


# OZIQ-OVQAT XAVFSIZLIGI: MILLIY VA GLOBAL MUAMMOLAR

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SHAROF RASHIDOV NOMIDAGI SAMARQAND DAVLAT UNIVERSITETI
BIOKIMYO INSTITUTI

**O‘ZBEKISTON RESPUBLIKASI OLIY TA’LIM, FAN VA INNOVATSIYALAR VAZIRLIGI**

**SHAROF RASHIDOV NOMIDAGI SAMARQAND DAVLAT UNIVERSITETI**

# “OZIQ-OVQAT XAVFSIZLIGI: MILLIY VA GLOBAL MUAMMOLAR” ILMIY JURNALI

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# GROWTH, DEVELOPMENT AND AMINO ACID COMPOSITION OF VEGETATIVE ORGANS OF CHELIDONIUN MAJUS L. IN GROWING CONDITIONS OF SAMARKAND REGION (UZBEKISTAN)

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***Annotation.*** *This article presents the results of a study of the growth, development and amino acid composition of the above-ground and underground organs of the promising medicinal plant Chelidoniun majus L. under different lighting conditions in the Samarkand region. The results showed that in the shade the amount of amino acids of this species is greater than under natural sunlight. The amino acid proline differed significantly in the root from the above-ground part. In the illuminated environment, it was established that the amount of amino acids in the above-ground part of the plant is equal to the amount of amino acids in the root. Despite the appearance of synthetic and antibiotic substances in the arsenal of modern medicine, interest in medicinal plants has not disappeared. It is known that the place of growth greatly affects the qualitative and quantitative content of biologically active substances, in addition, the proximity of industrial zones causes the accumulation of large quantities of substances harmful to the human body in plants.*

***Keywords:*** *Chelidoniun majus L., ontogenetic periods, aspartic and glutamic acids, amino acids.*

***Annotatsiya.*** *Maqolada Samarqand viloyatida turli yoritil ganlik sharoitida istiqbolli dorivor o‘simlik Chelidoniun majus L.ning yer usti va Yer osti organlarining o‘sishi, rivojlanishi va aminokislotalar tarkibini o‘rganish natijalari keltirilgan. Natijalar shuni ko'rsatdiki, soyada ushbu turdagi aminokislotalar miqdori tabiiy quyosh nuriga qaraganda ko'proq. Aminokislota prolin ildizda yer usti qismidan sezilarli darajada farq qilgan. Yoritilgan muhitda o'simlikning yer usti qismidagi aminokislotalar miqdori ildizdagi aminokislotalar miqdoriga teng ekanligi aniqlandi. Zamonaviy tibbiyot amaliyotida sintetik va antibiotik moddalar paydo bo'lishiga qaramay, dorivor o'simliklarga bo'lgan qiziqish yo'qolmadi. Ma'lumki, o'sish joyi biologik faol moddalarning sifat va miqdoriy tarkibiga katta ta'sir qiladi, bundan tashqari, sanoat zonalarining yaqinligi o'simliklarda inson organizmiga zararli moddalarning ko'p miqdorda to'planishiga olib keladi.*

***Kalit so‘zlar:*** *Chelidoniun majus L., ontogenetik davrlar, aspargin va glutamin kislotalar, aminokislotalar.*

**Introduction.** At present, herbal medicines are becoming increasingly popular in medical practice, which is primarily due to the growth of toxic-allergic diseases and drug resistance due to the use of synthetic drugs [1, 2].

The relevance of studying the issues of growth, development and amino acid composition of plants gives special importance in medicine to biologically active compounds from the groups of alkaloids contained in the vegetative organs of the plant and used in the treatment of a wide range of diseases [3].

One of the widely used and promising sources of such products is the plant greater celandine – *Chelidonium majus* L. of the Papaveraceae family. At the same time, interest in its use as a medicinal raw material has recently increased.

