# BORNEOL trans-p-HYDROXYCINNAMATE FROM *Seseli mucronatum* AND *S. asperulum*

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UDC 547.9:582.89

From the roots of *Seseli mucronatum* (Schrenk) M. Pimen. et Sdobn. and *Seseli asperulum* (Trautv.) Schischk. [1], by chromatography on silica gel L 40/100 in the petroleum ether–ethyl acetate system with an increasing concentration gradient of the latter we have isolated a colorless crystalline substance, $C_{19}H_{24}O_3$, with mp 151-152°C, $[\alpha]_D^{20}$ −27.5° (c 0.91; ethanol), $R_f$ 0.67 [Silufol, petroleum ether–ethyl acetate (1:1)], $M^+$ 300, giving a red coloration on reaction with diazotized sulfanilamide and readily hydrolyzed by alkali. The IR spectrum (Fig. 1) shows the presence in it of an ester grouping (1686 cm$^{-1}$) conjugated with an unsaturated aromatic system (1640, 1617, 1596 cm$^{-1}$) and a hydroxyl (3280 cm$^{-1}$). The UV spectrum [$\lambda_{max}^{EtOH}$ 229, 301 (infl.), 316 nm (log ε 4.13, 4.35, 4.41); $\lambda_{min}^{EtOH}$ 218, 251 nm (log ε 4.06, 3.30)] and the NMR spectrum [(Varian HA-100D, $CDCl_3$, 0 – HMDS, 20°C, δ); signals at 6.26 and 7.56 ppm, 1 H each, d, J = 16 Hz (trans-CH=CH); at 6.80 and 7.36 ppm, 2 H each, d, J = 8.8 Hz (protons of a benzene ring); and at 6.50 ppm, 1 H, s (OH)] show that the substance isolated is an ester of trans-p-hydroxycinnamic acid.

The structure of the residue of the terpenoid alcohol, $C_{10}H_{17}O$, follows from the NMR spectrum of the substance: the position (δ 4.95 ppm) and nature of the splitting of the signal of the methine proton geminal to the acyloxy group, and also those of the signals of the methyl groups (0.81 ppm, s, 6 H; 0.86 ppm, s, 3 H) and of the methylene and methine protons in the 1.0-3.0 ppm region are typical for esters of borneol [2].

Alkaline hydrolysis of the substance under investigation gave trans-p-hydroxycinnamic acid with mp 204-205°C, showing an IR spectrum identical with that of an authentic sample, and d-borneol with mp 206-207°C, $[\alpha]_D^{20}$ +41.4° (c 0.94; ethanol) with an NMR spectrum identical with that of a sample of *l*-borneol.

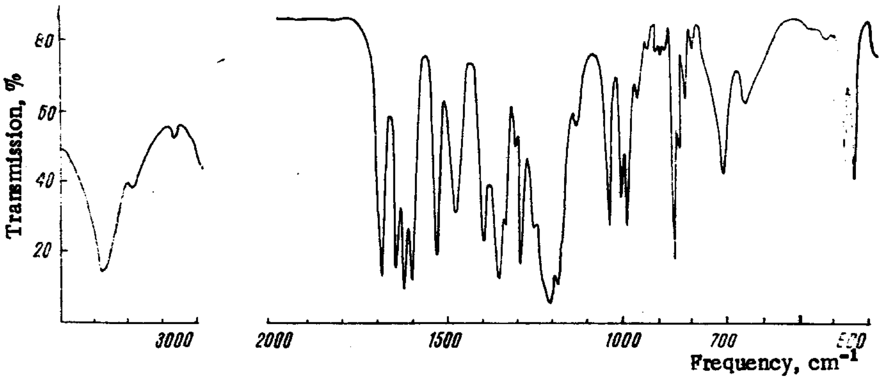

Fig. 1. IR spectrum of borneol trans-p-hydroxycinnamate (mull in paraffin oil).

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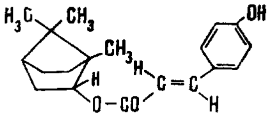
All-Union Scientific-Research Institute of Medicinal Plants. Translated from Khimiya Prirodnykh Soedinenii, No. 1, pp. 99-100, January-February, 1975. Original article submitted August 12, 1974.



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Thus, the substance isolated is d-borneol trans-p-hydroxycinnamate (I).

## LITERATURE CITED

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2. T. J. Flautt and W. F. Erman, J. Amer. Chem. Soc., 85, 3212 (1963).