

ISORHAMNETIN AND ASTRAGALIN FROM THE LEAVES OF  
*Hippophae rhamnoides*

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As reported previously [1], the leaves of *Hippophae rhamnoides* L. (common sea buckthorn) have yielded the flavonoid glycoside isorhamnetin 3-O- $\beta$ -D-glucopyranoside 7-O- $\alpha$ -L-rhamnoside. Continuing a study of the flavonoids of this raw material, we have isolated from an ethyl acetate extract two more substances B and C having  $R_f$  values of 0.84 and 0.64, respectively, in the butan-1-ol-acetic acid-water (4:1:2) system. The substances detected were separated on a column of polyamide with chloroform and mixtures of chloroform and ethanol with gradually increasing concentrations of the latter up to 20% as eluents. Substance B was eluted first and then C.

Substance B,  $C_{16}H_{12}O_7$ , mp 303-305°C, was identified by UV spectroscopy with diagnostic reagents, qualitative reactions, conversion products, a mixed melting point, and its  $R_f$  values in various systems in comparison with an authentic sample as 3,4',5,7-tetrahydroxy-3'-methoxyflavone (isorhamnetin).

Substance C,  $C_{21}H_{20}O_{11}$ , mp 217-220°C; UV spectrum: 375, 270 nm ( $CH_3OH$ ), 380, 270 nm ( $+H_3BO_3$ ), 390, 275 nm ( $+CH_3COONa$ ), 415, 282 nm ( $+CH_3ONa$ ).

Acid and enzymatic hydrolysis led to glucose and kaempferol,  $C_{15}H_{10}O_6$ , mp 330-331°C, which was identified from its UV spectra, the absence of a depression in a mixed melting point test, and its  $R_f$  values in various solvents with a marker.

A comparison of molecular rotations of the substance under investigation and phenyl glucosides [2] showed the presence of a  $\beta$ -glycosidic bond and of a pyranose oxide ring.

Thus, the glycoside obtained from the leaves of *Hippophae rhamnoides* is kaempferol 3-O- $\beta$ -D-glucopyranoside, which corresponds to astragalín.

This is the first time that astragalín has been isolated from the leaves of the sea buckthorn, but isorhamnetin has been detected chromatographically previously by Grigorescu and Cots [3] and by V. G. Minaeva et al., [4].

LITERATURE CITED

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