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PHENOLIC COMPOUNDS OF THE FLOWERS OF Cerasus serrulata

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There is no information in the literature on the chemical composition of the flowers of the Japanese flowering cherry Cerasus (Prunus) serrulata Don., family Rosaceae.

We have investigated the flowers of the Japanese flowering cherry grown under the conditions of Transcarpathia. The air-dry raw material of this plant (250.0 g) was exhaustively extracted with aqueous ethanol and the extract obtained was evaporated in vacuum to the viscous residue which was deposited on silica gel (60.0 g). The dry powder so obtained (116.2 g) was chromatographed on silica gel with chloroform–methanol in various ratios. When the resulting fractions were rechromatographed on polyamide and silica gel, β-sitosterol (I) and six phenolic compounds (II-VII) were obtained.

To identify the substances isolated we made use of the results of chemical transformations (acetylation, acid and enzymatic hydrolysis) and also of the results of UV, PMR, and mass spectroscopy and direct comparisons with authentic samples (compounds (I-III), (VI), and (VII)).

β-Sitosterol (I), yield 0.05%. White acicular crystals, $C_{29}H_{50}O$ (M^+ 414), mp 138-139°C (methanol).

p-Coumaric acid (II), yield 0.01%. Light yellow crystals with the composition $C_9H_8O_3$ (M^+ 164), mp 209.5-210.5°C (chl–MeOH).

Caffeic acid (III), yield 0.05%. Light yellow crystals with composition $C_9H_8O_4$ (M^+ 180), mp 220-222°C (aqueous acetone).

Ethyl caffeate (IV), yield 0.005%. Light yellow crystals with the composition $C_{11}H_{12}O_4$ (M^+ 204), mp 143-146°C (chlf–MeOH). The PMR spectrum of the acetate of (IV) contained the singlet signals of two aromatic acetoxy groups (2.30 and 2.24 ppm) showing the esterification of compound (IV) with ethyl alcohol.

Caffeoyl β-D-Glucopyranoside (V), yield 0.2%. White crystals with a yellowish tinge have the composition $C_{15}H_{18}O_9$, mp 182-184.5°C (ethanol). On enzymatic hydrolysis with β-glucosidase, substance (V) was split into glucose and caffeic acid (III). The presence of the singlet signals of two aromatic acetoxy groups in the PMR spectrum of the acetate of (V) (2.31 and 2.26 ppm) showed the glycosylation of the carboxyl in the molecule of (V) [1].

Astragalin (VI), yield 0.002%, yellow crystals with the composition $C_{21}H_{20}O_{11}$, mp 236-238°C (aqueous alcohol).

Isoquercitrin (VII), yield 0.02%. Yellow crystals with the composition $C_{21}H_{20}O_{11}$, mp 228-230°C (aqueous alcohol).

Hydrolysis (HCl or β-glucosidase) and NMR and UV spectra characterized the flavonoid compounds (VI) and (VII) as the 3-O-β-D-glucopyranosides of kaempferol (M^+ 278) and of quercetin (M^+ 302), respectively.

This is the first time that compounds (I-VII) have been isolated from the leaves of this plant.

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It is interesting that compounds (II), (III), (VI), and (VII) are widely represented in the genus Cerasus [2]. In our opinion, it is impossible to exclude the probability that compounds (IV) was an artefact arising in the course of isolation of the substances, since ethanol was used at the stage of extracting the raw material.

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CAROTENOIDS OF THE SEA BUCKTHORN, VARIETY OBIL'NAYA

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The aim of the present investigation was a study of the carotenoid complex of the fruit of the sea buckthorn, variety Obil'naya, bred by the M. A. Lisavenko Scientific-Research Institute of Siberian Horticulture.

The carotenoids were extracted with petroleum ether and ethanol [1]. To separate the carotenoids we used not only column chromatography but also thin-layer chromatography which considerably expands the possibilities of the isolation of zones containing small amounts of carotenoids. The carotenoids, obtained were identified with the aid of a spectrophotometer, the colors and positions of the zones on the chromatograms, and color reactions [2, 3]. The amounts of carotenoids were examined by using the extinction values and the results of spectrophotometric measurements. The fresh fruit investigated contained 16.5 mg of carotenoids per 100 g. The results of the investigation are given in Table 1.

It follows from Table 1 that the carotenoids possessing provitamin A activity (β-carotene, β-zeacarotene, γ-carotene, cryptoxanthin, and sintexanthin) make up 48% of the total. Of them more than half consists of the most biologically active carotenoids — β-carotene and cryptoxanthin.

TABLE 1

Number in order of position on the column	Carotenoid	Maxima of the absorption spectra, nm		Amount, % of the total carotenoids
		hexane	benzene	
1	β-Carotene	424, 453, 483	435, 462, 486	15,8
2	β-Zeacarotene	406, 426, 454	—	7,3
3	γ-Carotene	436, 462, 490	447, 476, 509	2,4
4	Prolycopene	434, 470, —	455, 484, —	3,2
5	Lycopane	447, 471, 502	454, 487, 520	6,0
6	Mutatochrome	404, 426, 450	414, 436, 463	1,8
7	β-Cryptoxanthin	425, 446, 477	—	18,4
8	Taraxanthin	418, 443, 470	430, 454, 484	12,4
9	Sintexanthin	425, 448, 474	436, 462, 484	4,1
10	Lutein	420, 444, 475	433, 459, 485	14,2
11	Lycophyll	446, 473, 502	456, 487, 520	0,7
12	Escholtzxanthin	444, 472, 500	458, 485, 515	0,9
13	Flavoxanthin	400, 420, 450	—	0,8
14	Luteoxanthin	—	408, 431, 458	0,4
15	cis-Luteoxanthin	—	305, 318, 406 — 430, 458	0,4
16	Capsanthin	450, 475, 504	459, 483, 516	0,5
17	Autoxanthin	380, 401, 425	—	5,8
18	Trollichrome	—	431, 457, —	4,9

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