In nature, *Ch. Május* L. grows in Europe and the Mediterranean, and is also common in America, where it was brought in 1672 by colonizers as a cure for warts. It has naturalized throughout the world in the temperate climate zone. In Russia, it grows as a weed throughout the entire territory, except for the Arctic [4]. They are

found in temperate regions from Europe to Japan. It grows in shady places along the banks of rivers and streams, along the edges of swamps, in bush thickets. As a weed it can be found in gardens, vegetable gardens, near houses, in pastures. This species does not occur in natural conditions in Uzbekistan. There is evidence that in folk medicine it is used to treat some diseases of humans and animals.

*Ch. Majus* is a poisonous plant. When broken, the stem secretes drops of thick milky juice, which immediately turns orange-red when exposed to air (the juice is very pungent, and should never be allowed to come into contact with the skin, especially the mucous membranes – eyes and mouth). The plant is not eaten by cattle in pastures: it causes poisoning, severe inflammation of the stomach and intestines. For example, pigs, having eaten celandine, not only lose strength, but also noticeably go deaf. Celandine is only harmless to sika deer. Drying does not destroy the poisonous properties of celandine, which cause depression and paralysis of the central nervous system. Celandine was considered a medicinal plant by the ancient Romans. Ibn Sina wrote that it is useful to chew greater celandine for toothache, "… the squeezed juice is very helpful in sharpening vision and reducing water (cataract) and cataract in front of the pupil."

The experience of primary introduction allows us to reveal the adaptive capabilities of medicinal plants and begin developing a set of agrotechnical measures necessary for the successful implementation of their biological potential in new growing conditions. In recent years, under the conditions of introduction of the Samarkand region, biological characteristics of a number of promising medicinal plants have been studied. Their ontogenesis, bioecology, productivity and phytochemical composition of species of several plant families have been studied [5, 6, 7, 8, 9, 10].

**Materials And Methods.**

**Botanical description.** *Chelidónium május* L. is a perennial herbaceous plant, a species of the genus *Chelidonium* L., the family Papaveraceae. The stem is 50-100 cm high, straight, branched. The basal leaves are petiolate, deeply pinnately divided, have three to five pairs of rounded or ovate lobes. The upper lobe is larger, usually three-lobed; the leaves are green above, glaucous below. The upper leaves are sessile. The flowers are regular, golden-yellow, collected in a simple umbel, each flower consists of four petals about 1 cm long.

*Ch. május* L. has no nectaries, but attracts insects with an abundance of pollen. It blooms from May to August. The fruit is a many-seeded pod-shaped capsule. The seeds are small, black, shiny with a white comb-like appendage, similar to elaiosomes (special appendages containing fatty substances), which attracts ants that spread these seeds (the phenomenon of myrmecochory).

**Climate and precipitation.** The studies were conducted in the meadow-gray soils of the Samarkand region during 2022-2024. Despite the fact that this is a foothill zone in terms of climate, the study area belongs to regions with a sharply continental climate and is located at an altitude of 800 m above sea level. The average annual precipitation is 358.8 mm. The average annual air temperature is 14.9ºC, the lowest average temperature in January is 3.4ºC. The average annual relative humidity is 59%. The average temperature in January-March was 4.4ºC. In January and February 2023, precipitation was 35.5 mm more than the annual precipitation amount, and the precipitation amount in March, April, May, June averaged 31.3 mm, which is 8.8 mm less than the annual precipitation amount for this period. The average number of frost-free days (not below 0ºC) is 235 days. The average air temperature is 15-16ºC, the absolute maximum is +42ºC and the absolute minimum is - 17ºC. The wind speed was 6-9 meters per second (Figure 1-3).

