FLAVONOL GLYCOSIDES FROM THE LEAVES OF Ulmus pinnato-ramosa

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By paper chromatography, and also by specific qualitative reactions, we have established that the leaves of Ulmus pinnato-ramosa contains four flavonol glycosides.

To isolate these compounds, a methanolic extract was evaporated in vacuum until the alcohol had been eliminated. The residue was dissolved in a small amount of hot water and was chromatographed on a column of Kapron, using water and methanol as eluents. The combined flavonoids present in the methanolic eluent were separated by preparative chromatography on paper in the butan-1-ol–acetic acid–water (40 : 12.5 : 29) and 15% acetic acid systems.

Substance I had mp 174-176°C [from acetone–water (1 : 1)], $[\alpha]_D$ –56.0°; R_f 0.82 in the ethyl acetate–formic acid–water (10 : 2 : 3) system and 0.4 in 15% acetic acid.

D-Glucose and an aglycone were identified in the products of hydrolysis with 2% sulfuric acid. The melting point of the aglycone was 274-276°C (from aqueous acetone).

The presence in the alkaline-cleavage products of phloroglucinol and p-hydroxybenzoic acid, and also the conversion of the aglycone into pelargonidin on reduction permitted the conclusion that the aglycone was 3,4',5,7-tetrahydroxyflavone (kaempferol).

On the basis of qualitative reactions, the products of acid and enzymatic hydrolysis and alkaline degradation, UV spectroscopy with ionizing and complex-forming additives, R_f values, and the melting point of a mixture, substance I was identified as kaempferol 3-O-β-D-glucopyranoside.

Substance II had mp 240-241°C (from dilute ethanol), $[\alpha]_D$ –80° (c 0.5; ethanol). Its R_f value in the butan-1-ol–acetic acid–water system was 0.68, and in 15% acetic acid it was 0.39. According to UV spectroscopy with ionizing and complex-forming additives the substance contains free hydroxy groups in the 3', 4', 5, and 7 positions. On acid hydrolysis and enzymatic hydrolysis with β-glycosidase, quercetin and D-glucose were isolated and identified.

Consequently, substance II is quercetin 3-O-β-D-glucopyranoside.

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