PHENOLIC COMPOUNDS OF Campanula glomerata

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Studying the epigeal part of Campanula glomerata L. (danesblood bellflower) collected in the high Altai, by paper chromatography we have detected not less than 19 substances of flavonoid nature. The air-dry raw materials were extracted successively with 96% and 70% ethanol. The combined extracts were evaporated under vacuum and the aqueous residue was treated with chloroform and then with ethyl acetate. From the ethyl-acetate extract by column chromatography on a polyamide sorbent we isolated eight substances (I-VIII) which were identified by their physicochemical properties and UV and IR spectra as known flavonoid compounds: quercetin, isorhamnetin, quercetin 3-O-β-D-glucopyranoside, quercetin 3-O-β-D-galactopyranoside, quercetin 7-O-β-D-glucopyranoside, isorhamnetin 3-O-β-D-glucopyranoside, isorhamnetin 3-O-β-D-galactopyranoside, and kaempferol 3-O-β-D-galactopyranoside.

By chromatography on polyamide, the aqueous residue gave another two flavonoid substances (IX and X).

Substance (IX), with the composition $C_{21}H_{18}O_{13}$, crystallizes from a mixture of ethanol and chloroform with mp 163°C (effervescence, decomposes at 220°C). From its physicochemical properties, the substance was identified as quercetin 3-O-β-D-glucopyranosiduronic acid [1].

Substance (X), with the composition $C_{22}H_{20}O_{13}$, was a yellow amorphous powder having no sharp melting point, R_f 0.30 (15% acetic acid). UV spectrum, nm: $\lambda_{max}(C_2H_5OH)$ 360, 300, 256; $\lambda_{max}(CH_3COONa)$, 368, 271; $\lambda_{max}(H_3BO_3 + CH_3COOH)$, 362, 265; $\lambda_{max}(C_2H_5ONa)$ 416, 273; $\lambda_{max}(ZrOCl_2)$ 405, 264; λ_{max} ($ZrOCl_2$ + citric acid) 357. On acid hydrolysis (5% H_2SO_4, 100°C, 4 h) it gave D-glucuronic acid and an aglycone with the composition $C_{16}H_{12}O_7$, mp 306-307°C (mp of the acetate 207-209°C) which was identified as isorhamnetin. The glucose was scarcely cleaved by emulsin and rhamnodiastase. The results of UV spectroscopy showed that the glucuronic acid was present at C_3 [2].

The results obtained permit the glycoside isolated to be considered to be isorhamnetin 3-glucosiduronic acid. It has not been described previously in the literature and is a new natural compound.

In addition to flavonoid compounds, the ethyl acetate extract was found to contain phenolcarboxylic acids. By chromatography on cellulose we isolated two phenolcarboxylic acids: chlorogenic acid with mp 202-205°C, $[\alpha]_D$ −33° and 3-(p-coumaroyl)quinic acid with mp 243-244°C, $[\alpha]_D$ −55°. The acids were identified by the products of their alkaline hydrolysis, their UV and IR spectra, and comparison with authentic samples.

LITERATURE CITED

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