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Bioactivity of Euphorbia Ferganensis Plant Substances and Amount of its Elements

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Abstract: In this paper, the issues of studying some bioactivities of Euphorbia ferganensis plant and methods of sterilization of vegetative organs of this plant, which are of scientific importance, were discussed. In addition, in this study, the content of water-soluble vitamins and chemical elements in dried leaves and seeds of Euphorbia ferganensis was analyzed in μg/g.

Keywords: Anhydride, bioactive, euphorbia ferganensis, enzymes, seed.

Introduction

The study of bioactive substances extracted from local plants and their medicinal properties is one of the urgent issues of today. It is known that species of the Euphorbia genus are currently of great importance in medicine and pharmaceutical industry. Pharmaceutical bioactive diterpenoids, chemicals useful for effective treatment of cardiovascular diseases, are isolated from latex extracts of species of Euphorbiacae family.

The study of the chemical composition of Euphorbia ferganensis, a member of the Euphorbiacae family, selected as a research object, the isolation of important active components in the course of various physiological and biochemical processes, and the study of their physico-chemical properties is one of the important scientific issues, as well as the importance of this plant It is also being studied that the biologically active substances contained in the root can be used as a primary remedy against viral diseases today. For this purpose, the research work is to study some bioactivity of the medicinal plant E. ferganensis, as well as its microclonal reproduction in vitro.

Euphorbia L. (euphorbia) - milkweed - is a family of plants belonging to the milkweed family, which are perennial or annual shrubs or trees. The flowers are small and homogeneous, collected in elementary inflorescences. These, in turn, combine to form complex, umbrella-like inflorescences. It blooms in May-August. The fruit is a pod. The Euphorbiacae family includes 160 plant species, 33 of which grow in Uzbekistan [1].

Euphorbia ferganensis is a species belonging to the family of flowering plants. Its homeland is Central Asia, in particular Uzbekistan, Tajikistan, Kyrgyzstan and the Fergana Valley region. Euphorbia ferganensis is a succulent perennial plant that grows up to 15 cm tall. The stem is woody and the top is herbaceous. The leaves are small and juicy, and the plant produces small green flowers. The plant is known for its ornamental value and is often grown as an indoor or outdoor plant in gardens [2].

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Figure 1. Euphorbia ferganensis plant growing in Namangan region.

E. ferganensis seeds are small and usually brown-black or dark gray in color. They are usually less than 1 mm in diameter and have an irregular, slightly angular shape. The surface of the seed may appear slightly wrinkled or bumpy. Like many other succulent plant seeds, Euphorbia ferganensis seeds are adapted to survive in arid conditions. They have a hard outer layer that protects the embryo from drying out and other environmental influences. Seeds can remain viable for several years if stored in a cool, dry place [3].

a b

Figure 2. Euphorbia ferganensis leaf (a) and seed (b)

The poisonous substance in the milky sap of most grass species is euphorbinic acid anhydride - euphorbin, which causes slow-growing inflammations in the mucous membranes of the eyes and ears, as well as in the gastrointestinal tract [3, 4].

Main part

The E. ferganensis plant belonging to the Euphorbiacae family, selected as the research object, was studied by the scientists of the Institute of Bioorganic Chemistry of the UzR FA. More than 70 phenolic compounds were isolated from the plant species belonging to this family and their chemical structure was determined. the biological activity of some of them was studied. During the study of phenolic compounds of the genus Euphorbia, a number of them were found to be new substances not

previously described in the literature. The structures of these compounds were established using physicochemical and spectral data [5].

There is a large amount of biologically active substances in the above-ground and below-ground parts of Euphorbia plants. Their leaves, stems and roots contain 0.18-0.19% rubber, 8-16% tar, 6.52% flavonoids, 1.65% coumarins, 10-13% astringent substances, 0.36-0.41% alkaloids, vitamin C, steroids and terpenoids, and essential oils. . The seed contains 28-33% oil. The milky juice of the leaf, stem and root parts contains 6.38-9.77% and 11.5-16.9% tar, high fatty acids, alkaloids, 1.2% rubber, essential oils [6].