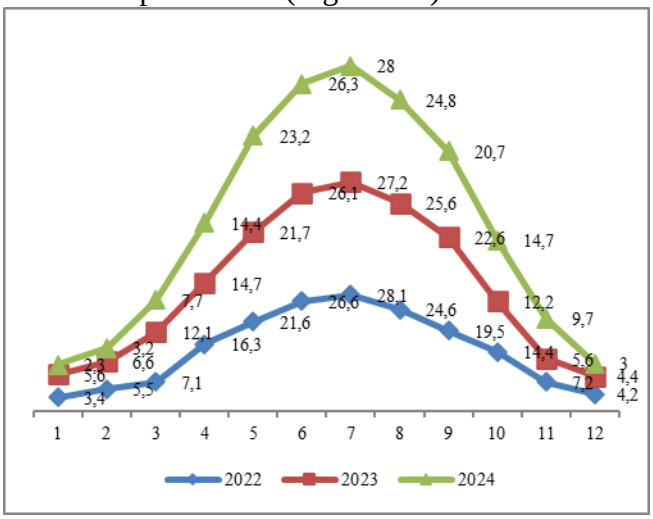



**Fig.1. Average annual air temperature,**ºC

**Growth and development.** The ontogenesis of *C. majus* was described by M.F. Levchenko [11] under conditions of culture by calendar age. However, for population-ontogenetic studies, it is more important to identify ontogenetic states than

to determine calendar age, since individuals reach a certain ontogenetic state at different calendar times [12].

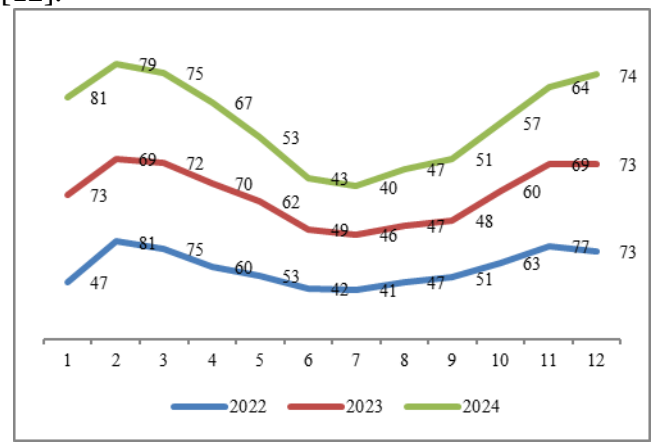



**Fig.2. Average annual air humidity**

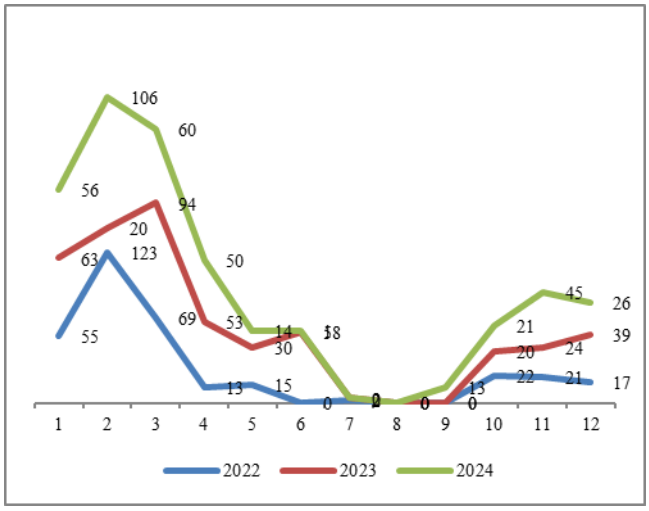



**Fig.3. Average annual precipitation**

**Methods for studying amino acid composition.** The content and amount of free amino acids in the plant were determined. The precipitated proteins and peptides were separated from the aqueous extract by centrifugation. For this purpose, 1 ml (exact volume) of 20% TCA was added to 1 ml of the studied sample. After 10 min, the sediment was separated by centrifugation at 8000 rpm for 15 min. 0.1 ml of the supernatant was separated and lyophilized. The hydrolysate was evaporated, the dry residue was dissolved in a mixture of triethylamine-acetonitrile-water (1:7:1) and dried.

