E- Global Congress
Hosted online from Dubai, U. A. E., E - Conference.
Date: 30th December 2025
Website: https://eglobalcongress.com/index.php/egc
ISSN (E): 2836-3612

HEALING PLANTS AND THEIR SIGNIFICANCE IN MEDICINE

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Introduction

Medicinal plants have been known to humankind since ancient times. Plants have long been widely used as a source of biologically active substances. The forests of Uzbekistan are distinguished by their abundance of diverse medicinal trees, shrubs, and herbaceous species. Plants nourish, clothe, and heal humans, serving as an important source of pharmaceutical and technical raw materials. For many centuries, medicinal plants remained the only source of therapeutic remedies. Since the Middle Ages, numerous scientific works describing healing plants and their use in improving human health have been passed down to us.

Outstanding representatives of Eastern medicine and renowned physicians of their time—such as Abu Ali Ibn Sina of Bukhara, Abu Abdallah Muhammad ibn Musa al-Khwarizmi of Khorezm, Abu Bakr Muhammad ibn Zakariya al-Razi, Abu Rayhan Muhammad ibn Ahmad al-Biruni, Arabmuhammadkhan's son Abulgazikhan, and Ismail al-Jurjani—are well-known throughout the world. These scholars successfully used medicinal plants in treating various diseases and left behind a rich written heritage documenting their medical knowledge.

Our great compatriot Abu Ali Ibn Sina (980–1037), who contributed immensely to the development of world medical science, dedicated more than twenty scholarly works to medical issues. Based on the experience he gained over twenty years of medical practice, he created the five-volume "Al-Qanun fi al-Tibb" ("The Canon of Medicine"). For centuries, this work served as a practical guide not only for Arab physicians but also for European medical practitioners. The book contains detailed descriptions of more than 500 medicinal plants and over 40 therapeutic preparations derived from them. This famous work of the scholar has been translated into many European languages and published numerous times. The Latin version of the book alone was reprinted sixteen times, and even today it has not lost its scientific relevance [1].

ISSN (E): 2836-3612

The contribution of the eminent encyclopedic scholar Abu Rayhon Beruni (973–1048) to the development of astronomy, mathematics, physics, mineralogy, geodesy, geography, and the natural sciences is truly immense. Among his scientific works, the most significant and voluminous is the book *"Kitab as-Saydana fi al-Tibb"* (Pharmacognosy in Medicine). This work provides information on 674 medicinal plants and 90 medicinal plant-derived products used in Eastern medicine of that era. The total number of plant names mentioned in *"Saydana"* reaches 750 [2].

For many centuries, the main therapeutic remedies of world civilizations were prepared from the raw materials of healing plants. Medicinal plants are non-toxic or minimally toxic and, most importantly, do not leave harmful aftereffects. They contain large amounts of biologically active compounds and exert long-term therapeutic effects on the human body. In the 20th century, synthetic chemistry developed rapidly, and many new, fast-acting, and potent medicinal substances were created through chemical synthesis. However, their regular use was later found to disrupt the structural and functional processes of the human body. Approximately 25% of synthetic medicines are still related to compounds originally derived from medicinal plants.

According to V. Dushenkov and I. Raskin [3], nearly 20,000 simple molecular compounds have been isolated exclusively from plants. Therefore, in recent decades, interest in medicinal plants has increased once again, as plant-based raw materials have been found to yield highly effective therapeutic products—such as vitamins, biologically active compounds, and minerals—which have strong beneficial effects on the human body.

Of the 847 simple molecular medicinal preparations introduced into medical practice since 1981, 43 are natural compounds and 232 are derivatives of natural compounds. Among the remaining 572 new medicinal preparations, 262 were found to be related to natural compounds. It is well known that approximately 50% of pharmaceuticals produced worldwide are based on raw materials obtained from medicinal plants. Particularly, 77% of preparations used to treat and prevent cardiovascular diseases, 74% of those used in the prevention and treatment of liver and gastrointestinal diseases, 73% of expectorants, and 60% of hemostatic drugs are produced from plant-derived raw materials [4].

