

Plant	Date of collection	Plant organ	Total, %	Alkaloids and other substances isolated	Content of substances, % of the dry weight of the plant
U. trisphaera	10 May 1963	leaves	0.85	Licorine hippeastrine tazettine pancratine hordenine acetamide n-hentriacontane	0.2 0.091 0.01 0.0005 0.0001 0.02 0.08
N. tazetta	4 Apr. 1964	"	0.23	licorine tazettine pancratine	0.13 0.011 0.001
N. tazetta	4 Apr. 1964	bulbs	1.0	licorine tazettine pancratine	0.52 0.11 0.001
N. kristalli	25 Aug. 1965	"	0.27	d-narwedine dl-narwedine licorine tazettine	0.1 0.009 0.032 0.011
N. folli	25 Aug. 1965	"	0.45	galanthamine licorine tazettine	0.007 0.15 0.08

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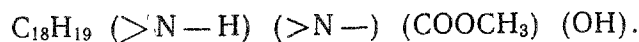
#### THE STRUCTURE OF VINCARIDINE

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When the total alkaloids of *Vinca erecta* were separated further on alumina [1], a new base, vincaridine, was isolated (0.007% of the weight of the dry plant) with  $R_f$  0.78 [butan-1-ol-acetic acid-water (100:5:100) system] and  $R_f$  0.17 [in a thin layer of alumina in the ethyl acetate-methanol (9:1) system].

Vincaridine has the composition  $C_{20}H_{24}N_2O_3$ , mp 216-217°C (methanol),  $[\alpha]_D - 58^\circ$  (c 0.73; chloroform) and forms a hydrochloride with mp 186-187°C. The IR spectrum of the base shows bands of N-H stretching vibrations ( $3390\text{ cm}^{-1}$ ), of an ester group ( $1730\text{ cm}^{-1}$ ), and of a disubstituted benzene ring ( $760\text{ cm}^{-1}$ ). The UV spectrum is characteristic for indoline bases and has two maxima:  $\lambda_{\text{max}}$  234, 288 m $\mu$  ( $\log \epsilon$  3.96, 3.54). The spectral data and the elemental analysis show that vincaridine corresponds to the following analytical formula:

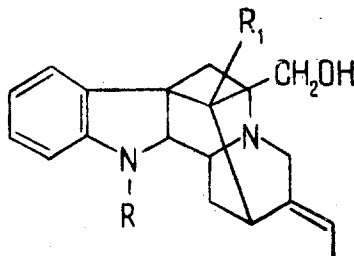


Acetylation of the base led to an acetylated product with mp 206-207°. The IR spectrum of the latter lacked the band of an NH group ( $3390\text{ cm}^{-1}$ ) and contained the band of an amide carbonyl group ( $1630\text{ cm}^{-1}$ ). The IR spectrum of acetylvincaridine exhibited a band due to the absorption of a hydroxy group ( $3260\text{ cm}^{-1}$ ).

In a study of the mass spectrum of vincaridine, we found peaks at 340 m/e (molecular ion), 323 m/e (M - OH), and 264 m/e (M - OH - COOCH<sub>3</sub>). In addition to these, there were peaks at 130, 144, 169, 182, and 251 m/e formed from the indole moiety of the molecule and a peak at 206 m/e formed from the nonindole moiety. The results of a

comparison of the mass spectra of vincaridine ( $R = H$ ,  $R_1 = COOCH_3$ ) and pseudoakuammigol ( $R = CH_3$ ;  $R_1 = CH_2OH$ ) [2] show that these substances are related; the difference amounts to 14 m/e in the fragments of the indole moiety of the molecule ( $R = a CH_3$  group in pseudoakuammigol) and 31 m/e in the ions of the alicyclic moiety ( $R_1 = COOCH_3$  instead of  $R_1 = CH_2OH$ ).

On the basis of the above results, it may be assumed that the structure of vincaridine is similar to that of pseudo-akuammigol.



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#### AN INVESTIGATION OF THE ALKALOIDS OF HAPLOHYLLUM RAMOSISSIMUM

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The plant H. ramosissimum Vved (family Rutaceae) was collected by one of the authors in the flowering stage in the Kara-Kalpak ASSR (Ust-Urt, Shurukh meteorological station). Chloroform extraction of the leaves of this plant gave 0.41% and that of the epigeal part gave 0.17% of a mixture of bases. On a paper chromatogram the mixture of alkaloids obtained gave two spots with  $R_f$  0.91 and 0.11 [butanol-HCl-H<sub>2</sub>O (4:1:3) system].

Separating the mixture of alkaloids by means of ion exchangers and on alumina gave two alkaloids. The first, skimmianine, was shown to be identical with an authentic sample from H. foliosum [1], while the second was a substance with mp 132-133°C; its picrate had mp 162-163°C (from alcohol), its hydrochloride 169-170°C (from alcohol), and the iso compound mp 187-188°C (from water). The constants and properties of the second alkaloid and dictamnine, first isolated from Dictamnus albus Linn., agreed [2]. Of the twelve species of the genus Haplophyllum studied dictamnine has so far been detected only in H. ramosissimum.

In addition to the alkaloids, the mixture of bases yielded a nitrogen-free crystalline substance with mp 145-146°C. The roots of H. ramosissimum from the same collection were found to contain 0.33% of total alkaloids. Separation of the mixture of alkaloids on alumina gave 0.06% of skimmianine and 0.03% of dictamnine (of the weight of the dry roots). The neutral substance with mp 145-146°C was not found in the roots.

This plant apparently does not contain any other alkaloids.

#### REFERENCES

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