AGLYCONE COMPOSITION OF THE FLAVONOID GLYCOSIDES OF *Astragalus mongolicus*

D. Dungérdorzh, V. V. Petrenko, and L. I. Deryugina

UDC 547.9722

We obtained the aglycones by the hydrolysis of the purified combined flavone glycosides with a 0.1 N solution of hydrochloric acid with heating on the water bath. The completeness of the hydrolysis was monitored by chromatography in 15% acetic acid. The aglycones were extracted with ether, and the ethereal extracts were washed to neutrality with water and were dried with anhydrous sodium sulfate. After the elimination of the organic solvent, a yellow crystalline powder remained which gave a positive Bryant reaction [1]. When the combined aglycones were chromatographed in the benzene–ethyl acetate–acetic acid (73.5 : 24.5 : 2) system on paper impregnated with a mixture of formamide and ethanol (1 : 4), it was found that it contained three substances fluorescing yellow in UV light.

The combined aglycones were separated into their individual components by adsorption chromatography on "alkaline" polyamide sorbent. As eluents we used chloroform and mixtures of chloroform and ethanol in various ratios. Three individual compounds were isolated which were provisionally called aglycones AM-1, AM-2, and AM-3.

The aglycone AM-1 consisted of yellow crystals readily soluble in ethanol, methanol, ether and ethyl acetate with mp 311-313°C, R_f 0.23 (60% acetic acid–solvent 1) and 0.40 [benzene–ethyl acetate–acetic acid (73.5 : 24.5 : 2)–solvent II].

Aglycone AM-2 formed yellow crystals with mp 305-307°C, R_f 0.27 (I) and 0.74 (II).

Aglycone AM-3 formed yellow crystals with mp 223-225°C, R_f 0.40 (I) and 0.92 (II).

The positions of the free hydroxy groups in the substances investigated were determined from the results of UV spectroscopy using ionizing and complex-forming reagents [2]. It was found that they were present at C_3, C_5, C_7, C_3', and C_4' in the aglycone AM-1, at C_3, C_5, C_7, and C_4' in the aglycone AM-2, and at C_3, C_5, and C_4' in the aglycone AM-3. The IR spectra of all the substances studied contained absorption bands characteristic of a carbonyl group (1660 cm^{-1}) and of a phenolic hydroxy group (3460 cm^{-1}), and substances AM-2 and AM-3 also showed a band characteristic for a methoxy group (2920 cm^{-1}). When the aglycones AM-2 and AM-3 were demethylated, preparative chromatography showed the production of substance characterized as 3,3',4',5,7-pentahydroxyflavone and 3,4',5,7-tetrahydroxyflavone, respectively.

Thus, what has been said above enables us to identify the aglycone AM-1 as 3,3',4',5,7-pentahydroxyflavone or quercetin, the aglycone AM-2 as 3,4',5,7-tetrahydroxy-3'-methoxyflavone or isorhamnetin, and the aglycone AM-3 as 3,4',5-trihydroxy-7-methoxyflavone, or rhamnocitrin, which is confirmed by the results of the comparative chromatography of the aglycones in the presence of standard samples and natural substances obtained by the alkaline destruction of the aglycones.

The results of the investigations performed have enabled us to establish for the first time that the flavone glycosides of *Astragalus mongolicus* are derivatives of the aglycones quercetin, isorhamnetin, and rhamnocitrin.

LITERATURE CITED

1. E. Bryant, J. Am. Chem. Soc., 39, 481 (1950).
2. V. I. Litvinenko and N. P. Maksyutina, Khim. Prirodn. Soedin., 420 (1965).

State Medical Institute of the Mongolian People's Republic, Zaporozh'e Medical Institute. Translated from Khimiya Prirodnykh Soedinenii, No. 2, pp. 250-251, March-April, 1974. Original article submitted June 7, 1973.