GLYCOSIDES OF KAEMPFEROL FROM Campanula hypopolia

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From ethanolic extracts of the epigeal part of <u>Campanula hypopolia</u> Trautv., collected in the flowering phase (gorge of the R. Zrug, Verkhii Zaramag, Northern Ossetia) by using fractional crystallization and preparative chromatography (column and paper) we have obtained four individual flavonoid compounds. The present paper gives the results of the identification of two of them.

Flavonoid (I), $C_{21}H_{20}O_{11} \cdot 1H_2O$, mp 194-195°C (methanol), $[\alpha]_D^{22} - 24.01$ [c 0.02; $C_2H_5OH - H_2O$ (1:1)]. UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 374, 272 nm; heptaacetate, mp 180-182°C (ethanol) [1].

Flavonoid (II), $C_{21}H_{20}O_{11} \cdot 2H_2O$, mp 192-194°C (aqueous acetone). UV spectrum: $\lambda_{max}^{C_2H_5OH}$ 355, 257 nm [2].

Under the action of 5% H_2SO_4 for 3 h, the two substances formed the same aglycone (yield 64-66%) which was identified by its physicochemical constants as 3,4',5,7-tetrahydroxyflavone (kaempferol) [3]. The carbohydrate components were D-glucose (in the case of flavonoid I) and D-galactose (for flavonoid II).

The UV spectrum (diagnostic reagents were used [4]) and the ZrOCl_2 -citric acid test [5] of the glycosides and their aglycones showed that the sugars in the molecules of the flavonoids were attached at carbon atom 3. The cleavage of the glycosides with an enzyme from <u>Aspergillus oryzae</u> is due to the presence in them of the β -configuration of the glycosidic bond.

The nature of the hydrolysis process [6] and also the results of differential IR spectroscopy (1092, $1030. \ 1010 \ \text{cm}^{-1}$) confirm the pyranose form of the carbohydrate rings of the glycosides isolated.

A mixed melting point of flavonoid (I) with an authentic sample of astragalin [7] gave no depression of the melting point.

On the basis of the results obtained, the first substance can be identified as kaempferol $3-O-\beta-D-$ glucopyranoside, or astragalin, and the second as kaempferol $3-O-\beta-D$ -galactopyranoside or trifolin.

This is the first time that these kaempferol monosides have been found in plants of the genus Campanula.

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