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ANTHOCYANINS OF THE SKIN OF THE FRUIT OF *Persica vulgaris*

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We have investigated ten varieties of the species *Persica vulgaris* Mill. of the early and middle periods of ripening and of different origins. All varieties apart from Inzhirnyi novyi had a yellow flesh of the fruit and main color of the skin was from creamy white to golden yellow and orange with a carmine, red, or bright red tinge. They contained sugars (10-14%), organic acids (0.4-0.6%), vitamins A and C, mineral salts, and pectin and tannin substances [1]. The chemical compositions of the leaves, flowers, fruit, stem bark and root bark have been reported previously [2-5].

The air-dry skins of the fruit were extracted by steeping at room temperature with chloroform, ethyl acetate, and methanol containing 1% of hydrochloric acid. The total yield of extractive substances in chloroform was from 5.4 to 6.0%.

Ethyl acetate extracted mainly the flavonoid and tannin substances, and methanol extracted chlorogenic acid, sugars, and anthocyanins with some contaminating substances. The anthocyanins were extracted from the concentrated extract with isoamyl alcohol. The amount of anthocyanins in the skins of different varieties of peach (in percentages on the air-dry weight of the raw material) were as follows:

Variety	Origin	Date of Ripening and Collection	Total Amount of Anthocyanins
Morettini giallo precoce	Italy	June 22	9.34
Red Haven	America	July 12	10.65
Golden Jubilee — standart	America	July 15	9.63
Sovetskii	Nikit-skii Botanical Garden	July 19	7.54
Kremlevskii	The same	July 25	5.64
Yulduz	R. R. Shreder Institute	July 27	13.76
Inzhirnyi novyi — standart	The same	July 28	5.32
Valiant	America	July 29	7.15
Lola — standart	R. R. Shreder Institute	July 30	13.37
Start — standat	The same	August 2	7.41

From the acidic methanolic extract by chromatography on cellulose powder we obtained a dark violet substance with mp 215-217°C (decomp.). From its chromatographic behavior [6, 7] and properties it was identified as chrysanthemin, isolated previously from peach flowers [3, 8].

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The main pigments of peach skin are anthocyanins. (+)-Catechin and traces of (−)-epicatechin gallate were detected in the ethyl acetate extracts of all the varieties by paper chromatography with a marker and an authentic sample. These compounds were separated by passage through a column of silica gel (type ASK). In this way we obtained (+)-catechin [9], which we have isolated previously from the fruit, stem bark and root bark [3, 4].

The methanolic extract yielded chlorogenic acid [9].

Glucose was detected by the paper chromatography of the methanolic extracts from all the varieties in various systems with an authentic sample [4].

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THE POLYPHENOLS OF SOME SPECIES OF THE GENUS *Atraphaxis*

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A detailed investigation of the chemical composition of the leaves of two species of *Atraphaxis*, *A. frutescens* (L.) and *A. pyrifolia* Bge., has shown that they contain no common substance of flavonoid nature: the flavonoids of the former are represented by catechins, kaempferol glucosides, quercetin, and myricetin and of the latter by rhamnosides of the herbacetin and gossypetin series [1-4]. Consequently, we have studied a third species of the same subgenus, *A. muschketovii* Krassn., which is regarded as the initial prototype of the whole genus *Atraphaxis* L. From the leaves of *A. muschketovii* growing in the same zone of the Trans-Ili Ala-Tau as the first two species and cultivated in the Main Botanical Garden of the Academy of Sciences of the Kazahk SSR, using methods of selective extraction and chromatography on silica gel, polyamide, and Sephadex LH-20, we have isolated and have identified on the basis of a comparison of their physicochemical constants with those of authentic samples: kaempferol 3-O-glucosides (yield 0.05% calculated on the absolutely dry raw material), quercetin (0.66%), myricetin (0.31%), rutin (traces), gallic acid (0.06%), 4,5-dihydroxy-3-methoxybenzoic acid (0.06%), and β-glucogallin (0.17%). In addition to these, a substance (8) was isolated with mp 211-213°C, $[\alpha]_D^{22}$ −46° (CH_3OH) λ_{max} 282 nm (log ε 4.03), R_f 0.70 [BAW (4:1:5.1)], 0.80 (15% HAc). Yield 2.7%. On acid hyrolysis, substance (8) formed D-glucose and an aglycone with mp 157-158°C, λ_{max} 284 (log ε 4.52); on the addition of alkali, λ_{max} 292 nm (log ε 4.38). The acylation of substance (8) with acetic anhydride in pyridine gave an acetate with mp 124-126°C, the PMR spectrum of which ($CDCl_3$) showed the monoglucoside nature of the substance: the protons of glucose residue were recorded in the δ 4.30-5.34-ppm region and its four acetyl groups in the δ 2.10-2.15-ppm region. At δ 2.24, 2.38, and 3.82 were observed three three-proton singlets, and in the weak-field region two one-proton doublets corresponding to two aromatic protons. The PMR spectrum of the trimethylsilyl ether of the aglycone of substance (8) contains the signals of two aromatic protons, of a methoxy group (δ 3.82 ppm), and the signal of three protons in the form of a singlet at δ 2.10 ppm. The IR spectra of substance (8) and its aglycone lack an absorption band characterizing an ester grouping, and therefore this signal was assigned to the protons of a methyl group attached to

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