

## COUMARINS FROM THE ROOTS OF *Cachrys pubescens*

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We have investigated the chemical composition of the roots of *C. pubescens* (Pall.) Schischnk., a species similar to *C. odontalgica* Pall., from the fruits of which pranchimgin has previously been isolated [1] while oxypeucedanin, bergapten, imperatorin, isoimperatorin, osthole, and prangenin have been detected in them chromatographically [2, 3]. The roots of *C. pubescens* were collected in the Zaisan depression (East Kazakhstan oblast).

The raw material was treated with methanol, and the extract was evaporated and diluted with water. The coumarin compounds were extracted with ether and, after drying over anhydrous sodium sulfate, the solvent was distilled off. The residue consisted of an oily mass.

The paper chromatography of the extract of the roots of *C. pubescens* showed the presence of not less than six coumarin derivatives with  $R_f$  0.66, 0.56, 0.41, 0.13, 0.03, and 0.00 [mobile phase petroleum ether, bp 40–60°C; FN-2 paper impregnated with a mixture of formamide and acetone (1:3)].

By column chromatography on acidic alumina [4] and elution with benzene and benzene-ethyl acetate, four individual coumarins were obtained. On the basis of their physicochemical constants, IR and NMR spectra, and mixed melting points with authentic materials, three of them were identified as isoimperatorin ( $R_f$  0.66), pranchimgin ( $R_f$  0.56), and imperatorin ( $R_f$  0.41).

The fourth compound,  $C_{16}H_{15}O_5Cl$ , mp 158°C (from methanol),  $[\alpha]_D^{20} -15.5^\circ$  (c 0.4; acetone) was shown by UV and IR spectra and a mixed melting point to be identical with saxalin [5]. This coumarin was not detected in the initial extract by paper chromatography.

### LITERATURE CITED

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