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ACCUMULATION DYNAMICS OF ALKALOIDS IN *Aconitum talassicum*

Zh. M. Eshmatov, M. N. Sultankhodzhaev,* and A. M. Nigmatullaev UDC 547.944/945

The medicinal plant *Aconitum talassicum* is indigenous to mountainous regions of Central Asia at heights of 2,500-3,000 m in damp meadows, ancient moraines, river valleys, and in juniper thickets [1, 2]. The plant has been used since antiquity in folk medicine as treatment for rheumatism and malaria [3] and in veterinary practice to treat flesh wounds and ulcers [4, 5]. The principal stands are located in the Talas river valley (Kyrgyzstan). All previously studied plant specimens contained talatisamine as the principal alkaloid constituent [6–9].

The plant grows in Uzbekistan on slopes of the Turkestan (Kulsai river gorge) and Chatkal (near Pskem village, on Kamchik pass, Chadaksai river gorge) ridges. The alkaloid composition of plants growing in Uzbekistan has not been studied before.

A derivative of practical medical interest was prepared from talatisamine.

In order to obtain a raw material source for preparing the drug, we studied roots and the aerial part of *A. talassicum* collected during various vegetative periods on Kamchik pass (Tashkent Oblast) (Table 1).

Air-dried raw material was moistened with Na_2CO_3 solution (5%) and extracted with $CHCl_3$ in order to extract fully the alkaloids. The condensed $CHCl_3$ extracts were worked up with aqueous H_2SO_4 (5%) until the reaction for alkaloids was negative. The resulting acidic solutions were washed with $CHCl_3$, made basic with Na_2CO_3, and extracted exhaustively with $CHCl_3$. The resulting $CHCl_3$ extracts were evaporated to afford total alkaloids (Table 1).

According to TLC, all studied samples contained talatisamine. Table 1 shows that the alkaloid content was greatest in the aerial parts of the plant in the early period. Keeping in mind that the aerial part of the plant is used as a source of talatisamine, we separated the total alkaloids obtained from the sample collected during the early period. Total alkaloids (3.55 g) were separated over a column of KSK silica gel (sorbent:compound ratio 50:1) with elution by $CHCl_3$:MeOH with gradually increasing fraction of the latter. Fractions obtained using $CHCl_3$ and $CHCl_3$:MeOH (100:1) afforded talatisamine (0.81 g) upon work up with acetone and recrystallization from MeOH. It was identified by comparison of its TLC, mixed melting point with an authentic sample, and comparison of IR and PMR spectra. Elution by $CHCl_3$:MeOH (50:1 and 25:1) isolated isotalatisidine (0.17 g). Fractions obtained upon elution by $CHCl_3$:MeOH (1:1) contained talatisine (0.08 g). The mother liquor of these fractions was rechromatographed over a column of silica gel (sorbent:compound ratio 20:1) with elution by the aforementioned solvents to afford isotalatisidine (0.08 g) and talatisidine (0.03 g). Mother liquors obtained upon elution by $CHCl_3$ were rechromatographed over a column of silica gel (sorbent:compound ratio 20:1) using $CHCl_3$ and $CHCl_3$:MeOH as eluents. Elution by $CHCl_3$ isolated 14-*O*-acetyltalatisamine (0.04 g).

Subsequent fractions eluted by $CHCl_3$:MeOH (100:1, 50:1) afforded talatisamine (0.27 g). The talatisamine content was 0.18% of the dry plant weight.

Talatisamine (0.12% of the dry plant weight) and isotalatisidine and talatisine were isolated using an analogous separation method from total alkaloids of the aerial part of the plant collected during flowering.

Thus, the aerial part of *A. talassicum* in the early period can be used as a raw material source for talatisamine production.

S. Yu. Yunusov Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, fax: (99871) 120 64 75, e-mail: niruno@mail.ru. Translated from *Khimiya Prirodnykh Soedinenii*, No. 1, pp. 133–134, January–February, 2011. Original article submitted June 1, 2010.

Table 1. Quantitative Content of Alkaloids in *Aconitum talassicum*

Vegetative period	Plant organ	Total alkaloid content, %	Vegetative period	Plant organ	Total alkaloid content, %
Early	Roots	1.3	Flowering	Aerial part	0.5
Early	Aerial part	0.57	After dying of aerial part	Roots	2.5
Flowering	Roots	2.4			

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