

Continuing a study of esters of plants of the genus *Ferula* L. we have investigated the roots of *Ferula calcarea* M. Pimen collected in the Daghestan ASSR.

A concentrated ethanolic extract of the comminuted roots of the plant was diluted with water (1:2) and treated with chloroform. The chloroform extracts were dried over anhydrous sodium sulfate, and the solvent was evaporated off. The total material obtained was deposited on a column (3 × 120 cm) of KSK silica gel, and the substances were eluted with chloroform, 200-ml fractions being collected.

Fractions 11-18, after the eluent has been driven off and the residue had been crystallized from ether, yielded a substance $C_{18}H_{24}O_4$ (I) with mp 85-86°C, $[\alpha]_D -41^\circ$ (c 1.0; chloroform), and fractions 24-32 on treatment with ether gave a substance $C_{17}H_{22}O_3$ (II) with mp 115-156°C, $[\alpha]_D -40.4^\circ$ (c 1.0; chloroform).

When elution of the substances from the column with chloroform was continued, the compounds $C_{23}H_{32}O_5$ (III), with mp 140-141°C, $[\alpha]_D -98^\circ$ (c 1.0; chloroform) (fractions 40-46) and $C_{22}H_{30}O_4$ (IV) with mp 189-190°C (c 1.0, chloroform) [sic] (fractions 49-57) were isolated.

When the column was washed with chloroform-acetone (9:1), another two substances were isolated: $C_{23}H_{32}O_6$ (V), with mp 105-106°C, $[\alpha]_D -35^\circ$ (c 1.0; chloroform), (fractions 60-64) and $C_{22}H_{30}O_5$ (VI), with mp 162-164°C, $[\alpha]_D -40^\circ$ (c 1.0; chloroform) (fractions 68-73).

A comparison of physicochemical constants (melting point, $[\alpha]_D$) and IR spectra of substances (I)-(VI) and esters isolated previously showed that they were identical with 7-chimganin (I), 7-chimgin (II) [1, 2], chimganidin (III), ferolin (IV) [3-5], rubaferinin (V), and rubaferidin (VI) [6].

It must be mentioned that with respect to its qualitative composition, *F. calcarea* is closest to *F. rubroarenose*, which also contains esters of borneol, angrendiol, and ugamdiol [6].

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