

From the results of PMR spectroscopy, the aglycone was shown to be identical with the previously known chrysoeriol. The proton at C-1" (glycosidic center) gives a signal in the form of an unsymmetrical doublet at 4.90 ppm ($J = 7$ Hz), which is characteristic of flavone β -D-glycopyranosides [3]. A singlet in the 3.92-ppm region (3 H) for (III) and (IV) shows the presence of a methoxy group at C-3'. In the acetate of (IV) two acetyl groups were detected—at C-5 (2.42 ppm) and at C-7 (2.33 ppm)—in the aglycone moiety and four in the carbohydrate moiety: a nine-proton singlet at 2.08 ppm for acetyl groups at C-2", -3", and -4" and a three-proton singlet at 2.04 ppm for an acetyl group at C-6". Thus, (IV) has been characterized as chrysoeriol 4'-O- β -D-glucopyranoside. Both flavonoid 4'-glycosides appear on chromatograms in filtered UV light in the form of dark spots the color of which changes little with zirconyl chloride and ammonia vapor, which corresponds to B-unsubstituted flavones [4]. This is the first time that substances (II), and (III), and (IV) have been isolated from plants of the family Caryophyllaceae [5], and (IV) is a new glycoside.

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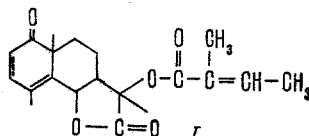
THE STRUCTURE OF SEMOPODIN AND A HYDROXYLACTONE FROM *Ferula oopoda*

S. V. Serkerov

UDC 547.913.5+547.473.2

We have previously reported the new sesquiterpene lactones semopodin [1] and a hydroxylactone [2] isolated from *Ferula oopoda* Boiss.

Semopodin contains a γ -lactone ring (1785 cm^{-1}), an α, β -unsaturated ester group (1710 cm^{-1}), a conjugated ketone group (1660 cm^{-1} , 232 nm , $\log \epsilon 4.3$), and double bonds ($1640, 1610\text{ cm}^{-1}$). The spin-spin coupling constant of the olefinic protons of the secondary-secondary double bond conjugated with the ketone group (doublets with centers at 6.30 and 6.81 ppm) is 10 Hz. This value is characteristic for six-membered rings and shows that semopodin belongs to the group of sesquiterpene lactones of the eudesmane (selinane) series [3].

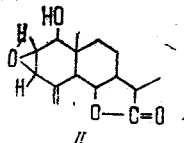


The choice between the possible variants of the structure of the main skeleton was made by comparing the value of the chemical shift of the angular methyl group of semopodin (1.30 ppm) with those for taurin (1.33 ppm) [4], artemin (0.89 ppm) [5], erevanin (0.80 ppm) [6], tauremisin (1.20 ppm) [7], artesisin (1.02 ppm) [8], and others. The frequency of the lactone carbonyl (1785 cm^{-1}) in the IR spectrum of semopodin is somewhat high, which shows that it is connected with a vinyl ester group [9, 10]. On the basis of what has been said, we consider structure (I) to be likely for semopodin.

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Previously [2], by comparing the NMR spectra of the hydroxylactone (II) and saponified badkhyzinin it was observed that (II) probably has the structure of the 11,13-dihydro derivative of saponified badkhyzin. In actual fact, saponification of the sesquiterpene lactone badkhyzidin [11] (11,13-dihydrobadkhyzinin) led to the hydroxylactone, which was identified by a comparison of its properties, melting point, and IR and NMR spectra. Consequently, the hydroxylactone has the structure (II):



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LACTONES OF *Ferula badghysi*

S. V. Serkerov

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By chromatographic separation on a column of alumina of the resin from the roots of *Ferula badghysi* Korov. collected in the Turkmen SSR we have obtained four substances, provisionally denoted by the symbols (I-IV).

Substance (I), $C_{20}H_{24}O_5$, mp 139-140°C (needles from ethanol). The IR spectrum shows the presence of a γ -lactone ring (1770 cm^{-1}), and α, β -unsaturated ester group (1703 cm^{-1}), a conjugated ketone group (1670 cm^{-1}), and double bonds ($1640, 1610\text{ cm}^{-1}$). The presence of a conjugated group is also shown by the UV spectrum: $\lambda_{\text{max}} 252\text{ nm}$ ($\log \epsilon 4.12$).

The NMR spectrum (here and below δ scale, ppm, spectrometer Varian HA-100D) showed the following signals: d 1.38 ($J = 7\text{ Hz}$, 3H, CH_3); d, 1.95 ($J = 1.5\text{ Hz}$, 3H, $\text{CH}_3-\text{C}=\text{O}$); d/d, 2.25 ($J_1 = 7, J_2 = 1.5\text{ Hz}$, 3H, $\text{CH}_3-\text{CH}=\text{O}$); s, 2.30 (6H, $\text{CH}_3-\text{C}=\text{O}$); d, 3.7 ($J = 10\text{ Hz}$, 1H, $-\text{CH}-$); q, 4.55 ($J_1 = 10, J_2 = 7.5\text{ Hz}$, 1H, lactone proton); m, 5.55 ($J_1 = 10, J_2 = 10, J_3 = 4\text{ Hz}$, hemi-ester proton); 6.18 (2H, $-\text{CH}=\text{O}$ of an ester group).

Substance (II), $C_{20}H_{24}O_5$, mp 98-99°C (from aqueous ethanol). ν_{max} (cm^{-1}): 1765 (CO of a γ -lactone), 1708 (CO of an α, β -unsaturated ester), 1668, and 1640 (double bonds); $\lambda_{\text{max}} 216\text{ nm}$ ($\log \epsilon 3.75$).

Saponification gave tiglic acid and a hydroxylactone $C_{15}H_{18}O_{14}$ mp 185-186°C. Its NMR spectrum had the following signals: s, 0.40 (3H, $\text{CH}_3-\text{C}-$); t, 1.80 (3H, $\text{CH}_3-\text{C}=\text{O}$); d/t, 1.92 ($J = 7\text{ Hz}$, 3H, $\text{CH}_3-\text{CH}=\text{O}$); d, 3.25

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