In addition, using the spectral analysis method, microelements in several species of euphorbia plants were studied in the DFS-13 spectrograph. Accordingly, the plant contains 21 elements: boron, phosphorus, lead, copper, titanium, manganese, nickel, molybdenum, strontium, tin, zinc, chromium, gallium, beryllium, zirconium, scandium, silver, vanadium, ytterbium, cobalt, barium elements were found [7].

In our country, a lot of work has been done on the extraction of phenolic substances from euphorbia. Gallic and ellagic acid esters were isolated from the roots of Euphorbia ferganensis growing in the territory of Uzbekistan, and their structure was determined by spectral methods [6, 7].

Interest in euphorbia is growing abroad. The composition of many plants belonging to the genus Euphorbia was studied, and hydrolyzable mono- and diellagotannins were isolated from them.

Samples for analysis were collected from the above-ground vegetative and generative organs of the E.ferganensis plant growing in Namangan region in April-May 2022. Laboratory analyzes were carried out at the Institute of Bioorganic Chemistry of the Federal Republic of Uzbekistan.

In this study, water-soluble vitamins in dried leaves and seeds of E.ferganensis were analyzed. Vitamins enhance the chemical reactions occurring in the body, affect the body's absorption of nutrients, support the normal growth of cells and the development of the whole body. It enters into the composition of enzymes in the body and ensures their normal activity and activity.

Determining the amount of vitamins was carried out in the following order: dried leaves and seeds of the plant were crushed for analysis. 1:10 dH2O was added to a 0.1g sample and stirred on a magnetic stirrer at room temperature for 30 minutes. After cooling, the mixture was filtered. The filtered sample was centrifuged at 6000 rpm for 10 min.

Then, HPLC analysis of water-soluble vitamins was performed on Agilent Technologies 1200 chromatograph ExlipseXDBC18 (reverse phase), 3.5 μm, 4.6x150 mm column. Diode array detector (DAD), 254, 290 nm. Solution A: 0.5% acetic acid, pH 1.7: B:CH_3CN (acetonitrile). The flow rate was 1 ml/min. Gradient %B/min: 0-5min/96:4%, 6-8min/90:30%, 9-15min/80:20%, 15-17min/96:4%. Thermostat 25^0C.

Vitamins	*E.ferganensis* seed	*E.ferganensis' leaf*	*Leaf of E.ferganensis grown in vitro*
	Concentration mg/gr		
B-1	0	0,01	0,03
B-2	0,11	0,19	0,1
B-6	0,35	0	0,01
B-9	1,09	0,81	0,5
PP B-3	0,03	0,22	0,14
C	0,08	0,04	0,02

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Based on the obtained results, it can be concluded that the seeds and leaves of E.ferganensis contain water-soluble vitamins such as B_1, B_2, B_3, B_6, B_9, PP, C. Among them, it was observed that vitamin B9 is more abundant in plant seeds than in leaves.

In this study, the amount of chemical elements in dried leaves and seeds of E.ferganensis was analyzed. Various biometals and minerals in nature play an incomparable role in the implementation of biochemical processes occurring in the tissues and cells of a living organism. Living organisms, especially plants, accumulate in their tissues and organs elements of great importance for the normalization of physiological, biochemical and genetic processes. Taking this into account, when studying the chemical composition of plants, determining their elemental composition is the main factor in finding solutions to theoretical and practical problems. Studying the role of such vital elements allows a deep understanding of the molecular mechanisms of biological and ecological characteristics of species (taxa) belonging to a certain group [8].

Samples were prepared in the following order: each sample was placed in separate polyethylene bags, and the time of collection, a brief description of the location, and area were indicated. Then, in laboratory conditions, the required amount was crushed in a porcelain bowl, dried at a temperature of 600^0 C, and passed through a 2 mm sieve. 30-40 mg of plant samples were taken for the determination of short-lived isotopes for neutron activation analysis (NAT) of samples using the quatrovania method. Each weighed sample was then placed in numbered plastic bags and sent to the VVR-SM research reactor for neutron activation analysis. Determination of the amount of elements in plant samples was carried out using neutron activation analysis in the VVR-SM (Russia, 1959, modernized in 1980) research reactor at the Activation Analysis Laboratory of the Institute of Nuclear Physics of the Russian Federation FA.

Samples brought from the research reactor were analyzed under laboratory conditions.

Different standards for determining the amount of elements: used in the laboratory (desalted filter paper obtained by dropping the exact amount of the element), IAEA Comparison standard samples such as Sabbage IAEA 359 and Lichen IAEA 336 were used as well as the comparator method.

