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ALKALOIDS OF *Aconitum nasutum*

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Aconitum nasutum Fisch. et Reichend grows in all regions of the Caucasus [1], forms thickets over wide areas, and is known as a decorative plant exhibiting an insecticidal, fungistatic, and repellent action [2].

We have previously given the results of an investigation of the hypogeal and epigeal organs of the plant; they contain aconisine [3], and the amount of alkaloids ranges from 0.06 to 2.6%, depending on the plant organ and the vegetation period [2]. There is also information on the isolation from the epigeal part of this plant growing in Georgia of six lycoctonine alkaloids: talatisamine, isotalatisidine, karakoline, aconosine, cammaconine, and columbianine (aconorine) [4].

We have investigated the roots of *Aconitum nasutum* from two growth sites: the gorge of the R. Daut (Karachaev-Cherkess Autonomous Republic of Russia) and the Lagonaki area (Maikop region). The alkaloid contents of the roots were 0.87 and 1.2%, respectively, on the weight of the dry raw material. In both cases, two alkaloids, with the compositions $C_{24}H_{37}NO_5$ (I) and $C_{22}H_{35}NO_4$ (II) were isolated from the mixtures of bases by chromatography on alumina.

Base (I) was amorphous. Its IR spectrum contained absorption bands at 3250 and 1740 cm^{-1} (hydroxy and ester groups). The PMR spectrum showed signals at (ppm) 1.00 (3H, t, J = 7.5 Hz, $NCH_2\underline{CH_3}$), 1.97 (3H, s, $OCOCH_3$), 3.14 and 3.20 (s, 3H each, 2 × OCH_3), 4.73 (1H, t, J = 4.5 Hz, H-14β). The mass spectrum had the peaks of ions with m/z (%) 419 (M^+, 4), 404 (3), 401 (2), 389 (25), 388 (100), 372 (8). When (I) was saponified, an amino alcohol with mp 144—145°C (from hexane–ether) was obtained which was identical with base (II). The spectral characteristics of base (II) and its melting point agreed with those published for aconosine [3]. A comparison of the IR spectrum of (II) with that of aconosine, isolated from *Aconitum arcuatum* [5], demonstrated their identity. The chemical shift of the signal of the β-proton at C-14 in the PMR spectrum of base (I) showed that it was 14-acetylaconosine. This alkaloid, which was called dolaconine, has been obtained previously from the plant *Aconitum stapfianum* [6].

From the epigeal part of this plant gathered in the gorge of the R. Daut before the beginning of flowering we obtained 0.21% of a mixture of bases from which, by treatment with hot hexane, 3.4 g of aconosine was isolated. Chromatography of the residual mother liquor on alumina gave a base (III) with mp 201—202°C (acetone), composition $C_{34}H_{47}NO_{11}$, M^+ 645, acetylaconosine, and aconosine. Analysis of the PMR and mass spectra of (III) showed that they corresponded to those published for aconitine [7, 8]. A direct copmparison of (III) with a sample of aconitine (mixed melting point, TLC, PMR spectra) showed their identity.

This is the first time that aconitine and acetylaconosine have been isolated from the plant *Aconitum nasutum*.

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