

# Therapeutical Potential of Medicinal Plants: A Review

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## Abstract

Ever since the evolution of mankind, medicinal plants have been playing an essential role in the development of human culture. As a source of medicine, these plants have always been at forefront virtually in all cultures of civilizations. Medicinal plants are regarded as rich resources of traditional medicines and from these plants many of the modern medicines are produced. For thousands of years medicinal plants have been used to treat health disorders, to add flavor and conserve food and to prevent diseases epidemics. The secondary metabolites produced by the plants are usually responsible for the biological characteristics of plant species used throughout the world. The microbial growth in diverse situations is controlled by plant derived products. In this review we gave general overview of the medicinal plants.

**Keywords:** Medicinal plants, Secondary metabolites, Therapeutics, Human civilization

## Introduction

Throughout the human evolution, there has been a noticeable concern for health care and the cure of diseases. Medicinal herbs were the main resource base of almost all the traditional health care systems. The resurrection of phytomedicines is due to increasing evidence of the human health hazards associated with many of the synthetic medicines. Since time immemorial, mankind has used plant extracts from different plants to cure many diseases and thus relieve him from physical agony. In our country, traditional system of medicine plays an important role in health care of rural people for all types of ailments. The healing power of traditional herbal medicines have been realized and documented since *Rigveda* and *Atharvaveda*. Perhaps, the earliest record of medicinal plant, was mentioned in *Rigveda*, is that of a herb called “*Ma Huang*”, a species of *Ephedra*, used medicinally in China for over 5000 years

Human beings have depended on nature for their simple requirements as being the sources for medicines, shelters, food stuffs, fragrances, clothing, flavours, fertilizers and means of transportation throughout the ages. For the large proportions of world’s population medicinal plants continue to show a dominant role in the healthcare system and this is mainly true in developing countries, where herbal medicine has continuous history of long use. The development and recognition of medicinal and financial aids of these plants are on rise in both industrialized and developing nations <sup>[1]</sup>. The foundations of typical traditional systems of medicine for thousands of years that have been in existence have formed from plants. The plants remain to offer mankind with new medicines. Some of the beneficial properties ascribed to plants have recognised to be flawed and medicinal plant treatment is based on the experimental findings of hundreds to thousands of years. The earliest reports carved on clay tablets in cuneiform date from about 2600 BC are from Mesopotamia; among the materials that were used were oils of *Commiphora* species (Myrrh), *Cedrus* species (Cedar), *Glycyrrhiza glabra* (Licorice), *Papaver somniferum* (Poppy juice) and *Cupressus sempervirens* (Cypress) are still used today for the cure of diseases extending from colds and coughs to inflammation

and parasitic infections<sup>[2]</sup>. The traditional medicine practice is widespread in China, India, Japan, Pakistan, Sri Lanka and Thailand. About 40% of the total medicinal consumption is attributed to traditional tribal medicines alone by China. In Thailand, herbal medicines make use of legumes encountered in the Caesalpiniaceae, the Fabaceae, and the Mimosaceae. It is estimated that in mid-90s, more than US\$2.5 billion have resulted from the sales of herbal medicines. The herbal medicinal preparations are more in demand than mainstream pharmaceutical products in Japan. In diversified industries the contribution of plants is remarkable such as fine chemicals, cosmetics, pharmaceuticals and drugs and industrial raw materials etc. For the development of new drug discovery medicinal plants perform a dynamic part. Medicinal plants have proved their sole role in coping with a number of deadly diseases including cancer and the diseases associated with viral onslaught viz. Hepatitis, AIDS etc. In the USA drug market approx. 100 plant made new drugs were presented during 1950-1970 which includes vincristine, reseinnamine, vinblastin, deseridine and reserpine which are from different plants. During 1971-1990 fresh medicines i.e., artemisinin, Zguggulsterone, ginkgolides, lectinam, E-guggulsterone, teniposide, ectoposide, plaunotol and nabilone appeared all around the world. The 2% medicines which were presented during 1991-1995 include irinotecan, toptecan, paclitaxel and gomishin etc. The isolation of serpentine in 1953 from the Indian plant *Rauwolfia serpentine* root was an innovatory episode in treatment of hypertension and lowering of blood pressure. The Vinblastine used for the treatment of leukemia in children, Hodgkins choriocarcinoma, non-Hodgkins lymphomas, testicular and neck cancer was isolated from the *Catharanthus roseus*<sup>[3, 4]</sup>. Indian indigenous tree of *Nothapodytes nimmoniana* (*Mappia foetida*) are frequently used in Japan for the cure of cervical cancer. Even today, plants are not only indispensable in health care, but form the best hope of source for safe future medicines<sup>[5]</sup>. In spite of the fact that now we have at our command a number of modern drugs, it is still genuinely urgent to discover and develop new therapeutic agents. It has been estimated that the acceptable therapy is available only for one third of the known human ailments. Therefore, the fight against diseases must be carried on relentlessly. Traditional plant medicines still enjoy significant position in the modern-day drug industries due to the minor side effects as well as the synergistic action of the combination of compounds. Most of the important drugs of the past 50 years, which have revolutionized modern medicinal practice, have been isolated/derivatized from plants. These chemical ingredients exhibit therapeutic properties of plant and animal drugs. The WHO endorses and promotes the addition of herbal drugs in national health care programs because they are easily accessible at a price within the reach of a common man and are time tested and thus considered to be much safer than the modern synthetic drugs<sup>[6]</sup>. Thus, the research of pharmacologically/ biologically active agents obtained by screening natural sources such as plant extracts had led to the detection of many pharmaceutically valuable drugs that play a key role in the treatment of human diseases<sup>[7]</sup>. World Health Organization (WHO) defines medicinal plants as the “diverse health practices, approaches, knowledge and belief incorporating plant-, animal- and/or mineral based medicines, spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to treat, diagnose, or prevent illness”. It is clear, however, that there is a need to validate the information through an organized infrastructure for it to be used as an effective therapeutic means, either in conjunction with existing therapies, or as a tool in novel drug discovery. Traditional medicines utilizes biological resources and the indigenous knowledge of traditional plant groups, the latter being conveyed verbally from generation to generation. This is closely linked to the conservation of biodiversity and the related intellectual property rights of indigenous people.

