Phytochemistry, 1970, Vol. 9, pp. 233 to 234. Pergamon Press. Printed in England.

SHORT COMMUNICATION

CONSTITUENTS OF THE LEAVES AND THE STEMS OF *CLEMATIS VITALBA*

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Plant. Clematis vitalba—Ranunculaceae.

Source. Northern parts of Anatolia—Turkey.[1]

Uses. Medicinal, antitumor activity against WM test system,[2] a T/C of 37% was obtained at a dose of 200 mg/kg.

Previous work. On sister species, *C. angustifolia jacquin*,[3,4] *C. terniflora*[5] and some others.

Leaves and stems. Extracted with $CHCl_3$ in a soxhlet until extinction (I). The mark was extracted with 70% aqueous alcohol (II), (I) was chromatographed on a silicic acid:celite (3:1) column.

n-*Triacontan.* $C_{30}H_{62}$, m.p. 64–65°, $(\alpha)_D \pm 0°$ (in $CHCl_3$). Found: C, 85·98; H, 13·81%; u.v. (no peaks), i.e. (2920, 2850, 1460, 725 and 715 cm^{-1}).

n-*Nonacosan.* $C_{29}H_{60}$, m.p. 63°, $(\alpha)_D \pm 0°$ (in $CHCl_3$). Found: C, 85·17; H, 14·49%; u.v. (no peaks), i.r. characteristic bands.

Ginnon. $C_{29}H_{58}O$, m.p. 74–74·5°, $(\alpha)_D \pm 0°$ (in $CHCl_3$). Found: C, 82·37; H, 13·89%; u.v. (no peaks), i.r. (2950, 2850, 1740, 1460, 1170, 730 and 718 cm^{-1}).

Ginnol. $C_{29}H_{60}O$, m.p. 79–80°, $(\alpha)_D \pm 0°$ (in $CHCl_3$). Found: C, 82·56; H, 14·35%; u.v. (no peaks), i.r. (3350, 2900, 1460, 1370, 1055, 725 and 718 cm^{-1}). *N*-Bromosuccinimide test (6) showed a primary alcohol.

"*γ-Sitosterol.*" $C_{29}H_{50}O$, m.p. 147–148°, $(\alpha)_D - 43°$ (in $CHCl_3$). Found: C, 83·85; H, 11·96%; u.v. a shoulder at 205 nm, i.r. characteristic bands of a steroidal alcohol. Melting point of acetyl derivative 140° (lit. 139–141), benzoyl derivative 146° (lit. 147–149).[7,8] NMR bands between 0·7–1·7 ppm methylene and methyl bands, 3·5 ppm CH—O, 5·1 ppm and 5·4 ppm HC= bands, integration showed 50 protons. Hydrogenation suggested one double band. According to Thompson *et al.*,[9] "γ-sitosterol" is now known to be a mixture of β-sitosterol and campesterol.

[1] P. H. DAVIS, *Flora of Turkey*, Vol. 1, p. 138, University Press, Edinburgh (1965).
[2] Protocols for screening chemical agents and natural products against animal tumors and other biological systems", *Cancer Chemotherapy Rep.* No. 25 (1962).
[3] T. H. TANG and Y. S. CHAO, *Arch. Pharm.* **11**, 60 (1940); *Chem. Abst.* **34**, 60133.
[4] TENG-HAN TANG and EU-HSIANG CHAO, *Natl Shangtung Univ. Chem. Lab. Rep.* **No. 3–4**, 19 (1934); *Chem. Abst.* **29**, 31151.
[5] M. ARITIMO, *Chem. Pharm. Bull. (Tokyo)* **11**, (10), 1225 (1963).
[6] P. F. KRUSE JR., K. L. GRIST and T. A. MCCOY, *Anal. Chem.* **26**, 1319 (1954).
[7] C. DJERASSI, M. GORMAN, A. L. NUSSBAUM and J. REYNOSO, *J. Am. Chem. Soc.* **76**, 4463 (1954).
[8] G. TAPPI and A. MONZANI, *Gazz Chim. Ital.* **85**, 725 (1955).
[9] M. J. THOMPSON, W. E. ROBBINS and G. L. BAKER, *Steroids* **2**, 505 (1963).

β-Sitosterol. $C_{29}H_{50}O$, m.p. 137°, $(\alpha)_D$ − 35° (in $CHCl_3$). Found: C, 83·8; H, 12·75%; mixed m.p.'s and i.r. curve comparison.

(II) was chromatographed on polyamide powder.

Chlorogenic acid. $C_{16}H_{18}O_9$, m.p. 206–207°, $(\alpha)_D$ − 30° (in EtOH), mixed m.p.'s and i.r. curve comparison.

Caffeic acid. $C_9H_8O_4$, m.p. 194–195°, $(\alpha)_D \pm 0°$ (in EtOH), mixed m.p.'s and i.r. curve comparison.

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