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ANTHRAQUINONES OF *Gallium articulatum*

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We have investigated the roots and rhizomes of the *Gallium articulatum* L., family Rubiaceae, for the presence of anthraquinones. The raw material for the investigation was collected close to Kislovodsk in the environs of the village of Podkumok.

In an ethanolic extract no less than seven substances of anthraquinone nature were detected by paper chromatography in the ethyl acetate-formic acid-water (10:2:3) system. The air-dry raw material was extracted with 96% ethanol by the fractional maceration method. The extract was evaporated in vacuum and was treated successively with water and chloroform. The aqueous fraction, by chromatography on a column of polyamide with elution first with water and then with water-acetone (1:9, 3:7, and 1:1) yielded substance (I) - $C_{25}H_{26}O_{13}$, yellow crystals with mp 256-257°C (from water), R_f 0.39 in the above-mentioned system.

Six anthraquinones were detected in the chloroform fraction. By chromatography on a column of hydrated silicic acid it was possible to isolate only substances (II)-(V). Substance (II) - $C_{14}H_8O_4$, orange-red crystals with mp 289-290°C (from benzene), R_f 0.98; (III) - $C_{14}H_8O_5$, dark red crystals with mp 259-261°C (from ethanol), R_f 0.51; (IV) - $C_{15}H_{10}O_4$, yellow crystals with mp 299-301°C (from chloroform), R_f 0.59; (V) - $C_{15}H_8O_7$, dark red crystals with mp 223-224°C (from chloroform), R_f 0.68.

On the basis of their physical and chemical properties, the results of UV and IR spectroscopy, and hydrolysis products, and a comparison with authentic samples, these substances were identified as ruberitric acid (I), alizirin (II), purpurin (III), rubiadin (IV), and pseudopurpurin (V).

The study of the other components isolated from this raw material is continuing.

The results of a quantitative determination of the anthraquinones in various vegetation phases of the plant using a photoelectrocolorimetric method [1] showed that the largest amount of the substances studied in the epigeal part of this bedstraw was present at the period of incipient vegetation (May) - 5.0-5.4%; and during flowering (July) and fruit-bearing (September) - 3.5-3.9 and 2.3-2.7%, respectively.

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