depression on admixture with an authentic specimen.

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<sup>1</sup> Culvenor, C. C. J., *Aust. J. Chem.*, 1962, **15**, 159.

<sup>2</sup> Šantavý, F., Šula, B., and Maniš, V., *Coll. Trav. Chem. Tcheosl.*, 1962, **27**, 1666.

<sup>3</sup> Culvenor, C. C. J., and Smith, L. W., *Aust. J. Chem.*, 1955, **8**, 556.

<sup>4</sup> Culvenor, C. C. J., and Geissman, T. A., *J. Amer. Chem. Soc.*, 1961, **83**, 1647.