

FLAVONOIDS FROM *Astragalus galegifolius*

AND *A. maximus*

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To isolate the flavonoids, an 80% methanolic extract from 600 g of air-dry flowers of *A. galegifolius* was purified with chloroform after the alcohol had been distilled off. Drying the aqueous extract then gave 0.12 g of bright-yellow acicular crystals with the composition $C_{21}H_{20}O_{11}$, mp 196-198°C, UV spectrum: $\lambda_{\max}^{C_2H_5OH}$ 375, 270 nm. Acid hydrolysis formed 66% of the aglycone, kaempferol, and D-glucose; $[\alpha]_D^{20} -10^\circ$ (c 0.1; ethanol), $K_{Ph}[M]_D^{20} -25.5^\circ$. This value and calculations by Klyne's method showed the α configuration and the pyranose form of the sugar substituent [1]. The glycoside was readily cleaved by the enzyme of *Aspergillus oryzae* into kaempferol and D-glucose. By its IR spectrum, a mixed melting point, and bathochromy, the glucoside was identified as astragalin [2-4].

The combined flavonoids were obtained similarly from 700 g of the leaves and flowers of *A. maximus*. The ethyl acetate extracted yielded 0.15 g of yellow acicular crystals of a flavonoid with mp 192-194°C. Acid and enzymatic hydrolysis gave 79.6% of kaempferol and D-galactose. $[\alpha]_D^{20} -8^\circ$ (c 0.1; ethanol), $K_{Ph}[M]_D^{20} -20.4^\circ$. According to the molecular rotation, the galactose has the β configuration and the pyranose form [1]. In the UV spectrum ($\lambda_{\max}^{C_2H_5OH}$ 359, 257 nm), bathochromic shifts showed the presence of the sugar substituent in position 3.

The results of a comparison of our experimental results with literature data indicate that the substance under investigation was kaempferol 3-O- β -D-galactoside, or trifolin [3, 4].

This is the first time that astragalin and trifolin have been isolated from the species mentioned.

LITERATURE CITED

1. I. P. Kovalev and V. I. Litvinenko, *Khim. Prirodn. Soedin.*, 233 (1965).
2. W. Rahman et al., *Naturwissenschaften*, **50**, 477 (1963).
3. T. A. Geissman, *The Chemistry of Flavonoid Compounds*, Pergamon, New York (1962).
4. K. Dumkow, *Planta Medica*, **19**, 3, 197 (1971).
5. I. I. Moniava, É. P. Kemertelidze, et al., *USSR Authors' Certificate No. 305,890*; *Byul. Izobret.*, No. 19, 7 (1971).

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