

KAEMPFEROL AND QUERCETIN FROM  
*Sempervivum ruthenicum*

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Continuing a study of the flavonoid composition [1] of succulents of the family of Crassulaceae, by paper chromatography we have found no less than 14 substances of flavonoid nature in the epigeal part of *Sempervivum ruthenicum*.

By preparative chromatography on polyamide, we have isolated two individual substances (I and II).

Substance I,  $C_{15}H_{10}O_6$ , has mp 330–331°C. UV spectrum:  $\lambda_{\max}$  350, 253 nm,  $\lambda_{\max}^{CH_3COONa}$  382, 269 nm. The IR region of the spectrum has absorption bands characteristic for flavones at 3200–3300  $cm^{-1}$  (OH groups) and 1665  $cm^{-1}$  ( $\alpha, \beta$ -unsaturated CO group) [2]. The acetate of I has mp 226–227°C.

Substance II,  $C_{15}H_{10}O_7$ , mp 310–312°C. IR spectrum: 3300  $cm^{-1}$  (OH groups), 1665  $cm^{-1}$  ( $\alpha, \beta$ -unsaturated CO group); mp of the acetate 199–201°C.

From its physicochemical properties, the properties of the acetyl derivatives, and the results of chromatographic studies with authentic samples, substance I was identified as 3,5,7,4'-tetrahydroxyflavone (kaempferol) and substance II as 3,5,7,3',4'-pentahydroxyflavone (quercetin).

LITERATURE CITED

1. P. A. Gnedkov, in: Chemical Investigations in Formation [in Russian], Kiev (1970), p. 149.
2. I. P. Kovalev and V. I. Litvinenko, KhPS [Chemistry of Natural Compounds], 233 (1965).

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