and sodium acetate, in contrast to substance B, no bathochromic shift of the maximum of the long-wave band was observed, which shows the presence of a methoxy group in position 3.

Substance C was identified as chrysoeriol — 4',5,7-trihydroxy-3'-methoxyflavone [2].

Substance D had the composition $C_{22}H_{22}O_{10}$, mp 244-245°C, λ_{max}^{MeOH} 270, 330 nm, and was a glycoside. Its hydrolysis gave an aglycone of the composition $C_{16}H_{12}O_5$, which was identified as acacetin with a known sample.

NMR spectrum (TFA, δ, ppm): 8.22 (d, J = 8 Hz, H-2',6'), 7.38 (d, J = 8 Hz, H-3',5'), 7.28 (d, J = 2.5 Hz, H-6), 7.10 (d, J = 2.5 Hz, H-8), 5.56 (d, J = 7 Hz, proton of the glycosidic center of β-glucose), 4.08 (s, $-OCH_3$), 3.8-4.4 (signals of glucose protons). The carbohydrate part of substance D, consisting of glucose, was attached in position 7 of the acacetin. The UV spectrum of the substance had a bathochromic shift of the maxima in the presence of $AlCl_3$, which was not observed on the addition of sodium acetate. Thus, substance D has the structure of 7-O-β-D-glucopyranosyloxy-5-hydroxy-4'-methoxylflavone — tilianin [3].

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PHENOLIC COMPOUNDS OF Rhodiola gelida

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We have investigated the composition of the phenolic components of Rhodiola gelida Schrenk. collected in the Frunze province of the Kirghiz SSR. For their isolation, 1 kg of the comminuted rhizomes with roots was extracted with 70% ethanol and the extracts were concentrated in an aqueous residue which was treated with chloroform and ethyl acetate. Concentration of the chloroform extract yielded substance (I), which was identified as p-hydroxyacetophenone [1]. The ethyl acetate extract was separated on a column of Kapron. Elution with water gave substances (II) and (III), and aqueous ethanol, followed by rechromatography in the chloroform—ethanol (3:2 and 2:3) systems, gave substances (IV) and (V).

Substance (II), $C_8H_{10}O_2$, mp 92-93°C. Substance III, $C_{14}H_{20}O_7$, mp 158.5-160°C, $[\alpha]_D^{20}$ −31° (c 2.0, H_2O), λ_{max} 221, 275 nm, PC R_f 0.81 (II), 0.46 (III) (2% acetic acid). The quantitative acidic and enzymatic hydrolyses of substance (III) yielded (II) and D-glucose. From the results of UV and IR spectroscopy, qualitative reactions, and the absence of a depression of the melting point of mixtures with authentic samples, the compounds were identified as 4-hydroxy-β-phenylethanol (p-tyrosol) and its glucoside (salidroside) which have been detected previously in other species of Rhodiola [2, 3].

Substance (IV), $C_{21}H_{20}O_{12}$, mp 204-205°C, $[\alpha]_D^{20}$ −29° (c 0.2; methanol), $\lambda_{max}^{CH_3OH}$ 275, 334 375 nm, $\nu_{C=O}$ 1660 cm^{-1}, R_f 0.11 and 0.65 (here and below, 15 and 60% acetic acid).

Substance (V), $C_{20}H_{18}O_{11}$, mp 242-244°C, $\lambda_{max}^{CH_3OH}$ 277, 280, 326, 385 nm, $\nu_{C=O}$ 1665 cm^{-1}, R_f 0.18 and 0.86. On acid and enzymatic hydrolysis with β-hydrolases the two compounds gave a single aglycone, which was identified as herbacetin (3,4',5,7,8-pentahydroxyflavone), and equimolar amounts of sugars: in substance (IV) the herbacetin was glycosylated with D-glucose and in (V) with L-arabinose.

The glycosides possessed a yellow fluorescence in UV light and gave a positive gossypetone test, which shows the presence of 3-OH and 5,8-dihydroxy groupings. From UV spectra with complex-forming and ionizing reagents [4], free hydroxy groups were found in positions 3,5,7, and 8 of substance (IV) and at C_3, C_5, C_8, and C_4', in substance (V).

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Under the influence of CH_3ONa, a bathochromic shift of the first band by 58 nm was observed for substance (IV). After the performance of the cyanidin reaction and the addition of $NaHCO_3$, the crimson coloration did not change [5], which showed the substitution of the hydroxyl in position 4.

The absence of a change in the UV spectrum of substance (V) under the influence of AcONa and a negative reaction with diazotized sulfanilic acid [6] permitted the conclusion that the L-arabinose was attached at C_7 of the herbacetin.

Thus, the results of a study of chemical behavior and of UV and IR spectra has enabled us to characterize substance (IV) as 3,4',5,7,8-pentahydroxyflavone 4'-O-β-D-glucopyranoside and substance (V) as 3,4',5,7,8-pentahydroxyflavone 7-O-β-L-arabinopyranoside, which we have called gelidolin and gelolin, respectively.

The phenolic compounds were accompanied by a crystalline substance having mp 166-167°C possessing the properties of polyhydric alcohols. From the melting point of its hexaacetate (122-123°C), the nature of its IR spectrum, and a mixed-melting point, it was identified as D-mannitol.

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ACCUMULATION OF CAROTENOIDS AND ASCORBIC ACID IN *Anethum graveolens*

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Previously, [1] studying the accumulation of essential oil in specimens of *Anethum graveolens* L. (dill) from different growth sites we investigated plants with different amounts of essential oil in the fruit. The best of them were recommended for cultivation and for the production of a high-quality food and drug raw material. We are making an analysis of the accumulation of carotenoids and ascorbic acid in 47 specimens of dill with the aim of finding plants richest in these compounds. The amount of ascorbic acid has been determined by the method of indophenol titration [2] and the amount of carotenoids by photoelectrocolorimetry at a wavelength of 440 nm in comparison with a standard solution of potassium dichromate [3].

Analysis of plants grown under the conditions of the temperate zone of the European part of the USSR has shown that the specimens of dill differed in the amounts of carotenoids and ascorbic acid that they contained. Not many specimens of dill with the maximum amount of carotenoids in the leaves (about 46 mg-%) were found. These were specimens from Eastern Egypt (46.5 mg-%), Iraq (44.5 mg-%), Nepal (39.2 mg-%), Sweden (38.3 mg-%), and Norway (38.3 mg-% on the absolutely dry weight of the raw material). Of domestic specimens, the richest in carotenoids proved to be the dill Gribovskii 388 (39.7 mg-%) and that growing in the AzSSR (37.2 mg-%) and the Buryat ASSR (45.3 mg-%). The highest carotenoids content was found in the leaves in the budding phase; their amount in the stems and fruit did not exceed 2-4 mg-%.

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