The molecular weight of the glucofructan determined on a column of Sephadex G-100 was 31,000.

The monosaccharide compositions (2 N H_2SO_4, 100°C, 48 h) of the hemicelluloses A and B were represented by the sugars rhamnose, xylose, arabinose, mannose, glucose, and galactose (51.1:3:1:traces:2.4:3.4 and 6.5:1:1.2:1.43:1.8:1.26, respectively, in moles).

Thus, the carbohydrate composition of pomegranate residues has been characterized. The quantitative and qualitative compositions of the polysaccharides isolated have been determined. The pectin substances isolated are distinguished by a high degree of methoxylation.

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COUMARINS OF SPECIES OF THE GENUS *Campanula*

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As reported previously [1], fraxetol 7-O-D-glucopyranoside (isofraxoside) has been isolated from the epigeal parts of *Campanula alliariifolia* and *C. letschchumensis* collected in the flowering stage.

Continuing a study of the coumarin compositions of bellflowers of the section *Cordifolia* (Fom.) Fed. [2], from the leaves and flowers of *C. alliariifolia* and *C. ochroleuca* Kem.-Nath (KBASSR [Karabdino-Balkar Autonomous Soviet Socialist Republic], gorge of R. Cherek-Balkarskii) we have obtained an aqueous-ethanolic extract which, after concentration, was treated successively with petroleum ether, chloroform, and ethyl acetate. The chloroform fraction was evaporated, and the resin was deposited on a column of Al_2O_3 (Brockman activity grade III) and was eluted with chloroform—methanol (4:1 by volume). The total material obtained was separated on a column of silica gel (type KSK) by repeated fractionation with chloroform—methanol in various proportions [3].

Another two crystalline substances (I and II) belonging to the hydroxycoumarin group were isolated [6].

Substance (I), $C_{16}H_{18}O_{10}$, light yellow acicular crystals with mp 204°C, $[\alpha]_D^{20}$ 86.6°. The UV region of the spectrum of the substance showed one fairly strong maximum at $\lambda_{max}^{CH_3OH}$ 350 nm. The IR spectrum contained bands characteristic of the coumarin nucleus [4]. On the basis of its hydrolysis products and physicochemical properties, the substance was identified as fraxoside (8-β-D-glucosyloxy-7-hydroxy-6-methoxycoumarin) [5], isolated previously from *Fraxinus potamophila* Herd. [3].

Substance (II), $C_{10}H_8O_5$, formed yellow plates with mp 228-234°C (from aqueous ethanol (1:1)). According to the results of alkaline degradation, UV and IR spectroscopy, and a mixed melting point, and also those of a chromatographic comparison with an authentic sample, the substance was characterized as 7,8-dihydroxy-6-methoxycoumarin (fraxetol) [1, 6] or fraxetin [5].

Fraxoside and isofraxoside have been detected chromatographically in the species *C. alliariifolia* Willd., *C. leskovii* Fed., *C. letschchumensis* Kem-Nath., and *C. makashvilli* E. Busch. out of the many populations growing in the Western Caucasus, while fraxitol and fraxoside were present only in the species *C. ochroleuca* Kem.-Nath., *C. dolomitica* E. Busch.,

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and *C. kirpicznikovii* Fed., the area of which is formed by the northern slopes of the Central Caucasus [1, 2].

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FERUCRIN ISOBUTYRATE AND FERUCRINONE FROM *Ferula foetidissima*

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A substance (I) with the composition $C_{28}H_{38}O_6$, M^+ 470, mp 183-195°C has been isolated by chromatography on silica gel in petroleum ether—ethyl acetate from a acetone extract of the fruit of *Ferula foetidissima* Regel. et Schmalh. collected in the Shakhdarinskii range close to the village of Khorog (samples No. 81-9). According to its UV spectrum, (I) is a coumarin derivative with an alkoxy substituent in position 7 (λ_{max}^{EtOH} 216.5; 242; 253; 324 nm; log ε 4.17; 3.47; 3.27; 4.21).

The substance contained a tertiary hydroxy group (3510 cm^{-1} band in the IR spectrum). The PMR spectrum exhibited, in addition to the signals of umbelliferone in the 6.1-7.7 ppm region, the signals of the protons of a terpenoid moiety [1.10, s, 6 H, $(CH_3)_2C$; 1.33, s, 3 H, $CH_3-\overset{|}{\underset{|}{C}}-$; 1.42, s, 3 H, CH_3-C-O; and 4.12, u.s., 2 H, CH_2-O-Ar] close in position and nature to the signals in the spectrum of ferucrin (II) [1]. However, unlike ferucrin, in the spectrum of which there is the signal of a proton geminal to a hydroxy group (3.15 ppm, m, ΣJ = 15.5 Hz, 1 H, $C\underline{H}-OH$), in the spectrum of (I) there was the signal of a proton (4.44 ppm, m, ΣJ = 15.5 Hz, 1 H, $\underline{H}C$-acyl) geminal to an alkoxy group and the characteristic signals of an isopropyl group (1.17 and 1.20 ppm, d, J = 7 Hz, 3 H each $(C\underline{H}_3)_2-CH-COO$; 2.52 ppm, m, 1 H, $(CH_3)_2-C\underline{H}-COO$.

Thus, on the basis of these results it may be assumed that (I) was ferucrin isobutyrate. The acylation of ferucrin with isobutyryl chloride gave a substance $C_{28}H_{38}O_6$, mp 193-195°C, identical according to its PMR and IR spectra with the isolated compound (I); a mixture of (I) with the synthetic specimen of ferucrin isobutyrate gave no depression of the melting point.

A terpenoid coumarin $C_{24}H_{30}O_5$, M^+ 398, mp 221-223°C, was isolated by chromatography under the same conditions from an acetone extract of the fruit of another sample *Ferula foetidissima* collected in the area of the Alai range in the valley of the R. Gar, close to the village of Urdush (No. 81—76). According to its UV, IR, and PMR spectra the substance was identical with ferucrinone (III), obtained previously by the oxidation of deacetylkellerin [2] and of ferucrin [3, 4]. This is the first time that ferucrinone has been isolated from a plant source.

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