

CHRYSARTEMIN A AND CANIN FROM *Achillea nobilis*

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Continuing a study of the lactones of the epigeal part of *Achillea nobilis* L. [1, 2], gathered in the environs of Karaganda, Republic of Kazakhstan, we have chromatographed on a column of type KSK silica gel the total extractive substances obtained by aqueous extraction and on elution by hexane—ethyl acetate (5%), have isolated two crystalline substances.

Substance (1) formed colorless crystals with the composition $C_{15}H_{18}O_5$, mp 252—253°C. In its IR spectrum we observed absorption bands in the regions of 3440 (OH group), 1742 (carbonyl of a γ -lactone) and 1663 cm^{-1} (C=C).

In the PMR spectrum, singlets in the regions of 1.13 and 1.35 ppm (each 3H) were assigned to methyl groups at C-10 and C-4, a triplet at 4.28 ppm (1H, $J = 10\text{ Hz}$) to a lactone proton, a broadened singlet at 4.93 ppm to the proton of a hydroxy group, and doublets at 5.22 and 6.07 ppm (each 1H, $J_1 = 3\text{ Hz}$, $J_2 = 3.5\text{ Hz}$) to the protons of an exocyclic methylene group conjugated with the carbonyl of a γ -lactone.

Substance (2) formed crystals with the composition $C_{15}H_{18}O_5$, mp 241—243°C. Its IR spectrum contained absorption bands in the regions of 3515 (OH group), 1767 (CO of a γ -lactone), and 1667 cm^{-1} (C=C).

In the PMR spectrum there were singlet signals in the regions of 1.11 and 1.51 ppm (each 3H) — methyl protons of CH_3 -14 and CH_3 -15; a doublet at 2.69 ppm (1H, $J = 11\text{ Hz}$) — proton at C-5; two doublet at 3.19 and 3.40 ppm (each 1H, $J = 1\text{ Hz}$) — vicinal protons at epoxy groups; a multiplet at 3.89 ppm (1H) — a proton at C-7; a doublet of doublets at 4.34 ppm (1H, $J_1 = 11\text{ Hz}$, $J_2 = 9\text{ Hz}$) — a lactone proton; a broadened singlet at 4.91 ppm (1H) — the proton of a hydroxy group; and two doublets at 5.25 and 6.06 ppm (each 1H; $J = 3.5\text{ Hz}$) — the protons of an exomethylene group conjugated with the carbonyl of a γ -lactone.

On the basis of a comparison of physicochemical and spectral characteristics with the literature [3, 4], the compounds (1) and (2) that we had isolated were identified as the sesquiterpene lactones chrysartemin A (1) and canin (2).

This is the first time that chrysartemin A and canin have been isolated from *Achillea nobilis*.

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