ALKALOIDS OF Veratrum lobelianum. III

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From the combined alkaloids obtained by treating the roots with rhizomes of Veratrum lobelianum Bernh. [1], by column chromatography with cellulose [2], we have isolated three alkaloids with the following R_f values: (I) – 0.45, (II) – 0.20, and (III) – 0.75 (chloroform saturated with formamide).

Alkaloid (I). $C_{39}H_{61}O_{13}N$, mp 191-192°C (from benzene), $[\alpha]_D^{22}$ –15° (c 0.5; pyridine). IR spectrum (KBr): 1740 cm^{-1} (ester carbonyl), 1460, 1380 cm^{-1} (second band stronger than the first, which shows the presence of an acetyl group in the substance) [3], and 1250 cm^{-1} (ester band). The UV spectrum of a sulfuric acid solution of the alkaloid (sp.gr. of the sulfuric acid 1.830; c 0.4 mg in 10 ml) taken 24 h after dissolution had λ_{max} 250, 290, 370, and 540 nm and a region of coincidence at 360 nm with the spectrum taken after 1.5 h, which shows the presence in the substance of the amino alcohol protoverine [4]. This was confirmed by a chromatographic comparison [butan-1-ol–CH_3COOH–H_2O (4:1:5)] of the products of the hydrolysis of the substance isolated (125 mg of the alkaloid, 4.1 ml of 85% methanol, 43.5 mg of K_2CO_3, 20-24°C, 24 h) [5] and of protoveratrine A (IV).

Treatment with ether of the acidified hydrolyzate yielded organic acids identified by their R_f values [butan-1-ol–1.5 N ammonia (1:1)] with the acids obtained in the hydrolysis of the protoveratrine A: acetic, (–)-α-methylbutyric, and (+)-α-hydroxy-α-methylbutyric.

It is known that in the methanolysis of protoveratrine A the acyl groups in positions C_7 and C_6 are split off, forming a mixture of three alkaloids: (IV), desacetylprotoveratrine A (V), and a diester (VI) with acyls at C_3 and C_{15}. When the alkaloid (I) was compared by paper chromatography [chloroform; chloroform–benzene (8:2), each saturated with formamide] with the products of the methanolysis of (IV) it was found that it was identical with (V) (R_f 0.45 and 0.17, respectively). On methanolysis, compound (I) was converted into (VI) (R_f 0.11).

By comparing the results of the analysis with those given in the literature, it was possible to deduce that the alkaloid (I) is desacetylprotoveratrine A. This is the first time that it has been isolated from Veratrum lobelianum Bernh.

Alkaloid (II). $C_{27}H_{43}O_2N$, mp 239-241°C (from ethanol), $[\alpha]_D^{22}$ –18° (c 0.65; ethanol). It dissolved in conc. sulfuric acid giving a yellow coloration rapidly changing to orange and then to red and red-brown. The UV spectrum of this solution taken 24 h after its preparation had λ_{max} 250, 323, 444, 504 nm. The melting point of the hydrobromide of the alkaloid was 266-269°C.

The results obtained agree with those given in the literature for rubijervine [7].

Alkaloid (III). $C_{27}H_{43}O_2N$, mp 237-238°C $[\alpha]_D^{20}$ +7° (c 0.713; ethanol). It dissolved in conc. sulfuric acid giving a yellow coloration rapidly changing to red-brown. The UV spectrum of this solution taken 24 h after the dissolution of the substance had λ_{max} 247, 323, 409, 504 nm. The melting point of the hydrobromide was 273-275°C.

The results of the analysis of the substance agree with those given in the literature for isorubijervine [7].

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