

ALKALOIDS OF *Aconitum orientale*

E. G. Mil'grom,^a V. N. Plugar',^a U. A. Abdullaev,^a
N. Kirimer,^b K. Kh. S. Basher,^b and B. T. Salimov^a

UDC 543.51+547.944/945

The results of the use of mass spectrometry for the qualitative and quantitative analysis of mixtures of bases obtained from the epigeal part of *Aconitum leucostomum* [1] and the roots of *Aconitum septentrionale* [2] have been reported previously.

In the present paper we give the results of the mass-spectrometric analysis of the total alkaloids of the roots and epigeal part of *Aconitum orientale* Mill., gathered on August 17, 1993, in the environs of Khamsikui (Turkey, North-Eastern Anatolia) at a height of 1300-1500 m above sea level. The usual chloroform extraction of 0.5 kg of comminuted air-dry epigeal part of the plant yielded 0.28% of total alkaloids, while aqueous alcoholic extraction of 0.27 kg of the roots gave 4.55%. With the aid of secondary-ion mass spectrometry (LSMIS) and also by using various mass-spectral methods in the EI regime — multipeak monitoring [2], measurement of the elementary compositions of key ions, calculation of the mass numbers of parental ions from metastable defocusing spectra — we have made qualitative analyses of both lots of alkaloids (instruments: MKh 1310, St. Petersburg, and MS 25 RF, United Kingdom).

The results obtained showed that the total alkaloids from the epigeal part of the plant included lappaconitine [3], lappaconine, lycoctonine [4], 10-hydroxylappaconine [2], anthranoyllycoctonine [5], lycaconitine [6], methyllycaconitine [7], delphatine [8, 9], talatisine [10], bases with M^+ 345, M^+ 357 ($C_{22}H_{31}NO_3$), M^+ 387 ($C_{22}H_{29}NO_5$), M^+ 483 ($C_{25}H_{41}NO_8$), M^+ 600 ($C_{32}H_{44}N_2O_9$), M^+ 686 ($C_{36}H_{50}N_2O_{11}$), and a neutral compound with M^+ 220 ($C_{15}H_{24}O$).

The total alkaloids from the roots of the plant differed from those given above by the absence of delphatine and of the compounds with M^+ 387, M^+ 483, M^+ 600, and M^+ 220, and by the presence of N-deacetylappaconitine [11] and delcosine (iliensine) [12].

We isolated lycoctonine from the total alkaloids both of the epigeal part of the plant and of the roots, with yields of 0.014% and 2.1% of the weight of the air-dry material under investigation, respectively.

It must be mentioned that this is the first time that the alkaloids anthranoyllycoctonine, lycaconitine, methyllycaconitine, 10-hydroxylappaconine, talatisine, and delphatine have been detected in the plant *Aconitum orientale*.

REFERENCES

1. V. N. Plugar', Ya. V. Rashkes, M. G. Zhamierashvili, V. N. Tel'nov, and M. S. Yunusov, Khim. Prir. Soedin., 80 (1982).
2. E. G. Sirotenko, Ya. V. Rashkes, and S. K. Usmanova, Khim. Prir. Soedin., 532 (1989).
3. A. D. Kuzovkov and P. S. Massagetov, Zh. Obshch. Khim., 55, 178 (1955).
4. A. N. Manukov, Z. M. Vaisov, O. N. Denisenko, and V. A. Chelombit'ko, Khim. Prir. Soedin., 864 (1991).
5. S. W. Pelletier, Alkaloids: Chemical and Biological Perspectives, 2, 280 (1984).
6. V. A. Tel'nov, N. M. Golubev, and M. S. Yunusov, Khim. Prir. Soedin., 675 (1976).
7. A. S. Narzullaev, M. S. Yunusov, and S. Yu. Yunusov, Khim. Prir. Soedin., 498 (1972).

a) Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, fax (3712) 89 14 75; b) Anatolian University, Center for the Study of Medicinal Plants (TBAM), 26470 Eskisehir, Turkey, fax (90—222) 33 50 127. Translated from Khimiya Prirodnikh Soedinenii, No. 6, pp. 828-829, November-December, 1994. Original article submitted May 16, 1994.

8. M. S. Yunusov and S. Yu. Yunusov, *Khim. Prir. Soedin.*, 334 (1970).
9. S. W. Pelletier, N. V. Mody, K. L. Varughese, J. A. Maddry, and H. K. Desai, *J. Am. Chem. Soc.*, **103**, 6536 (1981).
10. Z. Karimov and M. G. Zhamierashvili, *Khim. Prir. Soedin.*, 335 (1981).
11. L. V. Beshitaishvili and M. N. Sultankhodzhaev, *Khim. Prir. Soedin.*, 435 (1989).
12. S. Yu. Yunusov, *Alkaloids [in Russian]*, Tashkent (1981), p. 96.