



STUDY OF MEDICINAL PLANTS IN UZBEKISTAN AND FOREIGN COUNTRIES

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Abstract: This article analyzes the history of studying medicinal plants in foreign and national sources. It was discussed that medicinal plants are a source of study in various fields. Analytical conclusions were provided regarding the number of families and species on Earth and in our country.

Keywords: plant, medicine, ethnobotany, species, family.

The history of the study of medicinal plants dates back to the most ancient periods of human civilization. Today, it remains one of the central directions of pharmacognosy, ethnobotany, phytochemistry, and ecology. We will reflect on the historical stages and current state of research conducted in the Republic of Uzbekistan and foreign countries.

Speaking of medicinal plants, it is impossible not to mention Abu Rayhan Biruni. His work, popularly known as "Saydana"¹ is dedicated to the classification of plant names and their properties. The work is originally considered a linguistic source. The names of medicinal plants are given in dictionary order. Names are provided in multiple languages. The best thing is that the scientific name of the plant and its popularity among the people are also clearly mentioned. This method reduced the labor of the common population in finding medicinal plants several times over. In his work "Kitab as-saydana fi-t-tibb," Abu Rayhan Biruni provided unique information about 674 species and 90 products of medicinal plants. This work is the first systematic study of the flora of Central Asia, scientifically classifying the morphological characteristics of plants, harvesting dates, pharmacological effects, and methods of their application. Beruni's achievement is that he studied medicinal plants exclusively for medicinal purposes.

Also known as Abu Ali ibn Sina (Avicenna), in his work "Al-Qanun fi-t-tibb"² he described more than 800 medicinal plants in detail and analyzed their ontogenesis, chemical composition, and therapeutic effects. His achievement is significant in that he created a theoretical basis for the use of medicinal plants not only in folk medicine but also in scientific medicine.

In the second half of the 20th century, special attention was paid to the study and cultivation of medicinal plants. For the first time in Uzbekistan, medicinal plants were planted in the farms of the Bostanlyk district of the Tashkent region in 1973. Later (1978), a farm for growing medicinal plants named after Ibn Sina was established in the Pap district of the Namangan region. During this period, large-scale research was conducted at the Botanical Garden of the Central Asian State University, the Institute of Botany of the Academy of Sciences, and other institutions.

¹ Abu Rayhon Beruniy. Kitob as-saydana fi-t-tibb. –Toshkent: Fan nashriyoti, 1974. 5-12-b.

² Abu Ali ibn Sino. Al-Qonun fi-t-tibb. – Toshkent: Fan nashriyoti, 1995.

During the years of independence (after 1991), the study and cultivation of medicinal plants have reached a new level. Resolution of the President of the Republic of Uzbekistan No. PP-4670 dated April 10, 2020, "On measures for the protection, cultivation, processing, and rational use of available resources of wild medicinal plants" became an important document in the development of the medicinal plant industry. Based on this resolution, 9 clusters of medicinal plants were created, and measures were taken to preserve wild resources and establish cultivated plantations. Currently, comprehensive research is being conducted at the Tashkent Pharmaceutical Institute, the Institute of Botany of the Academy of Sciences of Uzbekistan, the State Forestry Committee, and other scientific institutions to study the biological diversity, pharmacological properties, and resources of medicinal plants. More than 700 species of medicinal plants have been recorded in Uzbekistan, of which about 120 species grow in natural conditions and are used in scientific and folk medicine.

In the modern era, the contribution of O.Kakhkharovich Khojimatov³ should be noted. In the works of O.K. Khojimatov "Medicinal Plants of the South-Western Tien-Shan" (2008) and "An Overview of Ethnomedicinal Plants of Uzbekistan" (Ethnobotany Research and Applications, 2020), more than 600 medicinal species of the flora of Uzbekistan were studied using ethnobotanical and pharmacognostic approaches. His achievement was the inventory of endemic species and the scientific substantiation of their use in folk medicine. O. Abduraimov⁴'s work "The Main Medicinal Plants in Arid Regions of Uzbekistan and Their Traditional Use in Folk Medicine" (Plants, 2023) analyzed 529 species of medicinal plants in desert and foothill zones. O. Abduraimov deeply studied the ecological adaptability of medicinal plants in hilly areas and their use in folk medicine. His achievement was evident in providing practical recommendations for resource conservation in the context of climate change.

