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19-OXODELTALINE, A NORDITERPENE ALKALOID FROM THE AERIAL PART OF *Delphinium uralense*

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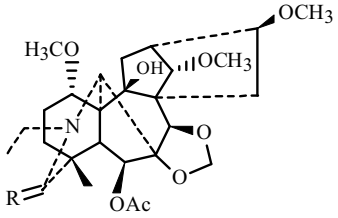
In continuation of research on the alkaloid composition of the aerial part of *Delphinium uralense* Nevski collected during budding in the southern Urals (Zilair Plateau), we isolated from the weakly basic alkaloid fraction (pH 6) [1–3] the norditerpene alkaloid 19-oxodeltaline (**1**), which was previously known as a conversion product of deltaline [4].



1, 2

1: R = O; **2:** R = H_2

The IR spectrum of **1** indicated hydroxyl (3300–3500 cm^{-1}), ester (1736), and amide (1622) groups were present. High-resolution mass spectrometry found that **1** had the formula $C_{27}H_{39}NO_9$, $[M]^+$ 521.263. The mass spectrum of **1** had series of peaks characteristic for lycoctonine compounds in addition to a medium-intensity peak for $[M - 59]^+$. PMR spectra of **1** were consistent with three methoxyls (δ 3.21, 3.32, 3.42 ppm), methyl of N-ethyl (1.11), and methylenedioxy (4.90, 4.92).

A 1H singlet at δ 5.38 ppm in addition to a 3H singlet at 2.04 in the PMR spectrum of **1** indicated that C-6 contained a β-OAc group [5]. A weak-field shift of the characteristic triplet for H-14β (4.13, J = 4.8 Hz) suggested that C-14 had an α-methoxyl; C-10, a β-OH group [6].

The appearance in the ^{13}C NMR spectrum of the resonance for C-19 at δ 172.8 ppm and a strong-field shift of the N–CH_2 resonance to 42.9 confirmed that C-19 had an oxo group. A 3H singlet in the PMR spectrum at 1.20 and a resonance at 21.5 in the ^{13}C NMR spectrum were consistent with a methyl group on C-4 in **1**.

The PMR, ^{13}C NMR, IR, and mass spectra for 19-oxodeltaline (**1**), which was isolated for the first time from a plant, were identical to those for synthetic 19-oxodeltaline [4], which was prepared by us from deltaline (**2**) by $KMnO_4$ oxidation in aqueous acetone.

IR spectra were recorded in mineral oil on a Specord M-82 spectrometer. Mass spectra (EI, 70 eV) were obtained in a Thermo Finnigan MAT 95 XP mass spectrometer by matching peaks. PMR and ^{13}C NMR spectra were recorded in $CDCl_3$ on a Bruker AMX III-300 instrument (300.13 MHz) with Me_4Si internal standard.

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