A CHEMICAL STUDY OF Seseli tenuisectum

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From a methanolic extract of the epigeal part of Seseli tenuisectum Rgl. et Schmalh., family Umbelliferae (3 kg), collected in July 1969 in the Mogoltau region (Chashma), Tadjik SSR, we have isolated 21 g of a crystalline substance $C_6H_{14}O_6$, mp 166-167°C. It was identified by a mixed melting point and by its R_f value in a thin layer in the presence of a "marker" as mannitol.

The lactone fraction precipitated with water from the concentrated methanolic extract was treated with ether and then with 5% aqueous Na_2CO_3. The total coumarins (57.5 g) purified in this way were chromatographed on a column of silica gel. Concentration of the benzene eluate (fractions 89-109) gave 0.2 g of a crystalline substance with the composition $C_{29}H_{50}O$ which was identified by its IR spectrum and a mixed melting point as β-sitosterol. The subsequent elution of the column with a mixture of benzene and chloroform (1 : 2) led to the isolation of 0.15 g of a compound with the composition $C_{14}H_{14}O_5$, mp 181-182°C (from methanol). On paper chromatography, this compound gave two spots with R_f 0.03 and 0.07 [paper impregnated with a 10% solution of formamide in methanol; mobile phase: n-hexane–benzene–methanol (5 : 4 : 1)]. In its physicochemical properties and constants, the substance corresponded to a mixture of the cis and trans forms of khellactone [1]. A comparison of the IR spectra of the substance obtained and of cis,trans-khellactone taken in chloroform confirmed the correctness of this hypothesis (3640-3210 cm^{-1}, –OH group; 1725 cm^{-1}–C = O of an α-pyrone; 1605 and 1497 cm^{-1}, –C = C– bonds of an aromatic system).

Mannitol and β-sitosterol were isolated from the roots of the same plant (3 kg) in a similar manner. When a methanolic extract obtained by the method described above (43.38 g) was subjected to chromatographic separation on silica gel, the concentrated chloroformic eluate (fractions 51-57) yielded 0.02 g of a substance in the form of acicular crystals with the composition $C_{15}H_{16}O_5$, mp 199-201°C (from methanol). Its IR spectrum had absorption bands at 1653, 1625, 1583, and 1494 cm^{-1} (vibrations of C = O and C = C bonds of γ-pyrone and aromatic rings) and 3530 cm^{-1} (–OH group). A diffuse absorption band in the 2750-2500 cm^{-1} region, due to a phenolic hydroxyl, shows the formation of a chelate bond [2]. On the basis of the IR spectrum and the absence of a depression of the melting point of a mixture with an authentic sample, this latter compound was identified as hamaudol – 3'-hydroxy-2',2'-dimethyl-3',4'-dihydropyrano-5',6':6,7-(5-hydroxy-2-methylchromone) [3].

LITERATURE CITED

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