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CHEMICAL COMPOSITION OF THE AERIAL PART OF *Valeriana alliariifolia* Adams

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ХИМИЧЕСКИЙ СОСТАВ НАДЗЕМНОЙ ЧАСТИ *Valeriana alliariifolia* Adams

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Abstract. The article presents information about the component composition of the acetone extract of the aerial part of *Valeriana alliariifolia* Adams. Plant raw materials for research were collected in the flowering phase from Batabat Reserve, Shahbuz district of Nakhchivan. Crystalline substances were obtained from the acetone extract of the plant. The individuality of the substances was checked by thin layer chromatography on Silufol UV 254 plates. The component content of the obtained extract was determined by the Gas Chromatography-Mass Spectrometry method (GC-MS). GC-MS analysis of the aerial part of the plant revealed the presence of five volatile constituents such as methylene chloride; trichloromethane; carbon tetrachloride; carbonic acid, ethyl-, methyl ester; ethane 2 chloro 1,1 detoxy.

Аннотация. Представлены сведения о компонентном составе ацетонового экстракта надземной части *Valeriana alliariifolia* Adams. Растительное сырье для исследований собирали в фазу цветения в Батабатском заповеднике Шахбузского района Нахичевани. Кристаллические вещества получали из ацетонового экстракта растения. Индивидуальность веществ проверяли методом тонкослойной хроматографии на пластинах Silufol UV 254. Компонентный состав полученного экстракта определяли методом газовой хромато-масс-спектрологии (ГХ-МС). ГХ-МС анализ надземной части растения выявил присутствие пяти летучих компонентов: метиленхлорид; трихлорметан; четыреххлористый углерод; угольная кислота, этил-, метиловый эфир; этан 2 хлор 1,1 детокси.

Keywords: *Valeriana alliariifolia*, aerial part, individual components, GC-MS analysis.

Ключевые слова: валериана чесночницелистная, надземная часть, отдельные компоненты, ГХ-МС анализ.



Introduction

The genus *Valeriana* L., belonging to the *Valerianaceae* DS family, is represented in the world by 300 species. Species of the genus are herbaceous plants, widespread in all regions of North, South, America and Europe.

Valeriana alliariifolia is a perennial plant with a height of 7-15-200 cm. The plant grows everywhere in all regions of Azerbaijan (except Talysh). The plant has one or more hollow, cylindrical, furrowed stems, branched in part with a flower group, in the lower part painted in pink-purple. Stem nodes have hairs. The flower group is thyroid, strongly branched, the flowers are small, light, reddish-violet. Blossoms in July-August, seeds ripen in August-September. In Azerbaijan, it is distributed in Sheki, Zakataly regions along the edge of forests. It reproduces both by seeds and vegetatively [1].

Species of the genus are represented by 12 species in the Caucasus and 8 species in the flora of Azerbaijan [2-9]. As a result of the experimental studies, numerous authors confirmed the distribution of the species in the Caucasus [2-4, 8-14].

A. Askerov noted the distribution of *Valeriana alliariifolia* in four botanical and geographical regions of Azerbaijan (except for the Kura-Araz plain): the Greater Caucasus, the Lesser Caucasus, Talysh, and the Nakhchivan Autonomous Republic [10].

The mentioned species is found in many countries of the world: Ukraine, Moldova, Poland, Czech Republic, Russia (in the Krasnodar Territory, Bashkortostan), Malaysia, Turkey, Transcaucasia, Greece, Ukraine, Moldova, Poland, etc. Distributed in peaty and humid places in the mountains, forests, steppes, watersheds throughout the country [10-14].

M. Gasimov, G. Gadimova in their work "Encyclopedia of spices and wild vegetable plants" mention the use in modern medicine of preparations derived from catnip roots for various diseases of the nervous system and as a means for preventing seizures [5].

V. Petkova gives detailed information about the tincture and preparations from the roots of catnip in scientific medicine, which have a calming effect, prevent bloating, eliminate spasms in gastrointestinal pain [15].

About 17 species of the genus *Valeriana* L. (*Caprifoliaceae*) are distributed in Turkey, and four of them are considered endemic. In Turkey, *Valeriana officinalis* L. is traditionally used to treat neurasthenia, nervous insomnia and palpitations [16].

Valeriana alliariifolia Adams is a species traditionally used in Turkish folk medicine as antispasmodic, sedative, antimycobacterial, antiviral, cytotoxic, etc. action [17-21].

In folk medicine, tea is brewed from the roots of catnip and used as a sedative for pain in the heart and palpitations, it is part of the preparations Valocardin, Cardiovalin, Validol, Corvalol, Valocormid, Valosedan, and etc. [1, 5-8].

According to the literature, preparations derived from cat roots enhance the secretion of the digestive glands and the secretion of bile in various diseases of modern medicine [15, 19, 20, 22, 23].

Iranian researchers *Valeriana alliariifolia* Adams. Taherpour A.A., Maroofi H, Bajelani O, Laricani K. β -pinene (12.06%), α -pinene (9.94%), α -terpinene (9.49%) of the main volatile components of the essential oil obtained from cat mint, comprehensively studied the medical value of isoterpinolene (7.15%) and 1.8-cineol (6.76%) [23].