The work "Technology and Ecology of Medicinal Plant Cultivation"⁵ by U.Akhmedov, A.Ergashev, A.Abzalov, M.Yulchieva, and D.Mustafakulov summarizes the experience of post-Soviet cultivation. It is characterized by the fact that it provides very valuable information about the patterns of cultivation. Z.I.Sanoev⁶, P.K. Turdiev, N.Kh. Alimova, and B.P. Berdimurodov systematized more than 700 types of medicines in Uzbekistan and their pharmacological properties in their work "Pharmacognosy".

Kh.Kh. Kholmatov⁷ analyzed the cluster system and export potential in his work "Pharmacognosy Part I."

In the works of Kh.K. Karshibaev⁸ and T.Kh. Makhkamov, titled "Biology and Ecology of Medicinal Plants," the biological and ecological characteristics of plants were studied in depth.

³ Khojimatov O.K. Лекарственные растения Юго-Западного Тянь-Шаня. – Ташкент, 2008. 322 с.

⁴ Abduraimov O.S., Li W., Shomurodov H.F., Feng Y. The Main Medicinal Plants in Arid Regions of Uzbekistan and Their Traditional Use in Folk Medicine // Plants. 2023. Vol. 12. № 16. Article 2950. <https://doi.org/10.3390/plants12162950>

⁵ Ahmedov O., Ergashev A., Abzalov A., Yulchiyeva M., Mustafakulov D. Dorivor o'simliklar yetishtirish texnologiyasi va ekologiya. – Toshkent: Tafakkur bo'stoni, 2018. 45-47-betlar. 224 b.

⁶ Sanoyev Z.I., Turdiyev P.Q., Alimova N.X., Berdimurodov B.P. Farmakognoziya. Darslik. – Toshkent, 2023. 417 b.

⁷ Xolmatov H.X. Farmakognoziya. I qism. – Toshkent, 2023. 210-212-betlar. 404 b.

⁸ Karshibayev X.K., Makhkamov T.X. Dorivor o'simliklar biologiyasi va ekologiyasi. – Guliston: "Ziyo Nashr-Matbaa" nashriyoti, 2022. 245 b.

In the joint works of D. Khamraeva⁹ and A. Khuzhanov, the introduction and ethnobotany of essential oil plants belonging to the Lamiaceae family were studied. This work served as the basis for developing a strategy for the conservation and sustainable use of medicinal plant resources at the Institute of Botany of the Academy of Sciences of Uzbekistan.

The history of studying medicinal plants in foreign countries also dates back to ancient times. In ancient China, Shen Nung (c. 2500 BC) compiled the first manual on medicinal plants. In India, the Ayurveda system has comprehensively studied medicinal plants, and even today, 40-60% of their medicines are prepared from plant raw materials. In Europe, the science of pharmacognosy was formed in the 18th and 19th centuries, based on Dioscorides's "Materia Medica" (1st century) and Galen's works. In Russia, A.F. Gammerman, A.P. Orekhov, and other scientists deeply studied the medicinal plants of Central Asia. In the modern era, traditional Chinese medicine (TCM), Indian Ayurveda, and the pharmaceutical industry in European countries are studying medicinal plants in conjunction with biotechnology and nanotechnology methods.

Currently, the study of medicinal plants in the Republic of Uzbekistan is carried out within the system of research institutes, higher educational institutions, and clusters. Laboratories for essential oil, medicinal, and dyeing plants operate at the Institute of Botany and the Botanical Garden of the Academy of Sciences. In 1997, medicinal preparations such as "Khojimatov's bile-conducting collection" were created and approved for use in medicine. Based on Presidential decrees (PP-3532, PP-5707, PP-4670), measures for the development of the pharmaceutical industry and the sustainable management of medicinal plant resources have been strengthened. As a result, after 2020, the number of clusters for growing medicinal plants increased, and their export potential increased.

