STRUCTURE OF ULUGANINE

M. A. Khasanova, U. A. Abdullaev,
M. V. Telezhenetskaya, and S. Yu. Yunusov

UDC 547.944/945

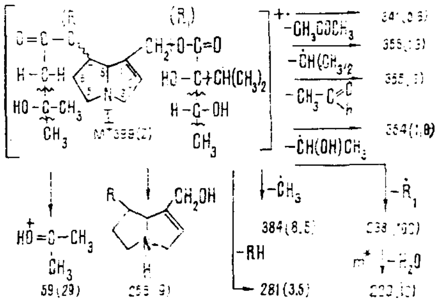
There is information in the literature on the alkaloid-bearing nature of Ulugbekia tschimganica (B. Fedtsch.) Zak. [1].

We have studied the alkaloids of the epigeal and hypogeal parts of this plant collected in the fruit-bearing period in July, 1973, in the Tashkent oblast. Ethanolic extraction yielded 0.14% of total alkaloids, of which 0.03% consisted of N-oxides. The combined alkaloids were separated on a column of silica gel. Elution with a mixture of chloroform and propanol (9 : 1) yielded an alkaloid (I) with mp 106-107°C (acetone), $[\alpha]_D^{25}$ −31.9° (c 0.47; acetone), the IR spectrum of which had characteristic bands at (cm^{-1}) 3525, 3397 (OH), 1733 (C=O), 1682 (C=C), 1370 and 1385 [$CH(CH_3)_2$], and 1250 (COO).

The mass spectrum of (I) showed ions with m/e 399 (M^+) and strong fragmentary ions with m/e 138, 136, 120, 93, and 80, the fragments of high mass being similar to the ions in the spectra of lasiocarpine (II) and viridiflorine (III). Thus, the spectrum of (I) showed the presence of ions corresponding to the M−100 and the m/e 220 ions in the spectrum of (II) at m/e 281 (M−118) and 238. These ions in the spectrum of (I) show the open nature of the pyrrolizidine diester [2].

A fairly intense peak at m/e 256 is analogous to the rearrangement ions with m/e 142 and 238 in the spectra of (III) and (II), respectively, and the triplet of ions M−43, M−44, and M−45 is characteristic of the spectra of compounds of type (III) [3].

In the region of low masses, an intense peak of an ion with m/e 59 can be seen; when a molecule of acetone is eliminated from M^+ according to McLafferty an ion with m/e 341 (M−58) is formed



In the spectrum of the deuterium analog of (I) the ion with m/e 59 is shifted by 1 and that with m/e 341 by 2 mass units in the direction of higher masses, which makes it possible to assume the presence of a residue of 2-hydroxyisovaleric acid (R) at C_7.

The NMR spectrum of (I) shows three doublets: at 0.86, 0.87, and 1.13 ppm for the methyl groups of trachelanthic acid R_1 [4]; a six-proton singlet at 1.2 ppm and a singlet at 2.38 ppm relate to the two CH_3 groups and the CH_2 groups, respectively, of the acid residue R.

Thus, the new alkaloid uluganine (I) is a diester of heliotridine or of retronecine with trachelanthic and 2-hydroxyisovaleric acids.

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Uzbek SSR. Translated from Khimiya Prirodnykh Soedinenii, No. 6, pp. 809-810, November-December, 1974. Original article submitted May 7, 1974.

LITERATURE CITED

1. T. Adylov, E. E. Korotkova, and K. Taidzhanov, Uzb. Biol. Zh., No. 5, 46 (1967).
2. E. Pedersen and E. Larsen, Org. Mass Spectrom., 4, 249 (1970).
3. U. A. Abdullaev, Ya. V. Rashkes, Kh. Shakhidoyatov, and S. Yu. Yunusov, Khim. Prirodn. Soedin., 634 (1972).
4. C. C. J. Culvenor and L. W. Smith, Austr. J. Chem., 19, 1955 (1966).