

THE FLAVONOIDS OF *Cirsium palustre*

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By means of two-dimensional chromatography, four substances of flavonoid nature have been found in the leaves of *Cirsium palustre* L. To isolate them, 400 g of the leaves of the plant was extracted in a Soxhlet apparatus for 48 h. The extract was evaporated under vacuum to 400 ml. On standing, 20 g (4%) of a yellowish precipitate consisting of two substances deposited.

The mixture of these substances (5 g) was separated by chromatography on a column of polyamide sorbent. Elution with 20-30% methanol in chloroform gave substance A with the composition $C_{21}H_{20}O_{11} \cdot 0.5 H_2O$, mp 266-268°C, $[\alpha]_D -54.7^\circ$ (c 0.6; formamide); λ_{max} 255, 268, 350 nm.

The color of the spot on the paper in UV light showed the flavone nature of substance A, and its $D_{1\%}^{1cm}$ value of 350 showed its monoglycosidic nature. A bathochromic shift of the long-wave maximum in the UV spectrum of substance A by 61 nm and a short-wave shift by 17 nm in the presence of sodium methoxide showed the presence of a free hydroxy group in position 4'.

In the presence of sodium acetate and boric acid, a shift of the maximum of the long-wave band by 22 nm was found, which is characteristic for a 3',4'-dihydroxy group. This is also confirmed by the presence of an additional maximum in the UV spectrum of substance A in methanol. The bathochromic shift of the long-wave maximum by 66 nm and of the short-wave band by 21 nm in the presence of zirconium nitrate shows the presence of a free hydroxy group in position 5. The results obtained show that substance A is luteolin 7-glucoside.

The hydrolysis of substance A gave an aglycone with mp 328-330°C forming an acetate with mp 224-226°C; λ_{max} 255, 268, 350 nm. A mixture of the aglycone of substance A with luteolin gave no depression of the melting point. Glucose was found in the mother liquors after acid and enzymatic hydrolysis.

In the NMR spectrum of silylated substance A, in addition to the signals of the protons of 7-substituted luteolin, a doublet was found at 4.91 ppm with an intensity of 1 H ($J=7$ Hz), which is the signal of the anomeric proton of β -glucose in position 7 of the flavone. The six protons of the glucose are represented by signals in the 3.4-3.8 ppm region.

Thus, substance A is luteolin 7- β -D-glucopyranoside.

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