FLAVONOIDS OF *Doronicum macrophyllum* AND *D. oblongifolium*

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We have previously reported the isolation from the roots of *Doronicum macrophyllum* of three alkaloids [1]. On studying the epigeal part of *Doronicum macrophyllum* and *D. oblongifolium* by paper chromatography using qualitative reactions [2] we have detected seven substances of flavonoid nature. To isolate the flavonoids, the flowers and leaves of *Doronicum macrophyllum* collected in the full-flowering period were extracted with methanol. The extract was evaporated to small volume and the residue was dissolved in hot water. The aqueous solution was treated successively with benzene, diethyl ether, and ethyl acetate. By chromatography on polyamide with elution by mixtures of chloroform and methanol with a gradient increase in the concentration of the latter and with aqueous alcohols, five flavonoids were isolated. The compounds isolated (substances (I-V)) were identified on the basis of the results of chromatographic analysis, melting points, NMR and IR spectroscopy, UV spectroscopy with ionizing and complex-forming reagents [3, 4], and chemical reactions (alkaline degradation, acid and enzymatic hydrolysis), and by comparison with authentic samples. Substance (I), $C_{15}H_{10}O_5$, mp 344-345°C, and substance (II), $C_{15}H_{10}O_7$, mp 304-307°C, isolated from the ethereal extract, were identified as apigenin and quercetin, respectively. Substances (III), $C_{21}H_{20}O_{11} \cdot H_2O$, mp 176-178°C, and (IV), $C_{21}H_{20}O_{12} \cdot 1.5\ H_2O$, mp 234-236°C, were isolated from the ethyl acetate extract and characterized as kaempferol 3-O-β-D-glucopyranoside (astragalin) and quercetin 3-O-β-D-glucopyranoside (isoquercitrin) [5]. Substance (V), $C_{27}H_{30}O_{16} \cdot 2H_2O$, mp 188-190°C, was isolated from the aqueous residue and was identified as quercetin, 3-O-(6"-O-β-rhamnopyranosyl-β-D-glucopyranoside) or rutin [6].

We have also isolated quercetin and isoquercitrin from the epigeal part of *D. oblongifolium*.

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