



## PHYTOCHEMICAL STUDY OF THE PLANT CONVULVULUS PSEUDOCANTHABRICA GROWING IN FERGANA REGION

A.M. Gapparov,  
D.S. Toshpulatova,  
H.V. Umarxonova

Kokand State Pedagogical Institute named after Mukimi, Kokand, tel. (99890) 3091881

Article history:	Abstract:
<b>Received:</b> April 1 <sup>st</sup> 2021 <b>Accepted:</b> April 17 <sup>th</sup> 2021 <b>Published:</b> May 9 <sup>th</sup> 2021	From the aerial part of the plant <i>Convolvulus pseudocanthabrica</i> , growing in Uzbekistan, 2 alkaloids of a known structure were isolated - convolicine and confolidine, as well as, for the first time from the genus <i>Convolvulus</i> - coumarin scopoletin, $\beta$ -sitosterol, an ethoxy derivative of caffeic acid, veratric acid, glucaaloid and the presence of tropine, mannose, galactose and the new ethoxy coumarin derivative umbelliferone.
<b>Keywords:</b> <i>Convolvulus pseudocanthabrica</i> , alkaloids, convolicin, confolidine, tropin, coumarin scopoletin, $\beta$ -sitosterol, ethoxy derivative of caffeic acid, veratric acid, acetamide, glucose, mannose, galactose, ethoxyumbelliferone.	

Earlier, 8 alkaloids [1,2], tropane derivatives, were isolated from the aerial part of *Convolvulus subhirsutus*, which grows in Uzbekistan, among which the main ones are convolvin and convolamine, and minor bases - phillalbin, conolidine, nortropine, phillalbine N-oxide, conolidine and confropine. Quantitative determination established the content in the aerial part of 0.6%, and in the roots - 1.6% of the sum of bases, in which the content of the main alkaloids - convolvin and convolamine, is 45-50% of the total mixture. Continuing the study of the alkaloids of this plant, collected in the vicinity of the village of Shohimardon, Fergana region, from the sum of alkaloids of the non-phenolic part after the removal of the main alkaloids of convolvin and convolamine during chromatography on a column with aluminum oxide, a base with m.p. 144-145<sup>o</sup>, identified with the known alkaloid convolicine. An alkaloid with m.p. was isolated from benzene eluates. 178-179<sup>o</sup> identified with confolidine.

The extract, after removing the alkaloids, was neutralized to pH 7, diluted with water in a 1: 1 ratio and treated sequentially with gasoline, ethyl acetate, and chloroform. Mannose, glucose and galactose were found in the remaining aqueous portion. Crystals with m.p. were isolated from the gasoline fraction. 136<sup>o</sup> identified with a true  $\beta$ -sitosterol sample. The mother liquor was treated with acetone; when the latter was concentrated, crystals with a mp. 81-82<sup>o</sup> identified with acetamide. When the mother liquor was treated with an acetone - methanol mixture, a substance was isolated with a mp. 181-182<sup>o</sup>, identified with a sample of veratric acid.

The chloroform fraction was also treated with acetone, from which crystals with m.p. 201-202<sup>o</sup>. The IR spectrum of the compound contains absorption bands of active hydrogen (3115 cm<sup>-1</sup> - OH), - CH (3045 cm<sup>-1</sup>), aromatic ring (1605, 1562, 1506 cm<sup>-1</sup>), conjugated carbonyl (1702 cm<sup>-1</sup>) [ 3.4]. In the UV spectrum, absorption maxima are observed at 297 and 345 nm, which are characteristic of 6- 7-dioxy coumarins [5]. In the PMR spectrum of coumarin, signals of aromatic protons are observed at 6.149 and 7.793 ppm. in the form of two doublets (J = 9.6 Hz) from protons at C-3 and C-4. In the area of 7.045 ppm there is a signal in the form of a singlet from a proton at C-5, at 6.705 ppm. - a signal in the form of a singlet from a proton at C-8. In a stronger field at 3.845 ppm discovered a three - proton singlet from the aromatic methoxyl group. For the components of the H-4 signal, as well as the H-8 signal, broadening is observed, caused by the long-range spin-spin interaction between them. J H-4 and J H-8 are practically equal to zero [6].

The molecular weight of coumarin is confirmed by a peak with a mass of 192 in the chromatomass spectrum of the substance. These spectral characteristics indicate that the isolated coumarin is scopoletin [7], isolated for the first time from plants of the genus *Convolvulus*.

