

E. N. Zhukovich, V. S. Kikoladze,  
N. Z. Tskitishvili, V. G. Tsitsishvili,  
and V. Yu. Vachnadze

UDC 547.944.945

In addition to alkaloids isolated previously - reserpinine, vincamajine, akuammine, vincamajoreine, vincamine, majdine, isomajdine, quebrachidine (vincarine), and vincaminine (17-epivincamajine), we have isolated another five bases from the herb *Vinca major* L. introduced into Georgia.

The total nonphenolic alkaloids were separated according to basicities by citrate-phosphate buffers [1]. The buffer fractions obtained were subjected to column chromatography in alumina (neutral, activity grade II, 1:30).

From the buffer fraction with pH 4, ethyl ether eluted 10-methoxyvellosine with mp 207-210°C (ethyl ether) [2].

From the fraction obtained on the buffer with pH 2.2, chloroform-methanol (98:2) with subsequent preparative separation by TLC [LC 5/40 silica gel, chloroform-methanol (6:1) system] yielded cathafoline [3].

Three bases were isolated from the total phenolic alkaloids. The mother solution after the separation of akuammine [1] was chromatographed on alumina. Elution with ether-chloroform (1:1) gave an amorphous base. A comparison of the physicochemical constants and spectral characteristics (UV, IR, PMR,  $^{13}\text{C}$  NMR, and mass spectroscopy) of the base with literature information enabled us to identify it as lanceomigine, obtained previously from *Alstonia lanceolata* [4].

When the column was eluted with chloroform a crystalline base was isolated with mp 280°C and  $R_f$  0.3 in the chloroform-methanol (6:1) system (LS 5/40 silica gel). The IR spectrum ( $\nu_{\text{paraffin oil}}$ ,  $\text{cm}^{-1}$ ) had strong absorption bands at 1740, 1260 ( $-\text{COOCH}_3$ ); 785, 745, 710. The mass spectrum ( $M^+$  764) permitted the assumption of the presence of a dimeric base. The investigation of the structure of this alkaloid is proceeding.

A base with mp 178-180°C (ethanol) was obtained when the column was eluted with chloroform-methanol (98:2). Its UV spectrum was characteristic for indoline derivatives ( $\lambda_{\text{max}}^{\text{EtOH}}$ , nm) 243, 312 ( $\log \epsilon$  2.91, 3.21). The IR spectrum ( $\nu_{\text{max}}^{\text{paraffin oil}}$ ,  $\text{cm}^{-1}$ ) contained absorption bands at 3200-3400 ( $-\text{OH}$ ); 1735 ( $\text{COOCH}_3$ ); and 725, 750, and 820 (trisubstituted benzene ring).

The mass spectrum contained intense peaks of ions with  $m/z$  (%): 398 ( $M^+$ , 30); 383 ( $M^+ - 15$ , 32); 382 ( $M^+ - 16$ , 100); 381 ( $M^+ - 17$ , 45), and also 352 (50); 337 (30); 174 (60); 121 (70). The closeness of some of the characteristics (IR, UV) of the base to those of akuammine and the presence in the mass spectrum of the diagnostic peak  $M^+ - 16$  [5], which was absent from the mass spectrum of akuammine while the other main fragments of the breakdown of the molecule were identical permitted the assumption that the base that had been isolated was akuammine N-oxide. For proof we performed a comparative analysis of the  $^{13}\text{C}$  NMR spectra of the substance and confirmed this hypothesis by the reduction of the N-oxide to the initial alkaloids.

Thus, an additional five bases have been isolated from *Vinca major* L, four having been obtained from this species for the first time: cathafoline, lanceomigine, the new alkaloid akuammine N-oxide, and also a base provisionally assigned to the dimeric alkaloids.