This operation was repeated twice to neutralize the acid. Phenylthiocarbamyl derivatives (PTC) of amino acids were obtained by reaction with phenylthioisocyanate according to the method of Stephen A., Cohen-Daviel. Derivatives of amino acids were determined by HPLC. HPLC conditions: Agilent Technologies 1200 chromatograph with DAD detector, Discovery HS C18 75x4.6 mm column. Solution A: 0.14 M $CH_3COONa$ + 0.05% TEA, pH 6.4, B: $CH_3CN$. Flow rate 1.2 mL/min, absorbance 269 nm. Gradient %B/min: 1–6%/0–2.5 min; 6-30%/2.51-40 min; 30-60%/40.1-45 min; 60-60%/45.1-50 min; 60-0%/50.1-55 min.

**Results and discussion.**

**Growth and development *C. majus*.** In the ontogenesis of *C. majus*, 4 periods of development are distinguished: latent, pregenerative, generative, postgenerative and 10 ontogenetic states (se, p, j, im, v, gj, g2, g3, ss, s). A detailed description of the complete ontogenesis of C. majus is given in the "Ontogenetic Atlas of Medicinal Plants" [13]. This work presents those qualitative features that are essential for visual determination of age groups in the conditions of the Samarkand region (table).

In the pregenerative period of development, such a feature, in our opinion, is the morphological features of the leaf. The sprouts develop the main shoot with two cotyledon leaves of pale green color, located oppositely, and one simple leaf with a rounded leaf blade with a serrated edge.

Juvenile plants are characterized by the appearance of leaves divided into 3 segments. In immature plants, odd-pinnate leaves with a serrated edge, divided into 5 segments, appear on the rosette shoot. In the virginal state, the main shoot remains rosette, but the degree of dissection of the leaf blade increases to 7-11 segments.

In the generative period of development, it is almost impossible to distinguish age states from each other by the dissection of the leaf blade, since the shoots have sessile and short-petiolate leaves with a different number of segments. Young, middle-aged, old generative plants do not have specific features in the structure of the leaf blade. In this regard, the definition of the ontogenetic state in these age groups is carried out by the number of generative shoots, by the thickness and condition of the caudex, by the power of the plant. Young generative plants form 1-2 semi-rosette generative shoots with 1-3 inflorescences.

Middle-aged generative plants also retain rosette leaves of the main semi-rosette shoot. Generative shoots are more powerful, they have 5 or more inflorescences. In the process of development of greater celandine to the g2 state, a two-headed caudex is formed. Old generative plants form 1-2 generative shoots with small odd-pinnately dissected leaves and 1-2 inflorescences.

Table 1.

**Morphometric indices of *Chelidónium május* L. leaf in different ontogenetic periods**

| Signs | Immature state | | | Virginile state | | |
|---|---|---|---|---|---|---|
| | $X_{min}$ | $X_{max}$ | $X_{avg}$ | $X_{min}$ | $X_{max}$ | $X_{average}$ |
| Sheet length, cm. | 5.8 (21.2) | 8.1 (13.2) | 6.6±0.6 | 12.6 (15.7) | 24.6 (11.8) | 14.6 (1.1) |
| Number of sheets, pcs. | 4.5 (15.3) | 8.5 (10.2) | 5.3±0.4 | 6.1 (8.2) | 15.3 (7.2) | 13.2 (1.1) |

*Note: $X_{avg}$ is the arithmetic mean, $X_{min}$ and $X_{max}$ are the minimum and maximum values of the feature. In brackets is the proportion of the total number of individuals, %.*

Subsenile plants have a simpler structure of rosette odd-pinnately dissected leaves compared to the leaves of adult plants. They are smaller and divided into 3-5 segments. Senile plants are represented by a small rosette shoot with small leaves of the juvenile type.

