DIMERIC PROANTHOCYANIDINS FROM *Rhodiola semenovii*

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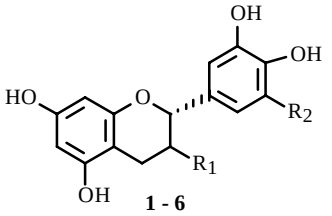
UDC 547.972

Five species of *Rhodiola* (Crassulaceae) plants grow in Uzbekistan.

Rose rhodiola is widely used in folk medicine as a tonic and adaptogenic agent [1]. This sepcies has not been observed in Uzbekistan. Therefore, we studied the chemical composition of Semenov rhodiola (*R. semenovii*) in a search for tonics from other *Rhodiola* species [2, 3].

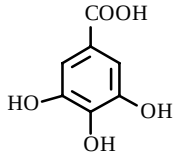
We investigated the roots and rhizomes of this species that were collected during flowering in Tashkent. We used column chromatography over microcrystalline cellulose powder and gel filtration over Sephadex LH-20 of the total aqueous alcohol extract and isolated more than 15 compounds.

Compounds **1-7** from the ether fraction of the aqueous alcohol extract had physicochemical and spectral properties (UV, IR, PMR) that identified them as (+)-catechin (**1**), (+)-gallocatechin (**2**), (-)-epicatechin (**3**), (-)-epicatechingallate (**4**), (-)-epigallocatechin (**5**), (-)-epigallocatechingallate (**6**), and gallic acid (**7**).



1 - 6

1: R_1 = ◄OH, R_2 = H;
2: R_1 = ◄OH, R_2 = OH;
3: R_1 = ····OH, R_2 = H;
4: R_1 = ····O-Galloyl, R_2 = H;
5: R_1 = ····OH, R_2 = OH;
6: R_1 = ····OGalloyl, R_2 = OH



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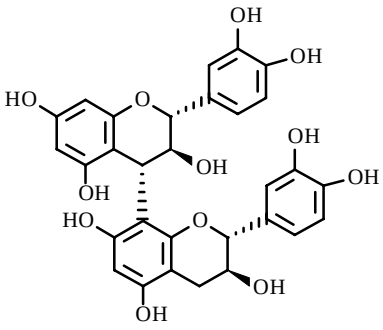

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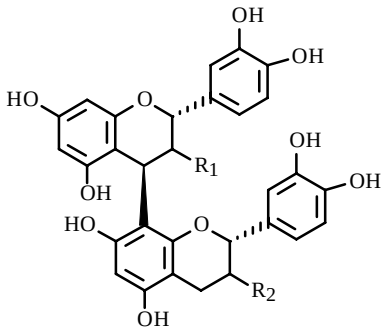

9, 10

9: $R_1 = R_2$ = ····OGalloyl;
10: R_1 = ····OH, R_2 = ····OGalloyl

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 0009-3130/04/4001-0094

The ethylacetate fraction of the aqueous alcohol extract gave three compounds (**8**-**10**).

Cleavage of **8** with a five-fold excess of KOH under a N_2 atmosphere formed fluoroglucinol and protocatechic acid. Treatment with HCl of an aqueous solution of the compound gave a red color, indicative of the formation of an anthocyanidin, and then a reddish-brown precipitate of flabophen.

Cleavage of **9** with base gave fluoroglucinol and protocatechic acid and formed gallic acid; with acid, anthocyanidin and then flabophen.

Cleavage of **10** with base produced three compounds, gallic and protocatechic acids and fluoroglucinol. The chemical transformations and UV, IR, and PMR spectra of **8**-**10** identified them as the dimeric proanthocyanidins (+)-catechin-(4α-8)-(+)-catechin (**8**), (-)-epicatechingallate-(4β-8)-(-)-epicatechingallate (**9**), and (-)-epicatechin-(4β-8)-(-)-epicatechingallate (**10**).

It should be noted that these dimeric proanthocyanidins were isolated for the first time from this plant species.

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