

297); 14,16-dianhydrogitoxigenin $[\alpha]_D^{23} + 510 \pm 20^\circ$ (s 0.3; chloroform) (14,16-dianhydrogitoxin has λ_{\max} methanol 219 and 338 nm).

Strophanthidin 19-aldoxine formed as the primary transformation products 10-cyanostrophanthidin (mp 236-240°C), $[\alpha]_D^{20} + 51.0 \pm 2^\circ$ (s 0.7; methanol) and 10-cyano-17 α -strophanthidin. Assuming that this simple method of obtaining cardenolide nitriles may have independent value, we performed a kinetic investigation under various temperature conditions with the aim of selecting the optimum variant. It was established that at 250°C the maximum amount of 10-cyanostrophanthidin reached 45% after 15 min, and that of 10-cyano-17 α -strophanthidin 36% after 26 min. The activation energy of the process is 106 kJ/mole.

Convallatoxin oxime also formed nitriles as the primary products of thermal transformations.

The results obtained indicate the fairly high lability of cardiac glycosides and aglycons under the action of heat, which must be considered in laboratory practice and, particularly, under production conditions.

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AN INVESTIGATION OF THE ALKALOID CONTENT OF SOME CENTRAL ASIAN PLANTS

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We have investigated several plants of the family Boraginaceae. There is no information in the literature on the presence of alkaloids in *Suchtelenia calycina* DC., *Tournefortia sogdiana* M. Pop., and *Caccina crassifolia* C. Koch. The epigeal part of *S. calycina* collected in the Ust Urt plateau in the flowering stage contained 1.1% of total alkaloids, the bulk of which consisted of echinatine [1], which was identified by a direct comparison with an authentic sample. In view of the hepatotoxic properties of echinatine [2], it is undesirable to use the plant as a fodder plant. *T. sogdiana* was gathered in the environs of Peski, Turkmenia. The epigeal part contained a total of 3.5% of alkaloids, from which a substance was isolated with mp 145-147°C, $[\alpha]_D - 16.1^\circ$ (s 3.1; ethanol).

Mass spectrum, m/z: 283 (M^+ , 268, 240, 229, 238, 140, 138, 120, 94, 93, 80. PMR (CDCl₃): 0.98 (3 H, d); 0.90 (3 H, d); 1.19 (3 H, d). These facts characterized the base as supinine [1]. The epigeal part of *C. crassifolia*, gathered in the flowering stage in the gorge of the R. Fandar'ya in Tadzhikistan yielded 0.08% of a mixture of bases, the separation of which on a column of silica gel led to the isolation of a compound with 137°C (M^+ 299). According to the results of mass and PMR spectra, it was probably a new isomer of heliotridine retronecine trachelanthates, since its melting point did not agree with any of the five known pyroolizidine esters with mol. wt. 299 [3].

The epigeal part of *Rindera austroechinata* M. Pop. was collected in Kirkkuduk in Tadzhikistan in the budding stage. Echinatine and its N-oxide have been isolated from this plant previously [1]. In our sample, likewise, echinatine was the main alkaloid. The mother liquor after its separation was transferred to a column of alumina. Elution was performed with benzene and with ether. On elution with benzene-ethanol-chloroform, a base was isolated with mp 116-117°C $[\alpha]_D^{20} + 88.0 \pm 5^\circ$ (s 0.4; ethanol), -16.5° (c 1.4; chloroform); picrate with 164°C; M^+ 237. From these characteristics it was identified as 7-angeloylheliotridine [4]. This is the first time that it has been isolated from the genus *Rindera*. The ethereal eluates were rechromatographed on a column of silica gel. Rinderine [1] was isolated by elution with benzene-chloroform (1:1).

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The total amount of alkaloids in the epigeal part of *Cynoglossum viridiflorum* Pall. ex Lehm. growing on the Ust Urt plateau was 0.5%. As well as the three alkaloids obtained previously from this plant, viridiflorine N-oxide [1] was isolated. In addition to the trachelanthamine and its N-oxide found previously trachelanthamidine [5] was isolated from *Trachelanthus korolkowii* Lipsky, collected in Tashkent province in the budding stage, this being the first time that this alkaloid had been isolated from the genus *Trachelanthus*. We may note that we obtained viridiflorine and trachelanthamine N-oxides in the form of solvates with 170-172°C and 125°C, respectively.

In samples of three species of *Salsola* investigated (*S. paletskiana* Liv., *S. nitraria* Pall., *S. dendroides* Pall.) gathered in the fruit-bearing on the Ust Urt plateau in Kara Kalapaka the amount of alkaloids did not exceed 0.01-0.07% and in not one of them were the salsoline and saosolidine that are characteristic for *Salsola richteri* [1, 6] detected.

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Dipthychocarpus strictus — A SOURCE OF SULFUR-CONTAINING ALKALOIDS

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In the Soviet Union, the family Cruciferae is represented by a single species *Dipthychocarpus strictus* (Fisch.) Trautv. This annual herbaceous plant is encountered as a weed of wheat plantations in Central Asia, Transcaucasia, and the South-Eastern European part of the USSR [1].

The study of the alkaloids of this plant was begun by Aripova, Akramov, and Yunusov, who isolated seven substances [2]. Having continued the investigation, we have isolated a total of 15 compounds. The majority of them each contained a sulfur atom, had similar properties, and proved to be N-alkyl derivatives of urea. Thirteen sulfur-containing alkaloids had not been described in the literature, and the structures of 10 of them were established [3, 4].

Our aim was to study the change in the qualitative and quantitative composition of the alkaloids in the epigeal part and seeds of this plant according to its growth site. The results of the determination of the total bases and the amounts of the main alkaloids are given in Table 1.

The yield of combined alkaloids and the ratio of the individual substances in them depended on the growth site. Thus, the epigeal part of the plant collected in the environs of the village of Aktash, Dzhizak province, contained half as much alkaloids as the epigeal part of the plant growing close to the village of Dzhilga. The seeds collected in the environs of Alimtau contained an eight times smaller amount of bases than the seeds collected close to

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