

The amount of lappaconitine in the epigeal part of the new material collected in 1985 was determined by the method developed. The results of a statistical treatment showed that the relative error of the method is about $\pm 7\%$:

f	$\bar{X}, \%$	S^2	S	P	$t_{0.05}$	ΔX	$E, \%$	$E_f, \%$
5	0,202	$33 \cdot 10^{-6}$	$6 \cdot 10^{-3}$	95	2,57	$\pm 0,018$	$\pm 6,21$	$\pm 2,53$

LITERATURE CITED

1. F. N. Dzhakhangirov, in: Abstracts of Lectures at an All-Union Conference on the Creation, Investigation, and Complex Application of Drugs Used for the Treatment of Cardiovascular Diseases [in Russian], Tbilisi (1983), p. 72.
2. U.S. Patent H 656,178, Pharmaceutical Composition Possessing Antiarrhythmic Effect, patented April 7, 1987.
3. FRG Patent 661,208, Arzneimittelpräparat mit antiarrhythmischer Wirkung; patent specification published July 15, 1987.
4. N. A. Aneli, B. Z. Makharashvili, and R. M. Mikeladze, Biologically Active Substances of the Georgian Flora [in Russian], Metsniereba, Tbilisi (1967), p. 309.

DYNAMICS OF THE ALKALOID CONTENT OF *Lilium martagon*

F. Fatkhiev, K. Samikov, and R. Shakirov

UDC 547.994/995

The present communication gives the results of investigations of the dynamics of the accumulation of the total alkaloids in *Lilium martagon* growing in the high-mountain part of the South Urals (Malyi Yaman-Tau range), where there are large thickets of this plant [1-3].

Samples of *L. martagon* were extracted with ethanol, and the alkaloids were isolated with chloroform by a known procedure [4].

The results obtained (Table 1) showed that the greatest accumulations of alkaloids are confined to the early vegetation period, and in the withering period these indices decreased more than twofold. We may note that in our case the total amount of the alkaloids in the flowering period was less than in plants from Buryatia [4].

When chloroform extract was concentrated, a mixture of crystals deposited in the separation of which on a column of silica gel the first 40 ml of chloroform-methanol (10:0.5) eluates yielded a base with mp 118-119°C (acetone), identical in R_f and melting point of a mixture with an authentic sample of liliidine [4, 5]. On the separation of the mother solution from the crystals on a column of alumina a chloroform-methanol (10:0.5) eluate yield an additional amount of liliidine.

TABLE 1

Developmental period	Time of collection (1989)	Amount of total alkaloids, %	
		in the epigeal part	in the bulbs
Beginning of the vegetation period	20 April	—	0,358
	30 April	0,160	0,346
Appearance of shoots (1-2 cm long)	18 May	0,121	0,217
Growth of the stem to 20m	30 June	0,117	0,207
Flowering	20 August	0,082	0,159
Ripening of the seeds	1 September	0,063	0,150
Beginning of weathering			

Institute of Chemistry of Plant Substances, Academy of Sciences of Uzbek SSR, Tashkent. South-Urals Reserve, Ufa. Translated from *Khimiya Prirodnikh Soedinenii*, No. 4, p. 559, July-August, 1990. Original article submitted October 31, 1989.

Thus, the dynamics of the accumulation of alkaloids in the epigeal part and bulbs of L. martagon from a new growth site has been established, the main alkaloid being liliidine.

LITERATURE CITED

1. Flora of the USSR [in Russian], Moscow-Leningrad, Vol. IV (1935), p. 288.
2. Guide to the Plants of the Bashkir ASSR [in Russian], Nauka, Moscow (1966), p. 495.
3. M. I. Neishtadt, Guide to the Plants of the Central Zone of the European Part of the USSR [in Russian], Uchpedgiz (1963), p. 640.
4. N. D. Abdullaev, K. Samikov, T. P. Antsupova, M. R. Yagudaev, and S. Yu. Yunusov, Khim. Prir. Soedin., 692 (1987).
5. M. Haladova, A. Bučkova, E. Eisenreichova, D. Unrin, and I. Tomko, Chem. Paper, 41 (C), 835 (1987).

ALKALOIDS OF THREE SPECIES OF Aconitum GROWING IN MONGOLIA

N. Batbayar, D. Batsurén, and M. N. Sultankhodzhaev

UDC 547.944/945

We have investigated the alkaloids of three previously unstudied species of Aconitum growing in Mongolia.

The epigeal part of Aconitum baikalense Turcz. gathered in the Ara Khangai aimak (province) in the fruit-bearing period yielded by ordinary chloroform extraction 0.3% of alkaloids on the weight of the dry plant.

Three bases were isolated by separating the total alkaloids on a column of silica gel with elution by benzene-methanol: (I) with the composition $C_{34}H_{47}NO_{11}$, mp 200-202°C; (II) with the composition $C_{22}H_{31}NO_3$, mp 197-199°C; and (III) with the composition $C_{22}H_{33}NO_3$, mp 164-166°C. From their spectral characteristics, the results of a comparison by TLC, and mixed melting points, bases (I-III) were identified as aconitine [1], songorine [2], and napelline [3], respectively.

The epigeal part of Aconitum volubile Pall. ex Koelle, gathered in the Bayan Khongor aimak in the fruit-bearing period contained 0.6% of alkaloids on the weight of the dry plant.

When the alkaloids were chromatographed on a column of silica gel with elution by benzene-methanol, two bases were isolated, and these were identified as aconitine and napelline.

From the epigeal part of Aconitum altaicum Steinb., gathered in the Kobdo aimak in the fruit-bearing period was obtained 0.13% of alkaloids on the weight of the dry plant. When the alkaloids were treated with acetone a crystalline mixture was obtained from which napelline was isolated by chromatography on a column of silica gel.

LITERATURE CITED

1. K. Wiesner, E. W. K. Jay, and L. Jay (Poon), Tetrahedron Lett., 867 (1971).
2. T. Sugawara, Chem. Pharm. Bull., No. 9, 897 (1961).
3. T. Okomoto, M. Natsume, Y. Jitake, A. Yoshino, and T. Amija, Chem. Pharm. Bull., No. 13, 1270 (1965).

Institute of Chemistry, Academy of Sciences of the Mongolian People's Republic. Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR, Tashkent. Translated from Khimiya Prirodnikh Soedinenii, No. 4, pp. 559-560, July-August, 1990. Original article submitted November 13, 1989.