ARABSIN – A NEW LACTONE FROM Artemisia absinthium

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Continuing an investigation of the lactones of the epigeal part of Artemisia absinthium L. [1], we have isolated a new sesquiterpene lactone, arabsin, $C_{15}H_{22}O_4$, mp 188-189°C (from benzene), $[\alpha]_D^{23}+89°$ (c 2.71; ethanol), mol. wt. 266 (mass spectrometry).

On chromatography in a fixed layer of alumina in the ethyl acetate–hexane (7:3) system, arabsin has R_f 0.45; in the benzene–methanol (9:1) system R_f 0.42. The IR spectrum of the lactone has absorption bands at 3505 cm^{-1} (hydroxy group), 1750 cm^{-1} (carbonyl of a γ-lactone), and 1711 cm^{-1} (carbonyl group in a six-membered ring). The IR spectrum has no maxima characteristic for conjugated systems.

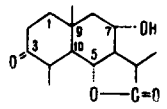
The presence of a lactone ring in the substance obtained is also confirmed by its solubility on heating in dilute alkalis with the recovery of the initial compound on acidification of the solutions.

The NMR spectrum has the following signals: singlet at 1.05 ppm (δ scale) due to an angular methyl group; doublets due to secondary methyl groups with centers at 1.07 ppm (J=3 Hz) and 1.12 ppm (J=2 Hz). A lactone proton is observed in the form of a triplet at 4.14 ppm (J=9 Hz), and there is a signal in the form of an unresolved multiplet with its center at 3.55 ppm which is due to the proton at C_7. This shows the location of the hydroxy group on the same carbon atom. Consequently, the arabsin molecule contains the fragment $-CH_2-CH(OH)-CH<$. A four-proton multiplet at 2.54 ppm corresponds to protons present in the α and β positions with respect to the carbonyl group.

The catalytic hydrogenation of arabsin in ethanol with platinum oxide gave dihydroarabsin, $C_{15}H_{24}O_4$, with mp 197-198°C. The IR spectrum of this compound lacks the absorption band of a carbonyl group.

The acetylation of arabsin with acetic anhydride in pyridine formed an acetyl derivative, $C_{17}H_{24}O_5$, mp 165-166°C.

The results presented have permitted arabsin to be assigned to the lactones of the eudesmane series and the following probable structural formula to be proposed for it:



LITERATURE CITED

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