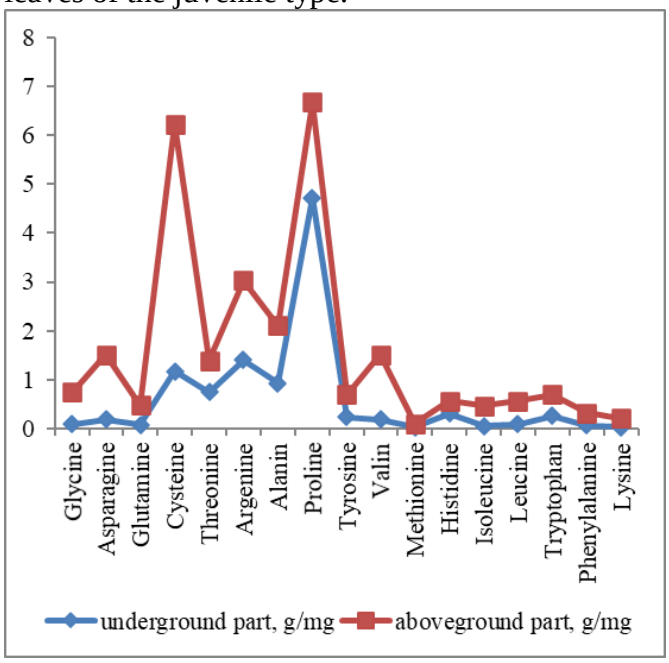



**Fig. 4. Amino acid composition and concentration of underground and aboveground organs of *Ch. majus* L. in natural sun conditions**

**Comparative analysis of amino acids of vegetative organs of plants under conditions of growing in shade and natural sun.** As a result of chemical analysis, the data show that the amount of aspartic and glutamic acids in the root of the plant raw material grown in a sunny environment is higher than in the above-ground part. It was found that the content of cysteine in the above-ground organs differs significantly from the content in the root. A similar situation is observed with valine, isoleucine, leucine, phenylalanine, tryptophan and lysine. The amino acid proline differed significantly in the root from the above-ground part. In a sunny environment, it was found that the amount of amino acids on the soil surface is equal to the amount of amino acids in the root. At the same time, an almost opposite trend was observed in the amount and composition of amino acids in plant raw materials grown in a shaded environment. That is, it was found that there is more aspartic and glutamic acids than contained in the raw material grown in the plant. Other amino acids also differed in different quantities and ratios.

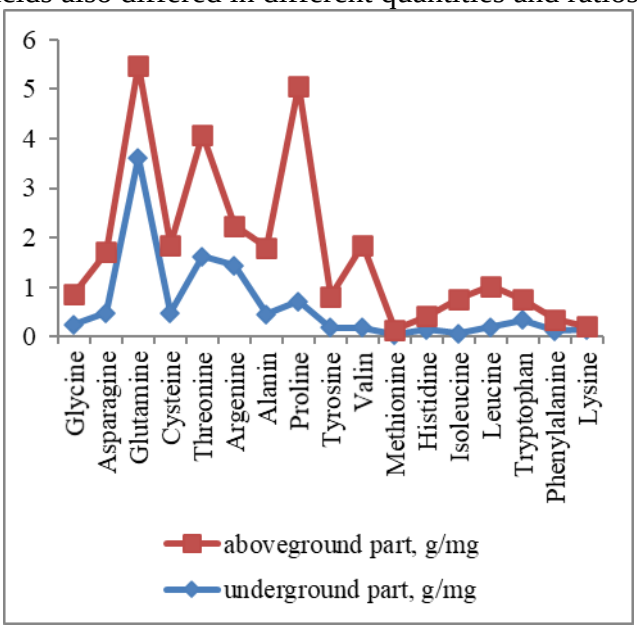



**Fig.5. Amino acid composition and concentration of underground and aboveground organs of *Ch. majus* L. in shaded conditions**

A plant grown in a sunny place contains significantly more aspartic acid than a plant grown in the shade. However, glutamine was found in higher amounts in the root and aboveground portion of the shade-grown plant than in the sun-grown plant, especially in the root. This was also true for most other amino acids (Figure 4, 5). The amount of total amino acids in the root of the shade-grown plant was 11.714 mg/g, and in the aboveground portion – 25.147 mg/g.