In foreign practice, China and India cultivate more than 80% of medicinal plants and supply them to the global market. In the European Union, pharmacognosy laboratories pay great attention to chemical composition and standardization. Uzbekistan is adopting this experience and enriching the local flora through introduction and acclimatization. Currently, due to climate change and anthropogenic impact, some medicinal plants are declining, making conservation and sustainable use a pressing issue. Regions such as the Surkhandarya region are rich in medicinal plant resources, and their study and processing have great prospects.

The monumental work "Medicinal Plants of Central Asia: Uzbekistan and Kyrgyzstan," edited by foreign researchers S.W.Eisenman¹⁰, D.E.Zaurov, and L.Struwe, deserves attention. This book is the first major English-language work created in collaboration with Rutgers University (USA) and scientists from Uzbekistan and Kyrgyzstan, providing detailed coverage of more than 200 important medicinal plants of Central Asia from the perspectives of taxonomy, morphology, ecology, ethnobotany, phytochemistry, and pharmacology. The achievement of S. Eisenman and D. Zaurov is that they were the first to document the medicinal properties of many species in English, creating hundreds of color photographs and English-Russian

⁹ Khamraeva D.T., Fakhriddinova D., Khojimatov O., Bussmann R.W., Abdinazarov S.K. Introduction of valuable medicinal plants of traditional medicine of Lamiaceae family in the conditions of the Tashkent Botanical Garden // Ethnobotany Research and Applications. 2024. Vol. 29. P. 1–12. Rasmiy havola: <https://ethnobotanyjournal.org/index.php/era/article/view/6011>

¹⁰ Sasha Eisenman, David Zaurov, Lena Struwe. Medicinal Plants of Central Asia: Uzbekistan and Kyrgyzstan. – New York: Springer, 2013. 340 p.



dictionaries. The book also analyzes the geographical, climatic, and vegetation characteristics of the flora of Uzbekistan and is an important source for southern regions such as Surkhandarya. This work was an important step in the scientific "discovery" of Central Asian medicinal plants by foreign scientists and laid the foundation for subsequent international projects.

R.W. Bussmann¹¹'s joint article "An overview of Ethnomedicinal Plants of Uzbekistan" (Ethnobotany Research and Applications, 2020) is considered one of the important studies. Bussmann's achievements were clearly manifested in his work using ethnobotanical methods (semi-structured interviews, expeditions) to document 117 species of medicinal plants in Uzbekistan across 45 families and 94 genera. He assessed Uzbekistan as the center of Central Asia's medicinal plant diversity and emphasized the level of endemism. Bussmann's other works (for example, a series of articles in 2020) help compare Central Asian ethnopharmacology in a global context.

In F. Sharopov¹²'s article "Aromatic Medicinal Plants from Tajikistan (Central Asia) " and subsequent research on Central Asia, the phytochemistry of essential oil plants was studied in depth. F. Sharopov's achievement was the determination of the composition of secondary metabolites and the biological activity of 18 aromatic plants. These works allow for a comparative analysis of similar species (mint, wormwood) in Surkhandarya and other mountainous zones of Uzbekistan.

In the article "Exploring biodiversity and ethnobotanical significance of Solanum species in Uzbekistan" by Y. Gafforov¹³ and colleagues, 8 species of the genus Solanum (*S. dulcamara*, *S. lycopersicum*, etc.) were examined in detail from ethnobotanical and pharmacological perspectives. Their achievement was the first comprehensive analysis of the morphology, distribution, phenology, pharmacology, and phytochemistry of Solanum species in Uzbekistan. This study opened a new direction for the flora of Uzbekistan and strengthened international cooperation.

N. Aldairov¹⁴ and his colleagues studied Central Asian ethnoveterinary in the works "An ethnoveterinary study of wild medicinal plants used by the Kyrgyz farmers" and "An ethnobotanical study of plants and traditional herbal therapies in the Kara-Koy Gorge, Kyrgyz Republic." N. Aldairov's achievement was the systematization of methods for documenting and preparing wild plants used in domestic animal diseases. These works can serve as a foundation for a comparative analysis with neighboring regions of Uzbekistan.

