SESQUITERPENE LACTONES OF Inula helenium

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From the roots of Inula helenium L. (elecampane inula), collected in the Buinaksk region of the Dagestan ASSR in August, 1971, we have isolated alantolactone, isoalantolactone, dihydroalantolactone, and dihydroisoalantolactone [1-6]. These substances were showed to be identical with known sesquiterpene lactones on the basis of features of their IR [1, 4], UV [4], and mass spectra and their melting points [1, 4].

The comminuted roots (2.9 kg) of elecampane inula were extracted with acetone four times, and the solvent was distilled off in vacuum to give 220 g of resin (7.6% of the air-dry weight of the roots). This resin was dissolved in chloroform and chromatographed on a column with inactive Al_2O_3. The substance was eluted with petroleum ether, 11 fractions of 200 ml each being collected.

Fractions 1-4 were combined and the solvent was distilled off. The residue consisted of an oil (2% of the weight of the roots) from which isoalantolactone crystallized [ethanol–water (1 : 1)], while the concentrated mother liquor yielded alantolactone.

Elimination of the solvent from fractions 5-11 gave dihydroisoalantolactone [ethanol–water (1 : 1)]. The residual mother liquor was evaporated, and dihydroalantolactone precipitated with mp 134-136°C [ethanol–water (1 : 1)], $[\alpha]_D^{20}$ +128.8° (c–1.429; ethanol), mol wt. 234 (mass spectrometry). IR spectrum, cm^{-1}: ν 1760 (C=O of a γ-lactone), 1670 and 1640 (C=C). UV spectrum: λ_{max} (in ethanol) 215 nm (ε 6120).

The IR spectra were taken on a UR-20 instrument, the UV spectra on a VNJCAMSP-700 spectrometer (in ethanol), and the mass spectra on a Varian MAT CH-6 instrument at 70 eV.

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