The results obtained permit two possible structures, IV and V, to be suggested for spireine.

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THE CONFIGURATION OF SOPHORIDINE

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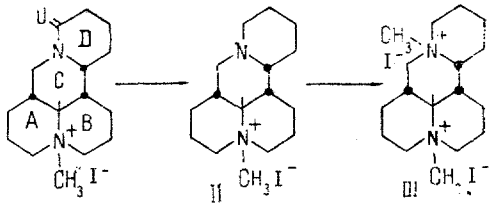
It has been shown previously [1] that in the lactam-containing alkaloid sophoridine [2, 3] the C/D rings are syn-cis-linked. To confirm this, the methiodide of sophoridine (I) was reduced with $LiAlH_4$. A product was obtained the methiodide of which was identical with the dimethiodide of sophoridane (III). Consequently, reduction given sophoridane monomethiodide (II) in which the free pair of the nitrogen atom of the trans-quinolizidine (A/B) system is blocked.



The IR spectra of I exhibits the band of a lactam carbonyl (1640 cm^{-1}) and lacks the band of a trans-quinolizidine system (2800–2700 cm^{-1}). The spectrum of II lacks the bands of both a lactam carbonyl and a trans-quinolizidine system, which indicates the cis-linkage of rings C/D in sophoridine.

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THE STRUCTURE OF BUCHARIDINE

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In the chromatographic separation of the combined alkaloids of Haplophyllum bucharicum Litv. we obtained a phenolic base with mp 251–252° C having the composition $C_{19}H_{25}O_4N$, mol. wt. 331 (mass spectrometry), and we have called it bucharidine.

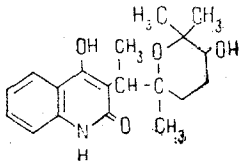
The base does not contain methoxyl, methylenedioxy, or N-methyl groups, is not hydrogenated over a platinum catalyst, and gives acetone on being oxidized by the Kuhn-Roth method. The IR spectrum of bucharidine has absorption bands at 3470 cm^{-1} (OH) and 1645 cm^{-1} (NCHO).

The IR spectrum of the base (λ_{max} 228, 274, 282, 314, 328 mμ; log ε 4.43, 3.79, 3.76, 3.77, and 3.66, respectively) almost coincides with that of 2,4-dihydroxyquinoline. The NMR spectrum confirms that the skeleton of bucharidine is a 2,4-dihydroxyquinoline structure. In the region of aromatic protons the spectrum contains a one-proton quartet at τ 2.12 and a three-proton multiplet at τ 2.78. The descreening of the $H_{(5)}$ proton relative to the multiplet of the other aromatic protons by 66 Hz [1], and also the solubility of the alkaloid in alkali, shows that the base has a 4-hydroxyquinol-2-one skeleton. The absence of a signal from the proton on the carbon atom in position 3 which, as is well known appears in the form of a singlet [2], shows that the residue of the molecule, $C_{10}H_{19}O_2$, is attached to the $C_{(3)}$ atom of the 4-hydroxyquinol-2-one nucleus.

The other signals in the NMR spectrum of bucharidine may be ascribed to the protons of the following groups: a two-proton unresolved multiplet with a center at τ 6.10 (−CH−CH_3 and −CH−OH), a four-proton multiplet at τ 8.08 (−O−C−CH_2−CH_2−C−O−), a six-proton singlet at τ 8.84, and three-proton doublet at τ 8.77, and a three-proton singlet at τ 8.70 (four methyl groups).

Under electron bombardment, the molecule of the bucharidine decomposes forming ions with m/e 272, 242, 214, 183, and 143, the last two ions being the most intense in the spectrum.

Taking into account what has been said above and also the fact that the NMR spectrum of bucharidine lacks the signals of olefinic protons, the following formula may be proposed for the base:



Bucharidine represents a new type of 4-hydroxyquinol-2-one alkaloids with a substituent in position 3 having a modified chain consisting of two isoprene units.

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DESOXYPEGANINE—A NEW ALKALOID FROM PEGANUM HARMALA

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We have studied the alkaloids of the plant Peganum harmala L., collected in the Sir'dar'ya region in June 1965 in the flowering and incipient fruit-bearing stage. Extraction with chloroform gave the total bases (1.3% on the weight of the raw material). By separation of the bases and their salts with respect to solubilities the following known alkaloids were obtained: l-peganine, dl-peganine, vasicine, desoxyvasicine, and harmine [1], and a base with mp 86–87° C, which gave well-crystalline salts: picrate, 203–204° C, hydrochloride 250° C, perchlorate 244–245° C, and nitrate 137–138° C (decomp.); mol. wt. 172 (mass spectrometry). The properties of the base are similar to those of the desoxypeganine obtained previously by the reduction of the chlorodesoxypeganine [2]. Subsequently, desoxypeganine was synthesized [3]. We obtained desoxypeganine from peganine by the method of Adams et al. [2]. The bases isolated from the plant and obtained from peganine were identical (chromatography in a thin layer of alumina, mixed melting point, IR spectra).

Consequently, the base that we have isolated is desoxypeganine, obtained from a plant for the first time.