## LITERATURE CITED

1. E. N. Zhukovich and V. Yu. Vachnadze, *Khim. Prir. Soedin.*, No. 4, 533 (1984).

---

I. G. Kutateladze Institute of Pharmacochimistry, Georgian SSR Academy of Sciences, Tbilisi. Translated from *Khimiya Prirodnykh Soedinenii*, No. 3, pp. 434-435, May-June, 1989. Original article submitted October 3, 1988.

2. M. Plat, R. May, J. Le Men, M. M. Janot, C. Djerassi, and H. Budzikiewicz, *Bull. Soc. Chim. France*, No. 9, 2497 (1965).
3. P. Rasonaivo, L. Langlois, and P. Potier, *Tetrahedron Lett.*, No. 16, 1425 (1973).
4. V. Vercauteren, G. Massiot, T. Sevenet, B. Richard, V. Lobjois, L. Le Men-Oliver, and J. Levy, *Phytochemistry*, 20, No. 6, 1411 (1981).
5. D. Phillipson and S. S. Hahda, *Lloydia*, 41, No. 5, 385 (1978).

## ALKALOIDS OF *Aconitum orientale*

L. V. Beshitaishvili and M. N. Sultankhodzhaev

UDC 547.944/945

The perennial herbaceous plant *Aconitum orientale* Mill., family Ranunculaceae, is widely distributed in the mountain regions of Georgia [1]. The alkaloids lappaconitine, avadharidine, and avadharine have previously been isolated from its roots. The last-mentioned alkaloid was characterized by its physical constants and empirical formula [2].

We have investigated the epigeal part of this plant collected in the environs of Bakuriani (GSSR) in the flowering period. Ordinary chloroform extraction yielded 0.53% of total alkaloids on the weight of the air-dry raw material. The total alkaloids were separated into ether and chloroform fractions. The ether fraction was chromatographed on a column of alumina (1:70). On elution with benzene and with benzene-methanol, six bases (I-VI) were isolated: (I) -  $C_{32}H_{44}N_2O_8$ , mp 215-218°C; (II) -  $C_{30}H_{42}N_2O_7$ , mp 212-214°C; (III) -  $C_{32}H_{44}N_2O_9$ , mp 131-133°C; (IV)  $C_{24}H_{39}NO_7$ , mp 167-169°C; (V)  $C_{23}H_{37}NO_5$ , mp 135-137°C; (VI)  $C_{25}H_{41}NO_7$ , mp 128-130°C.

Alkaloids (I)-(VI) were identified on the basis of their spectral characteristics and comparison with authentic samples as lappaconitine, N-deacetylappaconitine [3], gigactonine [4], cammaconine [5], and lycoctonine.

From the results of a comparison physicochemical constants and spectral characteristics with those given in the literature, alkaloid (III) was identified as ranaconitine [6].

### LITERATURE CITED

1. L. M. Kemulariya-Natadze, *Ranunculaceae in the Caucasus and Their Taxonomy* [in Russian], Tbilisi (1966), p. 118.
2. A. D. Kuzovkov and T. F. Platonova, *Zh. Org. Khim.*, 29, 2782 (1959).
3. S. W. Pelletier, *Alkaloids, Chemical and Biological Perspectives*, New York (1984), Vol. 2, p. 406.
4. Shin Ichiro Sakay, Nobio Shimma, and Toshihiko Okamoto, *Heterocycles*, No. 8, Spec. Issue, 207 (1977).
5. S. W. Pelletier, N. V. Mody, and N. M. Mollov, *Heterocycles*, 14, 1751 (1980).
6. S. W. Pelletier, N. V. Mody, A. P. Venkob, and N. M. Mollov, *Tetrahedron Lett.*, No. 50, 5045 (1978).

---

I. G. Kutateladze Institute of Pharmacochimistry, Georgian SSR Academy of Sciences, Tbilisi. Institute of the Chemistry of Plant Substances, Uzbek SSR Academy of Sciences, Tashkent. Translated from *Khimiya Prirodnikh Soedinenii*, No. 3, pp. 435-436, May-June, 1989. Original article submitted October 4, 1988.