¹¹ Khojimatov O. K., Khamraeva D. T., Khujanov A. N., & Bussmann R. W. (2020). An overview of Ethnomedicinal plants of Uzbekistan. *Ethnobotany Research and Applications*, 20, 1–19. <https://doi.org/10.32859/era.20.08.1-19>

¹² Sharopov F. S., Zhang, H., Wink, M., & Setzer, W. N. (2015). Aromatic Medicinal Plants from Tajikistan (Central Asia). *Medicines*, 2(1), 28–46. <https://doi.org/10.3390/medicines2010028>

¹³ Gafforov Y., Rašeta M., Zafar M., Makhkamov T., Yarasheva M., Chen J.-J., Zhumagul M., Wang M., Ghosh S., Abbasi A.M., Yuldashev A., Mamarakhimov O., Alosaimi A.A., Berdieva D., Rapior S. Exploring biodiversity and ethnobotanical significance of Solanum species in Uzbekistan: unveiling the cultural wealth and ethnopharmacological uses // *Frontiers in Pharmacology*. 2024. 14. 1287793. <https://doi.org/10.3389/fphar.2023.1287793>

¹⁴ Aldayarov N., Tulobaev A., Salykov R., Jumabekova J., Kydyralieva B., Omurzakova N., Kurmanbekova G., Imanberdieva N., Usabaliev B., Borkoev B., Salieva K., Salieva Z., Omurzakov T., Chekirov K. An ethnoveterinary study of wild medicinal plants used by the Kyrgyz farmers // *Journal of Ethnopharmacology*. 2022. 285. 114842. <https://doi.org/10.1016/j.jep.2021.114842>

Expeditions of botanists from Longwood¹⁵ Gardens (USA) and the Plant Collecting Collaborative in Uzbekistan have initiated an international cooperation for the collection and conservation of rare and endangered species. Their achievement was manifested in the creation of seed and herbarium collections in cooperation with the flora of Uzbekistan.

In addition, 657 plants are described in Pedanius Dioscorides¹⁶ *De Materia Medica*; Li Shizhen¹⁷'s work "Ben Cao Gang Mu" contains information covering 1,892 drugs and 11,000 prescriptions; Shen Nong¹⁸'s work "Shen nong ben Cao Jing" is considered the first medicinal manual; Barbara Griggs¹⁹ "Green Pharmacy" was the first to reveal the history of Western medicine; David Hoffman²⁰ "Medical Herbalism" combined clinical practice; Andrew Chevallier²¹ "Encyclopedia of Herbal Medicine" prepared encyclopedic descriptions for 550 plants.

It is evident from the aforementioned studies that extensive research on medicinal plants has been conducted both abroad and in our republic. Their chemical, morphological, pharmacological, and other properties are well-studied. However, there are practically unexplored medicinal plants in the Surkhandarya region and other regions of Uzbekistan. For example, rare species of *Ferula* (*Ferula tadshikorum*, etc.), some endemic species of *Astragalus* and *Lagochilus*, as well as rare representatives of the *Lamiaceae* and *Asteraceae* in mountainous zones, have not been fully studied in terms of their chemical composition, pharmacological effects, and ecological status. They are at risk of extinction due to climate change and anthropogenic impact. Future research should fill these gaps.

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¹⁵ Zale P. Uncharted Territory: Plant Exploration in Uzbekistan // Longwood Gardens Blog. 2019. January 10. <https://longwoodgardens.org/blog/2019-01-10/uncharted-territory-plant-exploration-uzbekistan>

¹⁶ Dioscorides Pedanius (of Anazarbus). *De materia medica*. Translated and edited by Lily Y. Beck. Hildesheim: Olms-Weidmann, 2005. xxviii + 540 p. (Altertumswissenschaftliche Texte und Studien, Band 38). ISBN 3-487-12881-0.

¹⁷ University of California Press seriyasi: <https://www.ucpress.edu/series/ben-cao-gang-mu-16th-century-chinese-encyclopedia-of-materia-medica-and-natural-history>

¹⁸ Shen Nong. *Shen Nong Ben Cao Jing (The Divine Farmer's Materia Medica)* / Transl. by Yang Shou-zhong. Boulder, CO: Blue Poppy Press, 1998.

¹⁹ Barbara Griggs *Green Pharmacy.* – Rochester: Healing Arts Press, 1997. 400 p.

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