

A CHEMICAL STUDY OF PLECTRANTHUS GLAUCOCALYX MAXIM.

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Three species of the plant genus Plectranthus grow in the USSR: Plectranthus glaucocalyx Maxim., P. excisus, and P. serra. These have not previously been subjected to a chemical study. The first of them is found only in Primorskii krai (the Maritime Territory), the Amur Oblast, and the southern part of the Khabarovsk Territory. Since antimicrobial activity has previously been found in this plant [1] we have carried out a chemical investigation of it.

The ethereal extraction of the leaves of Plectranthus glaucocalyx (glaucocalycate spurflower) gathered in the budding phase yielded a crystalline substance with the empirical formula $C_{20}H_{28}O_4$ called plectrin [2]. Its IR spectrum (Fig. 1) contains absorption bands of two carbonyl groups (1728 and 1714 cm^{-1}), a $C=C$ bond (1653 cm^{-1}), and a hydroxyl group (3264 cm^{-1}). P. serra, and P. excisus, collected in the Far East at different phases of development did not contain plectrin.

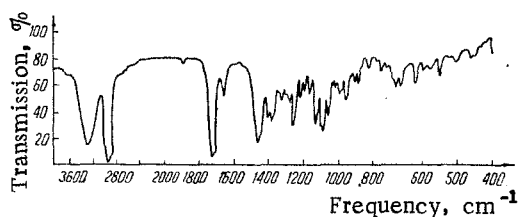


Fig. 1. IR spectrum of plectrin.

From the plant Isodon trichocarpus Maxim. closely related to Plectranthus, Japanese workers have isolated [3] a crystalline substance called enmein with the composition $C_{20}H_{26}(28)O_6$ and mp $307-309^\circ\text{C}$. This compound contains one double bond, two hydroxy groups, one lactone group, and one keto group.

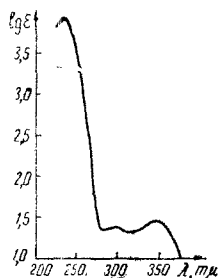


Fig. 2. UV spectrum of plectrin.

Experimental

Isolation of plectrin. One kg of the comminuted air-dry leaves of Plectranthus glaucocalyx was covered with 10% of ether and left for 14 hr. The extraction was repeated. The ethereal extracts were evaporated and the residue, consisting of a dark green viscous mass, was triturated with ether. The insoluble part was separated off and dissolved in methanol with heating. The hot solution was filtered with carbon, evaporated to half bulk, and filtered again. Cooling gave plectrin in the form of faintly yellowish crystals. After recrystallization from methanol, 1.5 g of plectrin (0.15% of the air-dry raw material) was isolated with mp $213-215^\circ\text{C}$, $[\alpha]_D^{20} -208^\circ\text{C}$ (c 1; chloroform). The substance is soluble in alcohol and chloroform, and insoluble in ether, aqueous solutions of alkalis, dilute acids, and water. UV spectrum (Fig. 2): λ_{max} 232, 295, 347 mμ (log ε 3.93, 1.37, 1.47). On chromatography in a free

layer of alumina (activity grade II, detection with iodine vapor) plectrin has the following R_f values: in acetone 0.86, in ethyl acetate 0.48, in dioxane 0.84.

Found, %: C 71.77; H 8.58; OH 12.27; mol. wt. 314 (mass spectrometry). Calculated for $C_{20}H_{28}O_4$, %: C 72.28; H 8.43; 2 OH 10.2, mol. wt. 322.

The IR spectrum was recorded in liquid paraffin on a UR-10 (Zeiss) spectrophotometer, and the UV spectrum in alcohol on a SF-4 spectrophotometer.

Summary

A previously unknown crystalline substance $C_{20}H_{28}O_4$, called plectrin, has been isolated from the leaves of Plectranthus glaucocalyx Maxim., family Labiatae.

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