Chromatography of the ethyl acetate fraction on a silica gel column from the ethyl acetate - gasoline fractions gave a substance with m.p. 140-141<sup>o</sup>. By the method of chromatomass - spectroscopy, a molecular weight of 208 atomic units was established for it. The UV spectrum of the compound exhibits maxima at 218, 245, 330 nm, which are characteristic of the conjugated aromatic system. The IR spectrum shows absorption bands of the 1,3,4-trisubstituted benzene ring at 1682, 1588, 870, 814 cm<sup>-1</sup>. The PMR spectrum of the compound in a strong field contains a 3-proton triplet at 1.224 ppm. (J = 7.2 Hz) from methyl signals of the ethyl group. At 4.128 ppm the signal from O-CH<sub>2</sub> (2H, J =

7.2 Hz) appears in the form of a quartet, at 6.162 ppm. a single-proton doublet ( $J = 16.2$  Hz) is noted - the signal of the  $\beta$ -proton (= CH-Ar). Between them are the signals of the protons of the pyrocatechol system of the aromatic ring: at 6.710 ppm. (1H, d,  $J = 8.4$ , H-5<sup>1</sup>) at 6.853 ppm. (1H, ddd,  $J = 1.6$ , H-2<sup>1</sup>), at 6.967 ppm (1H, d,  $J = 1.6$ , H-6<sup>1</sup>) [8-10]. The above spectral characteristics indicate that the compound we isolated is caffeic acid ethyl ester, isolated from a plant for the first time. Caffeic acid and its esters are intermediates in the biosynthesis of coumarins and flavonoids. By chromatomass spectroscopy, a peak with molecular weights of 190 and 141 was found in an alcoholic extract of the plant, which apparently correspond to coumarin ethoxyumbelliferone and amino alcohol tropin, respectively.

Thus, from *Convolvulus pseudocanthabrica*, 2 known alkaloids were isolated - convolicine and confolidine, as well as for the first time from this plant - scopoletin, caffeic acid ethyl ester,  $\beta$ -sitosterol, veratric acid, acetamide, and the presence of glucose, mannose, galactose, coumarin and ethoxyumbelliferone was found path.

## EXPERIMENTAL PART

IR spectra were recorded on a Perkin-Elmer Fourier transform infrared spectrometer, model 2000 in KBr pellets, and the UV spectrum was recorded on a Hitachi spectrophotometer in ethanol solution. NMR spectra were recorded on a Tesla BS-567 A / 100 MHz instrument (solvents - CD<sub>3</sub>OD, internal standard - HMDS, d-scale).

For column chromatography, alumina (neutral) 100/160  $\mu$ m was used, thin-layer chromatography was carried out on plates with KVK silica gel in the systems: chloroform - methanol, 9: 1 (1), chloroform - methanol 40: 1 (2).

**Isolation of the sum of alkaloids:** [11].

**Isolation of confolidine and convolicin.** Part of the total alkaloids was chromatographed on an alumina column. Benzene, chloroform, and mixtures of chloroform with methanol in various ratios were used as eluents. From individual benzene eluates, 10 mg of base were isolated, m.p. 178-179<sup>0</sup>, Rf -0.72 (TLC, silica gel, system 1) - confolidine. From the subsequent benzene eluates, 15 mg of an alkaloid with so pl. 144-145<sup>0</sup> identified with convolicin.

**Isolation of scopoletin and caffeic acid ethyl ester.**

The chloroform part of the alcoholic extract was treated with acetone, and crystals with a mp. 205-206<sup>0</sup>, Rf - 0.5 (system 2), without depression m.p. with a true sample of scopoletin. The ethyl acetate fraction of the alcohol extract was chromatographed on a silica gel column. Crystals were isolated from the first ethyl acetate - gasoline fractions with m.p. 140-141<sup>0</sup> (10 mg), Rf - 0.46 (system 2) - caffeic acid ethyl ester.

## REFERENCES

1. A. M. Гаппаров, Н. А. Раззаков, С. Ф. Арипова., Химия природ. соедин., 242 (2007)
2. А. М. Гаппаров, С. Ф. Арипова, Н. А. Раззаков, В. У. Хужаев, Химия природ. соедин., 601 (2008)
3. W. A. Andreae, Can. J. Res. (C), 26, 31 (1948)
4. Г. В. Букреева, Г. В. Пигулевский, ЖПХ, 39, 7, 1541 (1966)
5. Г. В. Пигулевский, Г. А. Кузнецова, ЖОХ, 24, 12, 2174 (1954)
6. М. Е. Перельсон, Ю. Н. Шейнкер, Г. П. Сырова, Химия природ. соедин., 6 (1970)
7. Н. Ф. Комисаренко, И. Г. Левашова, У. А. Ахмедов, Химия природ. соедин., 247 (1984)
8. А. Д. Вдовин, Д. Батсурэн, Э. Х. Батиров, М. Р. Ягудаев, В. М. Маликов, Химия природ. соедин., 4, 441 (1983)
9. M. W. Jarvis, A. G. Moritz, Aust. J. Chem., 21, 2445 (1968)
10. J. B. Rowbotham, T. Schaefer, Can. J. Chem., 51, 953 (1973)
11. Н. А. Раззаков, С. Ф. Арипова, Химия природ. соедин., 46 (2004)