+ CH_3ONa, 398 nm (decrease in intensity) – were identified on the basis of their IR, UV, and PMR spectra, and also by a comparison with authentic samples, as fraxidin and isofraxidin, respectively [3, 4]. The methylation of both (I) and (II) with diazomethane gave 6,7,8-trimethoxycoumarin with mp 102-104°C [3, 5].

Compound (III) – $C_{10}H_8O_5$, M^+ 208, mp 227-228°C, $\lambda_{max}^{CH_3OH}$ 230, 345 nm – was identical with the known coumarin fraxatin [3-5].

Compound (IV) – $C_{17}H_{20}O_{10}$, mp 191-192°C, $\lambda_{max}^{CH_3OH}$ 228, 293, 338 nm (log ε 3.76, 3.58, 3.43) – was a glycoside. Its PMR spectrum showed the signals of H-3, H-4, and H-5 protons (6.35 ppm d, 9.8 Hz; 7.62 ppm, d, 9.8 Hz, and 6.80 ppm, S, respectively), of two methoxy groups (3.64 and 4.03 ppm), of an anomeric proton (6.05 ppm, d, 6.5 Hz), and of the other protons of a sugar residue. The acid hydrolysis of (IV) formed fraxidin and D-glucose. Thus, compound (IV) was identified as fraxidin 8-O-β-D-glucopyranoside [4, 6].

Compound (V) – $C_{17}H_{20}O_{10}$, mp 217-218°C, λ_{max} 230, 308 infl., 342 nm (log ε 3.48, 3.60, 3.79) – was identified on the basis of the formation of isofraxidin and D-glucose on acid hydrolysis, a study of spectral properties, and comparison with literature information, as isofraxidin 7-O-β-D-glucopyranoside (calycanthoside) [4, 7].

Compound (VI) – $C_{16}H_{18}O_2$, mp 209-210°C, λ_{max} 230, 282, 340 nm (log ε 3.85, 3.27, 2.79) – was identified from spectral characteristics and by comparison with an authentic sample as scopoletin 7-O-β-glucopyranoside [3, 4, 8].

This is the first time that coumarins have been isolated from Salsola laricifolia.

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ACTION OF THE FLAVONOIDS QUERCETIN 3-RUTINOSIDE AND KAEMPFEROL 3,7-DIRHAMNOSIDE ON THE BIOSYNTHESIS OF MELANIN IN Verticillium dahliae

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We have previously isolated the flavonoids quercetin 3-rutinoside and kaempferol 3,7-dirhamnoside from the leaves of the cotton plant of the Tashkent-1 variety and of kenaf of the Uzbekskii-1574 variety [1, 2]. A connection between the amount of flavonoids and the degree of wilt-resistance of the plants was observed.

The aim of the present investigation was to study the action of the flavonoids isolated from the cotton plant and kenaf on the biosynthesis of melanin in the fungus Verticillium dahliae Kleb., which will assist in the elucidation of the participation of flavonoids in the protective reactions of plants on their attack by verticillium wilt.

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We used a natural isolate of the fungus V. dahlia Khl-1,3 obtained from the cotton-plant immunity laboratory of the Division of General Genetics of the Cotton Plant of the Academy of Sciences of the TadzhSSR. The cultivation of the fungus and the isolation and identification of the pentaketide metabolites were performed by methods described previously [3, 4]. The flavonoids were added to the medium in the form of ethanolic solutions, and the corresponding amount of ethanol was added to the control.

As is well known, as the result of the inhibition of melaninogenesis in the fungi imperfecti biosynthetic precursors of this biopolymer and the products of their transformations accumulate in the culture medium [5].

The treatment of the Khl-1,3 isolate with quercetin 3-rutinoside and kaempferol 3,7-dirhamnoside separately at concentrations of 0.1-0.5 μg/ml and a subsequent chemical study of the composition of the medium led to the isolation and identification as the main pentaketide metabolite of 2,5-dihydroxy-1,4-naphthoquinone. The accumulation of this substance indicated a blockage by the flavonoids tested of the biosynthesis of melanin similar in that produced by the systemic fungicide tricyclazole (5-methyl[1.2.4]triazole]3,4-b]benzothiazole) [5]. An increase in the concentration of quercetin 3-rutinoside to 1 μg/ml and of kaempferol 3,7-dirhamnoside to 5 μg/ml was accompanied by the appearance on the culture medium of the V. dahliae isolate of 2,5,7-trihydroxy-1,4-naphthoquinone.

We are the first to have detected an effect of the action of the biologically active substances used on the biosynthesis of melanin in the fungus V. dahliae. The results obtained are of value in the study of the molecular mechanisms of the phytoimmunity of the cotton plant to verticillium wilt.

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FLAVONOIDS OF Anaphalis velutina

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We have studied the flavonoids of the epigeal part of Anaphalis velutina H. Krask. (family Asteraceae) collected in the perios of mass flowering close to the village of Chingan Tashkent province. The dried and comminuted raw material was extracted repeatedly with chloroform. The solvent was distilled off and the residue was chromatographed on a column of silica gel with elution by petroleum ether and petroleum ether–diethyl ether with increasing concentrations of the latter. Rechromatography of the individual fractions on a column of silica gel led to the isolation of two individual flavonoids with mp 149-150°C (I) and 99-100°C (II).

Flavonoid (I) had the composition $C_{18}H_{16}O_7$, M^+ 344 (100%), $\lambda_{max}^{ethanol}$ 278, 325, 378 nm (log ε 4.36, 4.15, 4.01); ν_{max}^{KBR} 3335 (OH), 1648 (C=O), 1621, 1597, 1568 (aromatic C=C bonds).

The PMR spectrum of (I) ($CDCl_3$) contained the signals of the protons of three methoxy groups (3.86, 3.88, and 4.03 ppm, 3 H, s, each), of a monosubstituted benzene ring (7.38-7.62 ppm, 3 H, m, H-3',4',5'; 8.13-8.36 ppm, 2 H, m, H-2',6'), and of a hydroxy group at C_3 (6.91 ppm, s).

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