As a result of the research, the amount of 35 chemical elements was determined in the leaves and seeds of the E.ferganensis plant growing in Fergana region.

Table. The amount of chemical elements in Euphorbia ferganensis is µg/g

Elements	Leaf	Seed
	Concentration, mkg/g	
Ag	<0.01	0,032
As	<0.1	<0.1
Au	0,0084	0,0029
Ba	6,6	<1.0
Br	108	17
Ca	9770	6170
Ce	0,65	0,40
Cl	78100	20000
Co	0,47	0,31
Cr	0,88	0,42
Cs	0,071	0,021
Cu	6300	1040
Eu	0,017	0,0086
Fe	510	270

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Hf	0,069	0,019
Hg	0,017	<0.01
K	22900	13700
La	0,45	0,22
Lu	<0.001	<0.001
Mn	48	35
Mo	18	4,8
Na	75000	20000
Ni	6,5	4,5
Rb	1,9	1,1
Sb	0,024	0,02
Sc	0,16	0,074
Se	0,59	0,088
Sm	0,054	0,029
Sr	210	140
Ta	<0.1	<0.1
Tb	<1.0	<1.0
Th	0,11	0,076
U	<0.1	<0.1
Yb	<0.001	<0.001
Zn	20	31

Micro- and ultra-microelements such as bromine, calcium, chlorine, cobalt, chromium, copper, European, iron, lanthanum, magnesium, manganese, molybdenum, sodium, zinc can be listed as important bioelements in plant life processes.

The obtained results showed that the seeds and leaves of the plant contain large amounts of macro- and microelements such as calcium, chlorine, copper, potassium, and sodium. This, in turn, requires in-vitro microclonal propagation in order to enrich the food base, taking into account the medicinal properties and the chemical composition of E.ferganensis plant.

Conclusion

In conclusion, the presence of medicinal substances and elements in the composition of the Euphorbia ferganensis plant has been proven as a result of scientific research experiments. The chemical composition and water-soluble vitamins of the E.ferganensis plant selected as a research object were also obtained. Based on these results, it was determined that it is possible to achieve high efficiency by multiplying and localizing the plant in vitro.

References

1. ФлораУзбекистана. -Ташкент,-2019.-IVт.а.- с.251; б.- с. 96
2. Ne’matova M.A., Xalbekova X.U., Sherimbetov S.G., Abdullajanova N.F., Ishimov U.J. Euphorbia ferganensis o’simligi moddalari biofaolligi va in vitro sharoitida ko’paytirish masalalari. Биофика ва биокимё муаммолари Тошкент– 2022.
3. Абдулладжанова Н.Г., Мавлянов С.М., Далимов Д.Н.Фенольные соединения Euphorbia ferganensis B.Fedsch//Химия природ.содин.-2001.-№2.-С.167.

4. Tannins and related poliphenols of Euphoriaceous Plants.IV. Euphorbins A and B, novel dimeric dehydroelagitannins from Euphorbia hirta./Yoshida T., Chen L., Shungu T., Okuda T.//Chem.Pharm.Bull.-2016.-V.36.-P.2940-2949.
5. Н.Г.Абдулладжанова, С.М.Мавлянов, Ш.И.Салихов, Ф.Г.Камаев. Биологические активные вещества: фундаменталньные и прикладные вопросы получения и применение. -Украина, Новый Свет, АР Крым. 2011. С. 236-237.
6. Таджибаев М.М., Лутфуллин К.Л., Мирзаматов Р.Т. Фенольные соединения Euphorbia ferganrnsis и Astragalus orbicalates.//Химия природ.соедин.,-2008,-N3,-С.457.
7. Gharbia H. Danial., Diaa A. Ibrahim. Efficient Protocol of Micropropagation, and Organogenesis of *Euphorbia pulcherrima Willd*. Plants via Stem and Leaf Segments International Journal of Advanced Engineering Research and Science (IJAERS) [Vol-3, Issue-8, Aug- 2016].
8. Шеримбетов С.Г. Орол денгизининг куриган ҳудудларидаги ўсимликларнинг молекуляр-биологик ва экологик хусусиятлари // Биол. фанл. докт. ... дисс. 2017. Б. 135.