

FLAVONOIDS OF *Achillea santolina*

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Continuing a study of plants of the genus *Achillea* L. (yarrow), fam. Asteraceae in the flora of Uzbekistan, we have investigated inflorescences of *Achillea santolina* L. (santolin yarrow) gathered in the mass flowering period in the village of Tavaksai, Tashkentskaya oblast.

When an alcoholic extract was chromatographed on paper we detected no less than seven substances of flavonoid nature, six of which were then isolated in the individual state.

The air-dry raw material was extracted three times with 95% ethanol. The extracts were combined and evaporated in vacuum. The residue so obtained was diluted with water and treated repeatedly with ethyl acetate. By column chromatography of the ethyl acetate extract on polyamide we isolated substances (1—6)

Substance (1) — $C_{18}H_{16}O_7$, mp 143—144°C; λ_{max} 275, 356 nm — 5,7-dihydroxy-3,3',4'-trimethoxyflavone.

Substance (2) — $C_{15}H_{10}O_6$, mp 330—331°C; λ_{max} 256, 350 nm — 3',4',5,7-tetrahydroxyflavone (luteolin).

Substance (3) — $C_{15}H_{10}O_7$, mp 310—312°C; λ_{max} 255, 374 nm — 3,3',4',5,7-pentahydroxyflavone (quercetin).

Substance (4) — $C_{21}H_{20}O_{10}$, mp 226—228°C; $[\alpha]_D^{20}$ -79° (c 0.1; methanol); λ_{max} 268, 335 nm — apigenin 7-O- β -D-glucopyranoside (cosmosiin).

Substance (5) — $C_{21}H_{20}O_{12}$, mp 232—235°C, $[\alpha]_D^{20}$ -59° (c 0.5; ethanol); λ_{max} 257, 362 nm — quercetin 3-O- β -D-galactopyranoside (hyperoside).

Substance (6) — $C_{21}H_{20}O_{11}$, mp 255—257°C, $[\alpha]_D^{20}$ -58° (c 0.53; methanol—pyridine (3:2)); λ_{max} 255, 355 nm — luteolin 7-O- β -D-glucopyranoside (cynaroside).

The structures of the substances isolated were confirmed by UV and IR spectroscopy and the results of acid and enzymatic hydrolysis, and also by direct comparison with authentic specimens. Substance (1) has been isolated previously from *Achillea santolina* L. growing in Egypt [1], but this is the first time that substances (2—6) have been isolated from this species.

REFERENCE

1. S. M. Khafagy, N. Nazmi Sabri, F. S. G. Soliman, A. H. Abou-Donia, and A. Mosandi, *Pharmazie*, **31**, No. 12, 894 (1976).