**Conclusion.** In general, it has been established that most amino acids are synthesized comparatively more in the root and aboveground parts, which are the main raw materials of the plant grown in a shaded environment. This is explained by the fact that *Ch.majus* is a mesophytic plant, and its natural populations are found mainly in humid and sunny places.

Thus, using the characteristics of leaves and other macromorphological markers, it is possible to determine the biological age of plants without digging up specimens. At the same time, each studied stage of ontogenesis must correspond to a certain morpho-physiological state, characterized by some basic levels of morphological, physiological and biochemical indicators. In this regard, changes in the morphometric indicators of the leaf apparatus of *Ch.majus* in ontogenesis (leaf length, number of leaves, leaf surface area) were analyzed.

**References:**

1. M. Konopleva, Pharmacognosy: natural biologically active substances, (Vitebsk, 2002)
2. A.F. Gammerman, G.N. Kadayev, Medicinal plants (Plants-healers), (Higher school, Moskow, 1983)
3. S.A. Shalimov, Yu.A.Grinevich, S.V. Martynenko, Antitumor and immunomodulatory effect of the drug on the basis of thiophosphoric derivatives of *Chelidónium május* L. alkaloids, (Experimental oncology, 2001)
4. I.A. Gubanov, K.V. Kiseleva, V.S.Novikov, V.N. Tikhomirov, Identifier of vascular plants of the center of European Russia, (Argus, Moskow, 2012)
5. N. Z.asimova, Y.Tashpulatov, I. Mukumov, M. Hasanov, S. Shernazarov, Assessment of the influence of external factors on the growth of roots and bulb scales of some varieties of *Lilium* L, E3S Web of Conferences, EDP Sciences, 03016 (2024) https://doi.org/10.1051/e3sconf/202451003016
6. N. Bobokandov, Z. Nomozova, Y. Tashpulatov, E.Isomov, A. Akhmedov, Assessment of the current condition and ontogenetic structure of the populations of Leontice incerta Pall. (Berberidaceae) in the Kyzyl-Kum Desert, Uzbekistan. Biodiversitas Journal of Biological Diversity, 25 (6). (2024). https://doi:10.13057/biodiv/d250646
7. Y. S. Tashpulatov, A.T. Sarabekov, N.S. Khasanov, S.A. Valiyev, A.N. Khujanov, Chemical composition of helichrysum maracandicum popov ex kirp. in the condition in vitro cultivated. E3S Web of Conferences, 03018, EDP Sciences. (2024). https://doi.org/10.1051/e3sconf/202453803018
8. N. Bobokandov, Z. Nomozova, I., Mukumov, S. Mustanov, Y. Tashpulatov, Comparative analysis of the biochemical composition of *Leontice* L. Species. E3S Web of Conferences, 05001, EDP Sciences. (2024). https://doi.org/10.1051/e3sconf/202453705001
9. E. Isomov, Z. Nomozova, G. Djumayeva, N. Bobokandov, Y. Tashpulatov, Anatomical structure of vegetative organs of Artichoke Green gold variety (in medium saline soil conditions), E3S Web of Conferences, 01008, EDP Sciences. (2024). https://doi.org/10.1051/e3sconf/202451001008
10. N. Jumakulova, F. Kabulova, A. Khujanov, Y. Tashpulatov, M. Elomonova, Features of Phenological Phases of Blackberry in the Conditions of the Samarkand Region, American Journal of Plant Sciences, (2024) https://doi.org/10.4236/ajps.2024.1510056
11. M.F. Levchenko, Life cycle of *Chelidonium majus*, Bot. journal. Leningrad, (1974)
12. Plant coenopopulation (essays on population biology), Moskow, (1988)
13. Ontogenetic atlas of medicinal plants, Yoshkar-Ola. (1997)

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