COUMARINS OF Ferula szovitsiana AND F. persica

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From the total extractive substances of the roots of Ferula szovitsiana DC. (Szovic's giant fennel) by adsorption chromatography on silica gel we have isolated five compounds of coumarin nature with R_f 0.48 (I); 0.35 (II); 0.22 (III); 0.12 (IV); and 0.08 (V) [Silufol, benzene–chloroform–ethyl acetate (5 : 4 : 1) system]. The absence of depressions of the melting points with authentic samples and the coincidence of their UV, IR, NMR, and mass spectra enabled compound (I) with the composition $C_{24}H_{30}O_3$ (M^+ 366, mp 61-63°C, to be identified as umbelliprenin [1, 2]; IV, $C_{24}H_{30}O_5$ (M^+ 398), mp 91-93°C, as galbanic acid [3]; and V, $C_9H_6O_3$, mp 230°C, as umbelliferone [4].

Compound (II), $C_{25}H_{32}O_5$ (M^+ 412), bp 255°C, n_D^{16} 1,5280, d_4^{20} 1,0746, $[\alpha]_D^{20}$ −21.98 (c 0.801; CH_3OH) was shown to be identical with an authentic sample of methyl galbanate on the basis of a comparison of their physicochemical constants and spectral characteristics [5].

The IR spectrum of compound (III), $C_{24}H_{30}O_4$ (M^+ 382), mp 80-81°C, $[\alpha]_D^{20}$ −32.1° (c 0.96; chloroform) showed the absorption maxima characteristic for 7-hydroxycoumarin: λ_{max}^{EtOH} 220, 243, 253, 295, 325 nm (log ε 4.18; 361; 346; 396; 4.22). The IR spectrum of this compound contained absorption bands at 1725 cm^{-1} (CO of an α-pyrone) and 1615 cm^{-1} (C=C of an aromatic system). The NMR spectrum of (III) (Varian, HA-100D, 0 – HMDS, CCl_4) showed the signals of a gem-dimethyl group (0.93 and 0.96 ppm, 2 s, 3 H each), of a quaternary methyl group (1.21 ppm, s, 3 H), of a vinylmethyl group (1.70 ppm, s, 3 H), of an olefinic proton (5.35 ppm, tr, 1 H, J = 14 Hz), of a methine proton in an oxide ring (3.54 ppm, 1 H, d, J = 4 Hz) and the protons of the methylene group of an $Ar-O-CH_2-CH=$ group (4.50 ppm, 2 H, d, J = 7 Hz), and also the signals of the protons of a coumarin nucleus (6.04-7.44 ppm, 5 H). The mass spectrum of (III) contains the peak of the molecular ion with m/e 382 (2%) and peaks of fragments with m/e 162 (36%) and 220 (20%) corresponding to the coumarin and sesquiterpene moieties of the molecule. On the basis of the facts given, compound (III) was identified as farnesiferol C [6, 7].

From the total extractive substances of the roots of F. persica Willd. (Persian giant fennel) by adsorption chromatography on silica gel with elution by mixtures of petroleum ether and chloroform with increasing concentrations of the latter we isolated six crystalline compounds. On the basis of the results of IR, NMR, and mass spectroscopy, and also the absence of depressions of the melting points of mixtures with authentic samples, these compounds were identified as 5-methoxy-1-(1-oxopropyl)-3,4-methylenedioxybenzene, conferone, conferol, samarcandin acetate, samarcandin [8-13], and umbelliferone, respectively. This is the first time that these compounds have been isolated from the total extractive substances of the roots of F. szovitsiana and F. persica.

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COUMARINS OF THE ROOTS OF Angelica dahurica

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The present paper reports the results of an investigation of the coumarins of the roots of Angelica dahurica (Fisch.) Benth. et Hook f. ex Franch. et Savat, growing in the Mongolian People's Republic. The material was collected by the resources detachment of the Combined Soviet-Mongolian Biological Expedition of the Academy of Sciences of the USSR in the water meadows of the left bank of the River Khalkhin-Gol (Eastern aimak, Khamar-Daba somon) in August, 1973, in the flowering phase of the plants.

When a chloroform extract was separated and the individual fractions were rechromatographed on a column of neutral alumina (Brockmann activity grade III), five crystalline substances were isolated. Four of them – isoimperatorin, imperatorin, oxypeucedanin, and oxypeucedanin hydrate – were identified by the melting points, mixed melting points with authentic samples, and IR spectroscopy. The fifth compound was identified as bicangelicin from the mixed melting point, IR and UV spectra, and the formation of its acetate. The melting point of the acetate and its IR and UV spectra corresponded to those given in the literature [1].

Paper chromatography (with markers) before and after treatment of the chromatograms with alkali and diazonium compounds showed the presence also of xanthotoxin (system 1: mobile phase petroleum ether, stationary phase ethylene glycol), marmesin, and prangenin hydrate (system 2: mobile phase benzene, stationary phase formamide) [2].

Thus, contrary to information in the literature [3], no phellopterin or biacangelicol were found in the roots of A. dahurica growing in the Mongolian People's Republic.

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