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## General overview of medicinal and aromatic plants: A review

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### Abstract

Medicinal plants, also called medicinal herbs, have been discovered and used in traditional medicine practices since pre-historic times and attached with development of human culture. As a source of medicine, medicinal plants have always been at the forefront virtually 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 flavour 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 give a general overview of medicinal plants.

**Keywords:** Medicinal plants, secondary metabolites, drugs

### Introduction

It is an established fact that plants have played a crucial role in the socio-cultural development of human species concurrently in the different parts of human civilization (Pandey, 2019) <sup>[1]</sup>. Human beings have depended on nature for their simple requirements as being the sources for medicine, shelters, foodstuff, fragrances, clothing, flavours, fertilizers and means of transportation throughout the ages. For the large proportions of the 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 a continuous history of long use. The development and recognition of medicinal and financial aids of these plants are on the rise in both industrialized and developing nations (WHO, 1998) <sup>[2]</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 been 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 and 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 (Fakim, 2007) <sup>[3]</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 the 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, rescinamine, vinblastine, deserpidine and reserpine which are from different plants. During 1971-1990 fresh medicines *i.e.*, artemisinin, Z-Guggulsterone, ginkgolides, lectinam, E-guggulsterone, teniposide, etoposide, plautol and nabilone appeared all around the world.

The isolation of serpentine in 1953 from the Indian plant *Rauwolfia serpentina* 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* (Harrison, 1998; Jones, 1998) [4, 5]. 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 (Hamburger and Hostettmann, 1991) [6]. 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 (Singh and Singh, 1981) [7]. 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 (Rastogi and Meharotra, 1993) [8]. The phytochemical-pharmacological research work has recently yielded effective solutions to certain diseases which synthetic drug industry has failed to afford. 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 (Philipson, 1993) [9]. The manufacture of morphine on industrial scale by E. Merck, Germany in 1826 marks the beginning of commercialization of plant-derived drugs (Galbleyand Thiericke; 1999) [10]. Nearly half of the top selling pharmaceuticals in 1991 were either natural products or their derivatives (Cragg *et al.*, 1997) [11].

### Distribution of medicinal plants

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, Vindhya 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 (Mittermeier *et al.*, 2005) [12]. 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. The important aromatic plant species include *Caraway* (*Carum carvi*), *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*). In Uttar Pradesh the diversity of some important medicinal and aromatic plants include *Bauhinia* (*Bauhinia variegata*), *Brahmi* (*Bacopa monnieri*), *Eucalyptus* (*Eucalyptus citriodora*), *Turmeric* (*Cucurma longa*), *Ginger* (*Zingiber officinale*), *Neem* (*Azadirachta indica*) *Sandal* (*Santalum album*) *Indian hemp* (*Cannabis sativa*), *Gumachi* (*Abrus precatorius*), *Indian bael* (*Aegle marmelos*), *Kalmegh* (*Andrographis paniculata*), *Datura* (*Datura innoxia*), *Lasoor* (*Cordia dichotoma*), *Pepal* (*Ficus religiosa*), *Gular* (*Ficus racemosa*), *Makoia* (*Solanum nigrum*), *Kathber* (*Ziziphus xylopyrus*). Many of these plants are used as in standardized plant extracts.

### Future prospects of medicinal plants

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 (Singh, 2015) [13].

In the development of human culture medicinal plants have played an essential role, for example religions and different ceremonies (Hosseinzadeh *et al.*, 2014) [14] 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 (Clark, 1996) [15]. 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 [16]. Medicinal plants are resources of new drugs and many of the modern medicines are produced indirectly from plants.

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