

The Presence of Savinin in the Wood of *Juniperus communis* L. and *Juniperus thurifera* L.

J. B. BREDEBERG and J. RONEBERG

Organisk-kemiska institutionen, Kungl. Tekniska Högskolan, Stockholm, Sweden

Some years ago a compound $C_{20}H_{16}O_6$, m.p. 142–144°, $[\alpha]_D^{20} -38^\circ$ was isolated by one of us (J.B.B.) from the wood of the common juniper, *Juniperus communis*. Owing to the small amount obtained it could not be further investigated.

Recently a similar substance, "compound II", m.p. 156–157.5°, $[\alpha]_D^{20} -4^\circ$, was isolated from the wood of *Juniperus thurifera*¹. The ultraviolet and infrared spectra of the two products were almost identical. It was noticed during the purification of "compound II", which involved repeated sublimations, that the melting point increased and the optical rotation decreased whilst the ultraviolet and infrared spectra remained almost unchanged. This appeared to indicate continuous racemisation and the product from *J. thurifera* was therefore subjected to purification by means of recrystallisation only. The resulting product had m.p. 143–145° and $[\alpha]_D^{20} -75^\circ$.

Both compounds have now been identified as slightly impure savinin (m.p. 145–146°, $[\alpha]_D^{20} -87^\circ$) a lignan previously isolated from the needles of *Juniperus sabina*^{2,3}.

The low optical rotation of the product from *J. communis* is probably due to the fact that strong alkali had been used during its isolation.

The product was obtained in the following way:

Ether-extracted wood of common juniper (9.4 kg)⁴ was extracted with acetone for 60 h. The solvent was evaporated and the extraction residue poured into ether. The ether-soluble material was extracted with

alkali and the neutral part steam distilled. The non-steam volatile part (13 g) was hydrolysed with 2 N KOH in ethanol for 30 min. The acidic extract (0.8 g) was chromatographed on alumina and gave in the ether eluate 24 mg of a slightly yellowish crystalline powder, m.p. 140–144°. One sublimation gave m.p. 142–144°, $[\alpha]_D^{20} -38^\circ$ ($CHCl_3$, c 0.6, from 3 mg) mixed m.p. with authentic savinin, m.p. 145–146°, no depression. (Found: C 68.0; H 4.6; O 27.6. Calc. for $C_{20}H_{16}O_6$: C 68.2; H 4.6; O 27.3.) Ultraviolet spectrum: λ_{max} 238, 293 and 336 m μ ($\log \epsilon$ 4.16, 4.10 and 4.23), λ_{min} 229, 268 and 307 m μ ($\log \epsilon$ 4.11, 3.71 and 3.98). The infrared spectrum (in KBr) was identical with that of savinin.

For details of the isolation of "compound II" compare Ref.¹ When the crude compound was crystallised from benzene, absolute ethanol and from benzene again a product m.p. 143–145°, $[\alpha]_D^{20} -75^\circ$ ($CHCl_3$, c 1), was obtained. Mixed m.p. with authentic savinin, no depression. The infrared spectrum (in KBr) was identical with that of savinin.

A sample of pure savinin $[\alpha]_D^{20} -80^\circ$, kindly supplied by Dr. A. Schrecker, was sublimed and the $[\alpha]_D^{20}$ was now found to be -84° and after another sublimation -78° .

Our thanks are due to professor H. Erdtman for drawing our attention to the similarity between our preparations and savinin.

1. Runeberg, J. *Acta Chem. Scand.* **14** (1960) 1985.
2. Hartwell, J. L., Johnson, J. M., Fitzgerald, D. B. and Belkin, M. *J. Am. Chem. Soc.* **75** (1953) 235.
3. Schrecker, A. W. and Hartwell, J. L. *J. Am. Chem. Soc.* **76** (1954) 4896.
4. Bredenberg, J. B. and Gripenberg, J. *Acta Chem. Scand.* **8** (1954) 1728.

Received February 3, 1961.