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Abstract

Full Text

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STUDY OF THE ALKALOIDS OF THE AERIAL PART OF *VINCA ERECTA*

Continuing the study of the alkaloids of the aerial part of *V. erecta* Rgl. from various places of growth, we investigated a plant collected in the upper reaches of the village of Sidzhak, Verkhne-Chirchik district, Tashkent region. It was established that the qualitative and quantitative compositions of the alkaloids differ in plants studied from other regions of Uzbekistan (1-3).

The content of the total alkaloids in the plant of early collection, with an aerial-part height up to 3 cm (8 IV 1962), is 2.7%; with an aerial-part height up to 10 cm (19 IV 1962), 1.9%; at the stage of the beginning of fruiting (4 VI 1961), 1.4%; and at the fruiting stage (20-28 VI 1962), 1%.

By cold ether extraction of the aerial part of *V. erecta* collected at the fruiting stage, 0.98% of total alkaloids was obtained. From the concentrated ether extract of the total alkaloids, a base of composition $C_{22}H_{26}O_5N_2$, m.p. 179-180° (0.04%), $[\alpha]_D = +22.7^\circ$ ($C = 2.32$, pyridine), containing two methoxyl groups, was isolated. The alkaloid proved to be new and was named by us vineridine.

In the IR spectrum of vineridine there are bands at: 3480 ($= NH$), 1630 and

1710 ($CH_3OOC—C = C—O—$) (6, 7) and 1690 cm^{-1} ($= N—CO—$).

Vineridine with methyl iodide quantitatively forms a monoiodomethylate, which indicates the tertiary character of the second nitrogen atom. Comparison of the IR spectra of vineridine and of the oxindole base mitraphylline (8) permits vineridine to be assigned to alkaloids of this series. The total alkaloids after separation of vineridine were divided into phenolic and nonphenolic fractions. From the phenolic fraction were isolated vincanine, previously isolated from the roots of *V. erecta* (4), and akuammine, obtained from the aerial part of *V. major* (5).

The nonphenolic fraction of the total alkaloids was dissolved in benzene and treated with an equal volume of citrate-phosphate buffer solution at pH 2.6. From the buffer fraction, copsisinin 0.15% (1) was isolated, and from the benzene fraction a base $C_{22}H_{26}O_5N_2$, m.p. 202-203°, $[\alpha]_D = +20.3^\circ$ ($C = 1.23$, pyridine)

+54.5° (C = 1.10, acetone), containing two methoxyl groups. This base was named vinerine.

In the IR spectrum of vinerine there are bands at 3295; 1640 and 1740; 1670 cm^{-1}, indicating the presence of the same functional groups as in vineridine.

Vinerine and vineridine have, respectively, R_f 0.9 and 0.43 (in the system benzene–cyclohexane 1:1, formamide, ammonium formate), 0.85 and 0.3 (chloroform–methanol 9:1, formamide), 0.45 and 0.23 (benzene–formamide). On a thin-layer chromatogram, 0.65 and 0.25 (ethyl acetate–methanol 9:1).

Upon acetylation with acetic anhydride, vinerine forms N-acetylvinerine, m.p. 158-159°, $[\alpha]_D = -99.5°$, of composition $C_{24}H_{28}O_6N_2$. On a thin-layer chromatogram we have R_f 0.63 (in the system ethyl acetate–methanol 9:1); in the IR spectrum, bands of a secondary nitrogen atom are absent.

Upon acetylation of vineridine, N-acetylvinerine was obtained, reduction of which with sodium borohydride gives vinerine. Consequently, upon acetylation, vineridine passes from the less labile form into the stable form–vinerine. Vinerine and vineridine are probably diastereoisomers.

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Note: Figure translations are in progress. See original paper for figures.