A CHEMICAL STUDY OF *Adonis tianschanicus*

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There is information in the literature that the herb *Adonis tianschanicus* (Adolf) Lipsch. (Tien-Shan adonis) possesses cardiotonic activity [1]. We have investigated the chemical composition of the active substances of the epigeal part of the plant.

The substances were extracted, purified, and separated as described previously [2].

In purified extracts of the herb *A. tianschanicus* by paper chromatography in the chloroform/formamide (25%), chloroform–tetrahydrofuran (1 : 1)/formamide (25%), and chloroform–dioxane–butan-1-ol (7 : 2 : 0.5)/formamide (25%) systems we detected no less than 10 substances of cardenolide nature.

By column adsorption chromatography on alumina and column partition chromatography on silica gel we obtained three cardenolides identified as strophanthidin [$C_{23}H_{32}O_6$, mp 138-142/223-225°C, $[\alpha]_D^{21}$ +44° (ethanol)], cymarin, [$C_{30}H_{44}O_9$, mp 137-139°, $[\alpha]_D^{22}$ + 37° (ethanol)], and k-strophanthin-β [$C_{36}H_{54}O_{14}$, mp 187-193/205-210°C, $[\alpha]_D^{22}$ +32° (ethanol)] [2, 3], which we have previously isolated from *A. amurensis* and *A. turkestanicus*.

Of the flavonoid glycosides, by a method described previously on a column of polyamide sorbent we isolated two substances of luteolin nature, which proved to be orientin, $C_{21}H_{20}O_{11}$, mp 262-267°C, $[\alpha]_D^{20}$ + 20° (ethanol) and adonivernitol, $C_{26}H_{28}O_{15}$, mp 200-206°C, $[\alpha]_D^{20}$ −24° (ethanol), which have been obtained from *A. turkestanicus* [3].

Identification was carried out from physicochemical properties, transformation reactions, coloration with 84% sulfuric acid, UV and IR spectra, R_f values in various systems, and mixed melting points.

In addition to substances of the cardenolide and flavonoid groups, benzene–chloroform and chloroform extracts from the epigeal part of *A. tianschanicus* were shown to contain the hydroxycoumarins scopoletin and umbelliferone.

From the aqueous extracts obtained after the elimination of the cardenolides and substances of flavonoid nature we isolated the pentahydric alcohol adonitol ($C_5H_{12}O_5$, mp 101-103°C).

LITERATURE CITED

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