The plant contains essential oils, valeric acids, organic acids, alkaloids and many other valuable organic substances [24]. Preparations derived from *V.alliariifolia* have a positive regulatory effect on the human nervous system, heart muscle, contribute to the expansion of coronary vessels and normalize blood circulation [16, 20, 23, 25, 26].

The purpose of our research was to study the chemical composition of the aerial part of *V. alliariifolia* collected in Batabat Reserve, Shahbuz region of the Nakhchivan Autonomous Republic.

Materials and methods

The object of the study was the aerial organs of *Valeriana alliariifolia*, collected in the flowering phase from Batabat Reserve, Shahbuz region of the Nakhchivan Autonomous Republic in June 2022 (Figure). Dried and finely aboveground organs (197 g) were extracted with acetone (3 times, each time for 3 days) [27].



Figure. *Valeriana alliariifolia* Adams species (catnip) was collected in the flowering phase from around Batabat lake (reserve) of Shahbuz region at an altitude of 2500 m above sea level

Individual substances were obtained from the sum of extractive substances (6.0 g) by chromatography in a glass column (h=70.0; d=3.0 cm) filled with Al₂O₃ activity of III-IV degree.

The volume of each fraction was 100 ml. The substances from the column are first mixed with hexane, hexane + benzene (in the ratio of 2:1, 1:1), benzene, benzene + chloroform (in the ratio of 3:1, 2:1), chloroform + benzene 9:1; 8:1; 7:1; 6:1; 5:1; 4:1; 3:1; 2:1; 1:1, eluted with chloroform+alcohol (95:5). Crystalline substances were obtained in fractions 123-125. The individuality of substances was obtained by thin-layer chromatography on silifol UV 254 plates, and the individuality of crystalline substances was checked.

He samples were analyzed by gas chromatography-mass spectroscopy (GC/MS). It was studied which chemical compound the substances belong to.

For analysis on a GC/MS equipment (Shimadzu QP-2010 Ultra GC-MS, Japan), electron impact ionization, capillary tube Rtx - 5 MS with dimensions of 0.25 μ m \times 0.25 mm \times 30 m, helium was used as a carrier, the flow rate was 1.58 ml/min. The temperature of the ionization source was 250⁰C. During the analysis, the starting temperature of the oven is 40⁰C for 2 min, then 9⁰C/min. rapidly increased to 200⁰C, then 10⁰C/min. rapidly brought to 250⁰C. A total of 17 minutes were spent running each sample. The injector temperature was 275⁰C. The volume of the sample taken is 0.2 μ l (diluted with chloroform 1:20). Electron ionization of the mass detector 70 eV, mass range 29-450 a.c.v. (atomic mass unit, Yes). After the analysis, the substances were identified according to the literature data of the device (NIST 2010), retention time — Rt (Retention time), characteristic molecular and fragment ions (Organic acids, Glycoside, tannins, isovaleric acid).

Results and discussion

In order to study the biologically active substances contained in the representatives of the genus *Valeriana* of the family *Valerianaceae* D.C., growing in the flora of Azerbaijan, 5 substances were obtained from *Valeriana alliarifolia* by column chromatography by extraction of the aerial in acetone (Table 1).

As a result of studies in the aerial parts of the *Valeriana alliarifolia* plant, components belonging to different groups of natural compounds were identified.

Table

STUDY OF COMPOUNDS OBTAINED FROM THE AERIAL OF *V. alliarifolia* by GC/MS

RT	Area %	Molecular formula	Compounds
1.412	39.15	CH ₂ Cl ₂	Methylene chloride
1.792	57.69	CHCl ₃	Trichloromethane
2.097	0.14	CCl ₄	Carbon tetrachloride
2.548	1.09	C ₂ H ₅ COOCH ₃	Carbonic acid, ethyl-, methyl ester
6.596	1.93	C ₆ H ₁₃ ClO ₂	Ethane 2 chloro 1,1 detoxy

Approximately 40% of the total number of drugs accepted by the pharmacopoeia are herbal preparations. Tarasevich et al found that the rhizomes and roots of *Valeriana alliarifolia* species contain 0.52% essential oil, the amount of which varies depending on environmental factors and growing conditions [24].

N. I. Aliyev in his research found that the rhizomatous roots of catnip contain borneoyl-isovaleric (valerian-borneol, ether), isovaleric acid, α -pinene, δ -terpineol, sesquiterpenes, borneol esters of formic-acetic fatty acid and proazulene, containing essential oil, alkaloids, glycosides, modifiers, valerian, resinous substances [6].

S. K. Ibadullaeva, R. Alekperov confirmed the presence of 0.2% essential oil in the roots of the catnip, and the main components of the essential oil were pinene and borneol [7].

H. Bardakchi et al. found that the extract of *V. alliarifolia* contains 68 components (87.6%), of which trichloromethane is the predominant component. [28].

A. A. Taherpour et al., in a study conducted in Iran, studied the chemical composition of the essential oil of *V. alliarifolia* Adams, and found the main components in its composition: β -pinene (12.06%), α -pinene (9.94%), α -terpinene (9.49%), isoterpinolenic (7.15%) compounds [23].

In our study GC/MS analysis of the aerial part of *V. alliarifolia* revealed the presence of five volatile constituents such as methylene chloride, trichloromethane, carbon tetrachloride, carbonic acid, ethyl-, methyl ester, ethane 2 chloro 1,1 detoxy.

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