

Basic Physicochemical Properties of the Flavonoids of Crataegus curvisepala

Substance	Composition	Mp, ° C	$[\alpha]_D^{20}$ (in alcohol), degrees	$\lambda_{\max}$ , m $\mu$
Deacetylcratenacin (F)	C <sub>27</sub> H <sub>30</sub> O <sub>14</sub>	214—215	— 35	{ 334 (log $\epsilon$ 4.15) 270 (log $\epsilon$ 4.17)
Apigenin 7- $\beta$ -D-glucopyranoside (J)	C <sub>21</sub> H <sub>20</sub> O <sub>10</sub>	253—256	—125	{ 337 (log $\epsilon$ 4.30) 268 (log $\epsilon$ 4.26)
Rhamnoepigenin (D)	C <sub>21</sub> H <sub>20</sub> O <sub>9</sub>	284—285	—130	{ 339 (log $\epsilon$ 4.11) 266 (log $\epsilon$ 4.03)
Glucoluteolin (B)	C <sub>21</sub> H <sub>20</sub> O <sub>11</sub>	255—258	— 80	{ 355 (log $\epsilon$ 4.30) 265 (log $\epsilon$ 4.43)
Quercitrin (E)	C <sub>21</sub> H <sub>20</sub> O <sub>11</sub>	187—190	— 20	{ 360 (log $\epsilon$ 3.88) 261 (log $\epsilon$ 3.98)

Apigenin was isolated from the products of the acid hydrolysis of flavonoids J and D. From a chemical and spectroscopic study (with the addition of sodium acetate, sodium ethoxide, and other reagents) it was found that the first of them is 5, 4'-dihydroxyflavone 7- $\beta$ -D-glucopyranoside (apigenin 7- $\beta$ -D-glucopyranoside) and the second is 5, 4'-dihydroxyflavone 7- $\alpha$ -L-rhamnopyranoside (rhamnoapigenin).

Flavonoid B is one of the luteolin flavonoids which is difficult to hydrolyze and was identified as 5, 3', 4'-trihydroxyflavone 7- $\beta$ -D-glucopyranoside (glucoluteolin). The presence of a hydroxy group at C<sub>8</sub> of flavonoid B, a chemical study of which we have reported previously [2], was not confirmed.

The results of a chemical and spectroscopic investigation have shown that flavonoid E is a glycoside of quercetin and is 5, 7, 3', 4'-tetrahydroxyflavone 3- $\alpha$ -L-rhamnopyranoside (quercitrin).

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Khar'kov Chemical and Pharmaceutical  
Scientific Research InstituteINVESTIGATION OF THE TANNING SUBSTANCES OF AGRIMONIA ASIATICA

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Agrimonia asiatica Juz., family Rosaceae, is used in popular medicine as an astringent in bowel diseases [1]. We have confirmed this feature by showing that agrimony contains tanning substances which accumulate in all phases of the growth of the plant and particularly in the flowering period (table). In order to investigate the substances of the polyphenolic complex of the hypogeeal organs of Asiatic agrimony collected in Western Tien Shan, we studied the precursors of the tanning substances (phenolcarboxylic acids, polyphenols) and particularly the tannides, leucoanthocyanidins, and catechins. Benzoic acid was found among the free acids.

The tannides proper were identified from the products of acid hydrolysis of the extracts, the alkaline hydrolysis of the phlobaphenes, and the pyrolysis of the tanning preparation obtained. Gallic and benzoic acids and catechol were

detected by acid hydrolysis and chromatography. Alkaline hydrolysis of the phlobaphenes (obtained by acid hydrolysis) showed the presence of hydroquinone and catechol, and pyrolysis the presence of catechol, pyrogallol, and gallic acid. The leucoanthocyanidins were isolated by repeated reprecipitation from a methanolic extract with ether [2]. The yield of leucoanthocyanidins from the roots was 2.8% and from the rhizomes 0.86%.

Dynamic Accumulation of Tanning Substances, % of the  
Absolutely Dry Weight

Growth phase	Organs					
	roots	rhizomes	leaves	stem	flower-stalk	fruit
Before flowering	15.4	7.84	14.9	3.8	—	—
Flowering	25.8	16.44	16.09	5.83	8.6	—
Milky maturity of the fruit	22.8	9.3	14.25	5.06	—	5.05

When the total leucoanthocyanidins were fused with a 50% solution of caustic potash and the products were chromatographed, catechol, phloroglucinol, and gallic acid were found. From the components obtained, the substance can be identified as leucodelphinidin.

The catechins in extracts of the raw material were studied chromatographically [3, 6]. 1-Epigallocatechin, d, 1-gallocatechin, d, 1-catechin, and epicatechin gallate were found in the leaves. In addition to the substances mentioned, epigallocatechin gallate was found in the hypogeeal organs, while 3, 1-gallocatechin was absent.

Thus, the polyphenolic complex of *Agrimonia asiatica* consists of derivatives of catechol and pyrogallol in association with benzoic and gallic acids, leucodelphinidin, and catechins.

A substance with an astringent action was obtained from the hypogeeal organs (from concentrated aqueous extracts after the addition of an electrolyte, sodium chloride) [4]. The product contained catechol tanning agents (73.19%) and pyrogallol tanning agents (8.91%) [5].

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REPIN, A NEW SESQUITERPENE LACTONE FROM ACROPTILON REPENS

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A crystalline combination of substances with mp 143°-160° C has been isolated from the leaves and flower heads of *Acroptilon repens* (L.) D. C. collected in the region of Kirovobad in May 1964.

Fractional crystallization or chromatography on alumina of this mixture gave two colorless crystalline substances with mp 154°-156° C (from alcohol), R<sub>f</sub> 0.29 [in a thin layer of neutral alumina (activity grade IV) in the petroleum