

A report has been made previously [1] on the phenolic components of *Atragene sibirica* L. (Siberian clematis) family Ranunculaceae. In a study of its chemical composition, we detected alkaloids which, on the basis of the Lieberman-Burchard reactions with concentrated H_2SO_4 , can be assigned to the steroid or diterpene series. We now give information obtained in their study. The bases accumulate in predominating amount (0.06%, gravimetric method [2]) in the hypogeal part, and therefore we investigated the roots of plants collected in the flowering phase in the Altai krai.

The comminuted raw material was moistened with a solution of ammonia and was extracted with chloroform. The chloroform extracts were concentrated and were treated with 1% hydrochloric acid, the acid solution was made alkaline with 5% Na_2CO_3 to pH 9, and the combined bases were extracted with chloroform (16.8 g or 3.4%). They were separated on a column of SiO_2 . Elution with chloroform-ethanol (9:1) gave base (I), and then the combined fractions were rechromatographed on a column of Al_2O_3 in the chloroform system [base (II)] and in chloroform-ethanol with gradually increasing concentrations of the latter (9:1 \rightarrow 7:3). This yielded the alkaloids (III-V).

Base (I): R_f 0.80 (here and below, TLC, SiO_2 /13% of gypsum, chloroform-ethanol (9:1)), $[\alpha]_D^{20} +24.2^\circ$ (c 0.42; ethanol), λ_{max} 262 nm. On chromatograms it showed a violet-blue fluorescence in UV light and with concentrated H_2SO_4 it gave a yellow coloration changing to pink.

Base (II): oily liquid, R_f 0.88 ± 0.02 ; $[\alpha]_D^{20} -120^\circ$ (c 0.5; chloroform), λ_{max} 234 nm. In UV light it showed a yellow-green fluorescence, and with concentrated H_2SO_4 it gave a lemon-yellow color.

Base (III): R_f 0.78; $[\alpha]_D^{20} -25.1^\circ$ (c 1.0; chloroform); λ_{max} 262 nm; IR spectrum, cm^{-1} : 3270 - 3400 (OH), 2940, 2865, 1470, 1435 (CH_2 and CH_3), 1670 ($>C=N$), 1720, 1280, 1245, 1220, 1130 (ester $C=O$), 1040 (β -OH- Δ^5 system) [3]. In UV light a blue fluorescence is observed and with concentrated H_2SO_4 a red-brown coloration.

Base (IV): mp 201-202°C, R_f 0.87, $[\alpha]_D^{20} +14.6^\circ$ (c 0.6; ethanol; λ_{max} 289 nm. In UV light on TLC the substance fluoresces yellow-blue and with concentrated H_2SO_4 it gives a dirty pink coloration.

Base (V): R_f 0.90 (in the chloroform-ethanol (1:1) system), λ_{max} 274 nm, $[\alpha]_D^{20} -40.85^\circ$ (c 0.7; ethanol). In UV light it gives a blue fluorescence and under the action of concentrated H_2SO_4 a yellow-green coloration. Compounds (I) and (IV) were identified as the alkaloids delphinine and aconidine respectively [4, 5] from their physicochemical properties, IR spectra, and direct comparison with authentic samples.

LITERATURE CITED

1. V. S. Bokova, E. A. Krasnov, T. F. Marina, T. V. Kositsyna, and O. V. Lashchenko, The Study of Preparations of Plant and Synthetic Origin [in Russian], Tomsk (1978), p. 14.
2. Methods for the Biochemical Investigation of Plants [in Russian], Leningrad (1972), p. 341.
3. R. Shakirov and S. Yu. Yunusov, Khim. Prir. Soedin., 3 (1980).
4. R. F. Raffaui, A Handbook of Alkaloids and Alkaloid-Containing Plants, Wiley-Interscience, New York (1970), p. 976.
5. S. Yu. Yunusov, Alkaloids [in Russian], Tashkent (1974), p. 320.