The phytochemical-pharmacological research work has recently yielded effective solutions to certain diseases which synthetic drug industry has failed to afford. The most important among them are the research work on *Artemisia annua*, *Cathranthus roseus*, *Taxus* spp., *Lantana camara* and *Baccopa* spp. etc. Such plants were earlier considered as poisonous or useless, but now have been found to contain molecules of high drug values and are considered as medicinal herbs of great significance. Modern searches for bioactive molecules typically make use of sophisticated bioassays and bioassay-guided fractionation of medicinal plants used by traditional healers. This has led to the isolation of several new therapeutically important compounds. A good number of potent drugs and a large number of therapeutic leads and many new pharmacologically active constituents have been developed from herbal drugs due to the dedicated efforts of researchers<sup>[8]</sup>. The manufacture of morphine on industrial scale by E. Merck, Germany in 1826 marks the beginning of commercialization of plant-derived drugs<sup>[9]</sup>. Nearly half of the top selling pharmaceuticals in 1991 were either natural products or their derivatives<sup>[10]</sup>. The distribution analysis of the medicinal plants shows that they are distributed across diverse habitats and landscape elements. Nearly about 70% of the medicinal plants in India are found in tropical forests in Eastern and western Ghats, Chota Nagpur plateau, Aravalis, Vindhyas and the Himalayas. Among the Himalayas, Kashmir Himalayan region is nestled within the Northwestern folds of the recently designated global biodiversity hotspot of the Himalayas<sup>[11]</sup>. It is an integral but geologically younger part of main Himalayan range. Floristic wealth of this region includes a fairly good representation of medicinal plants. Kaul<sup>[12]</sup> has listed 111 medicinal plants from Kashmir and Ladakh. He has also mentioned in his book about healing properties of 291 species of medicinal plants from these regions. The medicinal flora of Kashmir, however, has not been paid due attention and Kashmir alone may have at least two times this number. Some of the most important medicinal plants of Kashmir Himalaya include *Dioscorea deltoidea*, *Rheum emodi*, *Arnebia benthamii*, *Inula racemosa*, *Datura stramonium*, *Aconitum heterophyllum*, *Artemisia* spp., *Podophyllum hexandrum*, *Juniperus macropoda*, *Hypericum perforatum*, *Hyoscyamus niger*, *Sassurea* spp., and *Picrorhiza kurroa* etc., growing in abundance in areas like Yusmarg, PirPanjal, Sonamarg, Gurez, Lolab valley, Gulmarg, Khilanmarg, Pahalgam and Tilail valley. Besides there is a number of aromatic and medicinal plant species grown in different high-altitude regions of Kashmir Valley. The important aromatic plant species include Caraway (*Carum cervi*), Saffron (*Crocus sativus*), Siya zira (*Bunium persicum*), Garlic (*Allium sativa*), Coriander (*Coriandrum sativum*), Mint (*Mentha* spp.), Fennel (*Foeniculum vulgare*) and Hare's foot (*Trigonella foenum-graecum*). Many of these plants are used in standardized plant extracts. There is a promising future of medicinal plants as there are about half million plants around the world, and most of them are not investigated yet for their medical activities and their hidden potential of medical activities could be decisive in the treatment of present and future studies<sup>[13]</sup>. In the development of human culture medicinal plants have played an essential role, for example religions and different ceremonies<sup>[14]</sup>. Among the variety of modern medicines, many of them are produced indirectly from medicinal plants, for example aspirin. Many food crops have medicinal effects, for example garlic. Studying medicinal plants helps to understand plant toxicity and protect human and animals from natural poisons. The medicinal effects of plants are due to secondary metabolite production of the plants. Keeping this in consideration there have been increased waves of interest in the field of research in natural product chemistry. This interest can be due to several factors, including therapeutic needs, the remarkable diversity of both chemical structure and biological activities of naturally occurring secondary metabolites, the utility of novel bioactive natural compounds as biochemical probes, the development of

novel and sensitive techniques to detect biologically active natural products, improved techniques to isolate, purify, and structurally characterize these active constituents, and advances in solving the demand for supply of complex natural products <sup>[15]</sup>. The knowledge on traditional medicine has been continuing for years and has been transmitted from generation to generation. Apart from the medicinal uses, herbs are also used in natural dye, pest control, food, perfume, tea and so on. In many countries different kinds of medicinal plants/ herbs are used to keep ants, flies, mice and flee away from homes and offices. Now a days medicinal herbs are important sources for pharmaceutical manufacturing. Recipes for the treatment of common ailments such as diarrhoea, constipation, hypertension, low sperm count, dysentery and weak penile erection, piles, coated tongue, menstrual disorders, bronchial asthma, leucorrhoea and fevers are given by the traditional medicine practitioners very effectively.

## Conclusion

The importance of traditional medicine has also recognized by World Health Organization (WHO) and has created strategies, guidelines and standards for botanical medicines. For the cultivation, processing of medicinal plants and the manufacture of herbal medicines agro-industrial technologies need to be applied <sup>[16]</sup>. Medicinal plants are resources of new drugs and many of the modern medicines are produced indirectly from plants.

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