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SHORT COMMUNICATION

# CONSTITUENTS OF THE *HYPERICUM ANDROSAEMUM*

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A STUDY of *Hypericum androsaemum* L. and *Hypericum elatum* Ait., two species of the *Hypericum androsaemum* (Keller's section), has shown the presence of α-terpineol and hydrocarbon waxes in the unripened seed capsules.

Hypericum androsaemum *L.*

The unripened seed capsules (10 kg) of tutsan (*H. androsaemum*)[1-3] were steam distilled, the ether extract of the distillate furnishing a pale yellow oil (3·5 ml) which on distillation yielded as a first fraction a colourless oil (0·6 ml), b.p. 62°/0·5 mm. An i.r. absorption spectrum and also a NMR spectrum of this oil ($[\alpha]_D^{20°} = -35·0$) proved to be identical with those spectra of an authentic specimen of (±)-α-terpineol. This oil was shown to contain 92 per cent α-terpineol by gas chromatography using an authentic sample as reference.

A third fraction (0·3 g), b.p. 115–120°/0·5 mm, solidified and was crystallized from ethanol to furnish a colourless solid, m.p. 38–42°, the i.r. spectrum of which showed it to be a straight-chain hydrocarbon. Gas chromatographic analysis of this solid showed the presence of the straight-chain hydrocarbons, $C_{19}H_{40}$, $C_{21}H_{44}$ and $C_{23}H_{48}$ in the ratio 3:5:2 respectively.

Hypericum elatum *Ait.*

The unripened seed capsules (10 kg) of *H. elatum*[2] were steam distilled, the ether extract of the distillate furnishing a pale yellow oil (2·0 ml) from which crystals separated. Fractional distillation of the filtrate yielded as a first fraction a colourless oil (0·4 ml), b.p. 62°/0·5 mm. In the same way as for tutsan berries (above), the oil was identified as α-terpineol (90 per cent pure).

The precipitate from the oil (see above) was sparingly washed with petroleum ether (b.p. 60–80°) to furnish colourless crystals (0·2 g), m.p. 52–54°. The i.r. absorption spectrum showed it to be a straight-chain hydrocarbon. Gas chromatographic analysis indicated the presence of the hydrocarbons $C_{27}H_{56}$ and $C_{29}H_{60}$ in the ratio 2:1 respectively as the main components of this solid. The second fraction, b.p. 125–130°/0·5 mm, of the oil distillate, solidified to a wax (0·4 g) which on crystallization from ethanol furnished a colourless crystalline solid, m.p. 59°. The i.r. absorption spectrum and gas chromatograph of this wax indicate that it is a mixture of straight-chain hydrocarbons, with $C_{27}H_{56}$ as the main component.

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[1] K. R. HARGREAVES, *Nature* **206**, 830 (1965).
[2] C. MATHIS and G. OURISSON, *Phytochem.* **3**, 133; **3**, 377 (1964).
[3] R. SALGUES, *Qualitas Plant. Mater. Vegitables* **3**, 38 (1961).