ISSN (E): 2836-3612

According to the Food and Agriculture Organization (FAO), more than 50,000 medicinal plant species are currently used for therapeutic purposes worldwide. The use of local flora for medical treatment is especially high in Southeast Asian countries, with this share amounting to 20% in India and 19% in China. Preparations made from medicinal plant raw materials also occupy a substantial place in the pharmacopoeias of Japan, Germany, and other European countries. In Uzbekistan, approximately 4,500 species of higher plants grow naturally, about 1,200 of which possess medicinal properties. Currently, 112 species of medicinal plants are officially approved for use in medical practice within the Republic, and 80% of them grow naturally.

Medicinal plants and plant-based therapeutic preparations play an important role in public health, disease prevention, and the healthy development of younger generations. The cultivation of medicinal plants is one of the main branches of forestry and plays a significant role in supplying the pharmaceutical industry and the population with high-quality, environmentally clean medicinal plant raw materials.

In recent years, many countries—including Uzbekistan—have witnessed rapid development in the pharmaceutical industry, which has significantly increased the demand for medicinal plant raw materials. Due to the limited reserves of naturally growing medicinal plants, the future needs of the pharmaceutical industry can largely be met only through the cultivation of medicinal plants. In Uzbekistan, specialized farms engaged in the cultivation of medicinal plants have been established, and many forestry enterprises, private farms, and agricultural entities have introduced systems for cultivating and processing medicinal plant raw materials.

The therapeutic effect of medicinal plants depends on the quantity of active compounds they contain. These compounds accumulate in different amounts in different parts of the plant. For medicinal preparation, the required parts of the plant are collected at specific periods: buds are gathered in early spring; leaves before or during flowering; flowers when fully opened; fruits and seeds when ripe; and underground organs (roots, rhizomes, bulbs) in early spring or late autumn. The active constituents of medicinal plants may include alkaloids, various glycosides, anthraglycosides, cardiotonic glycosides, saponins, flavonoids, coumarins, tannins, essential oils,

vitamins, resins, and other compounds. Many plants are used to produce antibiotics and phytoncides that can destroy microorganisms and viruses [5]. Most of the medicinal plants used in scientific medicine are the same species that have been employed in folk medicine for centuries. In Uzbekistan, the most widely used medicinal plants include pomegranate, licorice, almond, medicinal marshmallow, walnut, *jag-jag*, plantain, *isirig* (Peganum harmala), *itsigek*, *amonqora*, pistachio, *sachratqi*, *choyo't*, *shildirbosh*, sweet flag, wormwood, camelthorn, beet, *qoqio't*, barberry, rosehip, and others. Various alkaloids are derived from these plants: pachycarpine from licorice, harmine from *Peganum harmala*, anabasine from *itsigek*, galantamine from *amonqora*, and spherophyzine from *shildirbosh*. Anthelmintic pelterine tannate and extracts are prepared from pomegranate peel. Preparations of medicinal marshmallow act as expectorants and emollients; *jag-jag* and *lagoxilus* preparations are used as hemostatic agents; medicines prepared from pistachio and *choyo't* are used for treating gastrointestinal diseases.

Depending on the active substances they contain, medicinal plants are classified as alkaloid-containing, glycoside-containing, essential oil-containing, or vitamin-rich plants. Based on their pharmacological properties, they are categorized as sedative, analgesic, hypnotic, cardiotonic, central nervous system stimulants, antihypertensive agents, and other therapeutic groups [2].

Due to the growing annual demand for medicinal plant products in our country, the volume of raw materials being harvested is also increasing. Consequently, reserves of several medicinal plants in areas where they previously grew abundantly have begun to decline, leading to significant restrictions—or in some cases, complete cessation—of harvesting activities.

In conclusion, it should be emphasized that cultivating medicinal plants, expanding their growth on irrigated lands, and developing proper agro-technologies will create an additional raw material base for the pharmaceutical industry of our Republic and help preserve the reserves of medicinal plants naturally growing in the wild. The only rational way to ensure the sustainable use of medicinal plant resources is to domesticate these species and establish industrial-scale plantations. Preserving these valuable natural resources—medicinal plant reserves—for future

ISSN (E): 2836-3612

generations, protecting their natural habitats, and ensuring their long-term service to human well-being is of great importance.

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