FLAVONOIDS OF Turgenia latifolia

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UDC 547.972.2:582.89

By qualitative reactions, we have detected three flavonoids with R_f 0.21, 0.36, and 0.89 [BAW (4:1:5) system] in the herb Turgenia latifolia (L.) Hoffm. (family Umbelliferae). In order to study them, the epigeal part of the plant collected in June, 1969, in the Saryagach region (Kazakh SSR) was dried, comminuted, and treated with a mixture of ethanol and acetone (1:1). The extract was concentrated, diluted with water (1:2), the precipitate that deposited was filtered off, and the filtrate was passed through a column of polyamide.

On elution with water and 20% ethanol, a flavonoid was obtained with mp 256°C, $[\alpha]_D^{20} - 55°$ (c 0.36; DMFA), R_f 0.21. UV spectrum: λ_{max} 265, 353 nm. On the basis of bathochromic shifts of the long-wave maximum in the UV spectrum in the presence of diagnostic reagents [1], it was established that the compound contains free hydroxy groups in the 3', 4', and 5 positions.

On acid hydrolysis, the substance underwent cleavage, forming D-glucose, L-rhamnose, and an aglycone which was identified from its physicochemical properties (bathochromy, melting point of 328°C) and its IR spectrum as luteolin. The yield of aglycone was about 40% of the weight of the glycoside. Consequently, the initial substance is a bioside. The presence of glucose and rhamnose and their position at C-7 was also confirmed by the NMR spectrum. Enzymatic hydrolysis with β-amylase gave a monoside and D-glucose. It follows from this that the latter is the terminal sugar and is attached to the rhamnose in the $1 \rightarrow 4$ position.

The IR spectrum of the substance showed absorption bands at 1025, 1050, and 1080 cm^{-1} and also at 1020 and 1070 cm^{-1}, showing that one hexose is in the pyranose form and the other in the furanose form. Bands at 900 and 980 cm^{-1} relate to a β-glycosidic bond. The experimentally found value of $[M]_D \cdot K_{Ph}$ (−219.6) is in close agreement with the value calculated by Klyne's method [2] for luteolin β-D-glucopyranosyl-β-D-rhamnofuranoside. On the basis of what has been said, the flavonoid under consideration has the structure of luteolin 7-[O-β-D-glucopyranosyl-$(1 \rightarrow 4)$-β-L-rhamnofuranoside].

When the chromatographic column was washed with 40% ethanol, a flavonoid was isolated with mp 239°C, $[\alpha]_D^{20} - 41°$ (c 0.6; DMFA), R_f 0.36, UV spectrum (λ_{max} 257, 354 nm), the bathochromic shifts of which showed that it was another luteolin glycoside. Its acid and enzymatic hydrolysis (β-glucosidase) formed luteolin and D-glucose. The yield of aglycone was 65% by weight. Consequently, the substance is a monoside. The presence of absorption bands at 1082, 1056, 1025, 835, and 850 cm^{-1} shows that the glucose is attached to the aglycone by a β-glucosidic bond and is in the pyranose form, as is confirmed by the molar optical activity calculated for this structure by Klyne's method.

A mixture of flavonoid (II) with a sample of 7-O-β-D-glucopyranosylluteolin kindly given to us by V. A. Bandyukova showed no depression of the melting point. Their IR spectra were also identical.

When the polyamide sorbent was eluted with methanol, we obtained a flavonoid with mp 328°C, R_f 0.89, which was identified by its IR spectrum and a mixed melting point as luteolin.

LITERATURE CITED

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Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR. Translated from Khimiya Prirodnykh Soedinenii, No. 5, pp. 645-646, September-October, 1972. Original article submitted December 30, 1971.

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