



## Abstracts

# 9<sup>th</sup> International Symposium on The Chemistry of Natural Compounds

**Host:**

Xinjiang Technical Institute of Physics & Chemistry, Chinese Academy of Sciences  
Institute of the Chemistry of Plant Substances, Academy of Sciences of Uzbekistan  
Eskisehir Anadolu University, Turkey

**Organizer:**

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Key Laboratory of Plant Resources and Chemistry in Arid Regions, CAS

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## ALKALOID COMPOSITION OF THE CULTIVATED SPECIES *DIPHYCHOCARPUS STRICTUS*

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Plant *Diphychocharpus strictus* Trautv. belongs to the cruciferous (Cruciferae) and it is annual grass which grows in Tashkent, Kashkadarya, Surkhandarya, Bukhara regions of Uzbekistan and Karakalpakstan. *D. strictus* is the only member of the genus *Diphychocharpus*, which grows in Central Asia and it is a source of sulfur-containing alkaloids, derivatives of N-alkylurea with expressed antihypoxic action.

Studies of alkaloids of this plant led to the isolation of number of sulfur-containing alkaloids, which are based on the structural chain, combining thiomethyl, sulfoxide, nitrile group with a molecule of urea in various combinations.

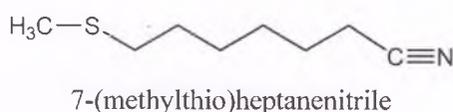
To determine the outcome of introducing native species *D. strictus* as alkaloid containing plant, we investigated the alkaloids of aerial parts of plant species introduced to the Botanical Garden in Tashkent. By quantitative studies it has been found that total alkaloids are 0.06%.

Oily mixture of two alkaloids were obtained by chromatographic separation of total alkaloids *D. strictus* on a column of aluminum oxide of the first petrol-chloroform (4:1) eluates. Two liquid alkaloids were identified by repeat chromatograph of fraction on silica gel column eluting with a gradient mixture of petrol-chloroform. One of them with a value of  $R_f$  0.60 (system: chloroform-methanol, 9:1) turned out to be previously isolated and known alkaloid diptocarpilidine and the other one with  $R_f$  0.65 was a new alkaloid, not described in the literature of minor alkaloids in the past.

Isolated alkaloid was oily, optically inactive substance, well soluble in acetone, ethyl acetate, chloroform, methanol, hardly soluble in hexane and petroleum ether. Its UV spectrum shows an absorption maximum at 206 nm ( $\lg \epsilon$  3.05). An IR spectrum was characterized by existence of bands absorbing stretching and bending vibrations of C-H.

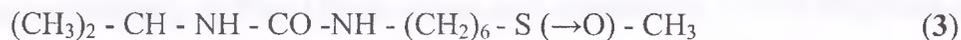
CH<sub>2</sub>-groups, and also noted the presence of absorption bands at 2200 cm<sup>-1</sup> corresponding to nitrile group. Unlike other alkaloids of *D. strictus*, there is no absorption band of sulfoxide group (1020-1050 cm<sup>-1</sup>) in the spectrum. These PMR spectrum of the alkaloid showed the presence in the structure of the molecule S-CH<sub>3</sub>-group, protons of which appear as a triple proton singlet at 1.92 ppm. The signal at 2.72 ppm (2H, m,  $J = 6$  Hz) assigned to the protons of the CH<sub>2</sub>-S-group at 2.39 ppm detected the signal from protons N = C-CH<sub>2</sub>-group (2H, t,  $J = 7$  Hz). In the region 1.40 - 1.80 ppm there are 3 signals: 2 multiplets for 2H each at 1.60 (2H, m, CH<sub>2</sub> at C2 and 1.72 (2H, m, CH<sub>2</sub> at C5) and a multiplet of intensity in the 4 proton units pri1, 4 - 1.5 (4H, m, 2 CH<sub>2</sub> at C3 and C4).

A comparative review PMR spectra of alkaloids **2** shows that the spectrum diptocarpilidine (**2**) at 2.57 ppm present 3 proton singlet from the protons sulfinile (CH<sub>3</sub>-S→O) - group. The PMR - spectrum of alkaloid **1**, this signal undergoes a diamagnetic shift is observed at 1.92 ppm. This suggests that a missing oxygen function. Taking into account this fact, it was assumed that the base **1** is diptocarpilidine deoxy derivatives. To confirm this hypothesis held an alkaloid oxidation with hydrogen peroxide. The reaction product was identified with alkaloid diptocarpilidine. Hence, **1** has the structure of 7-(methylthio)heptanenitrile.



Isolation of a new alkaloid desoxydiptocarpilidine of introduced plants collected during the end of the growing season indicates that, apparently, desoxy produce synthesized by plants in the late period of above ground parts.

Continuing chromatography total alkaloids *D. strictus* on a column of alumina from the chloroform eluates identified three crystalline base with m.p. 100-101 °C, m.p. 135-136 °C and m.p. 124-125 °C, identified with the alkaloids diptocarpamine (**3**), diptocarpidine (**4**) and diptocarpaine (**5**).



All selected crystal base isolated previously from the wild species *D. strictus*.