

Wild Indian Medicinal Plants and their Biological Studies

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Abstract: The term "medicinal plants" refers to both aromatic and non-aromatic plants that are utilised in cosmetics, dyes, and aromatherapy. India has a huge variety of medicinal plants that can be seen. Various pieces of literature have been found on Pulses, cereals, fruits, and vegetables. Many countries around the world have abundant natural biodiversity, which regularly contains medicinal and fragrant plants. Genetic diversity and species survival now face greater difficulties as a result of over-exploitation and habitat degradation. Current trends supporting ecologically friendly agriculture and growing local involvement in the sustainable conservation and use of natural resources are driving innovative techniques to improve the usage of medicinal and aromatic plants. So, in current study we focused on biodiversity of different habitat of India and their potential biological action for human welfare.

Keywords: Diversity, Medicinal plants, Wild Plants, Ayurveda, Biological action

Introduction

The word "medicinal plants" refers to both aromatic and non-aromatic plants that are used for cosmetic, dye, and aromatherapy purposes. This group includes condiments and spices as well. Usually the entire plant is employed, including the flowers, leaves, fruits, stem roots, or their bark, gums, oleoresins, etc. Since the dawn of time, people have employed plants as a means of treating illness and easing physical suffering. Primitive peoples have used trial and error to develop some knowledge of therapeutic plants throughout history. These early attempts at medicine were founded on superstition and conjecture. The Indian subcontinent consists of about 17,000 species of flowering plants. Out of them about 1000 species of useful and medicinal plants are reported. Out of these only 1000 species are considered as medicinal herbs, some of them are our regular food plants. They are trees, shrubs, climbers, herbs and grasses. They are spreading in different habitat such as plains, coastal areas and hills. Some are confined some regions of our country; some plants will be found only particular altitude of Himalayan mountain. In reality the medicinal plants term is very broad one, it is very difficult bring with in an outline. As per old say food is medicine and medicine are food. If we take our food in a proper manner our system will not require any medicine. Proper food will be a balanced diet which will consist of food items that will give 6 types of taste. Our cereals, pulses, fruits, tuber crops, vegetables, greens, oil seeds, aromatic crops all are coming in medicinal plant category.

In light of the global rise in interest in herbal remedies for healthcare, the conservation of medicinal plants (MPs) is receiving more attention (Franz,1993). According to international trade statistics, India is second only to China in terms of yearly exports of medicinal raw materials (32,600 tonnes: US\$ 46 million) (Dhar et al.,2000). Over 15,000 species of higher plants have so far been identified in India, a nation with a mega-diversity. According to the All India Co-ordinated Research Project on Ethnobiology, close to 50% of them are said to have medicinal properties. (Singh & Hajra,1996). Indian Himalaya region (IHR) is home to

approximately 1748 plant species (23.2 percent of India), including 51 species of pteridophytes and 1685 angiosperms with proven medicinal significance. A number of native (31%), endemic (15.5%), and threatened elements are present in the area, as well as 3.5% of all MPs that fall within one of the several threat categories listed in CAMP and 14% of the total Red Data plant species of IHR (Samant et al., 1998). IHR's medicinal plants can be found in a wide range of environments and living forms. (Dhar et al., 2000). Around 30,000 species of plants, or 10% of all plant species, are thought to be utilized as medicines globally. 70% of the world's population, according to a World Health Organisation (WHO) estimate from 2002, uses medicinal plants to treat illnesses through their traditional healers. Plant-based medications have a long history of use in the Indian subcontinent. 65% of patients are treated by traditional healers in Sri Lanka, 60% in Indonesia, 60% in Pakistan, 85% in Myanmar, 80% in India, and 90% in Bangladesh, according to a report by the WHO. In Nepal, traditional healers who prescribe herbal remedies provide healthcare to 75% of the population, particularly in rural areas. Locals gather the many plant components of these medicinal species, such as roots, rhizomes, leaves, bark, stem, flowers, fruits, seeds, etc., for both home use and for sale (Hasan et al., 2013). The increasing numbers of plants with therapeutic properties have recently been indiscriminately harvested for export to India, China, and other foreign markets. The species are being overexploited due to high demand for certain of products in both domestic and international markets (Sharma et al., 2004). Some medicinal plant species are currently in a condition of depletion as a result of overexploitation (Rawal 2004). Since the majority of plants traded in Nepalese marketplaces come from wild sources rather than cultivated sources, there has been an increase in pressure on wild plants as a result of this demand (Bhattarai and Karki 2006)

According to the World Health Organisation (WHO), 35,000 to 70,000 species have been used as medicines, which equates to 14-28% of the 250,000 plant species that are thought to exist worldwide. Around 70% of the world's population relies on plants for their primary health care. More than 50 of the most popular medications on the market today came from tropical plants. For the creation of novel pharmaceuticals, the chemical and biological variety of plants offers a potentially endless renewable source (Akerele, 1992). The natural biodiversity endowment of many nations around the world includes a steady portion of medicinal and fragrant plants (Mamedov, 2012). These species have a significant positive impact on people's health, local economies, cultural integrity, and overall well-being especially that of vulnerable social groups including the elderly, children, and women, as well as rural impoverished people. Over the past ten years, their importance has come to be recognised more and more, which has changed how people view these and other species that have been marginalised or ignored by study and conservation efforts (Padulosi et al., 2002). Due to excessive exploitation and habitat destruction, challenges to genetic diversity and species survival have also grown. Innovative strategies to improve the use of medicinal and aromatic plants are being driven by current trends that support environmentally friendly agriculture and increased local participation in the sustainable conservation and use of natural resources. These approaches are more participatory in nature, which means they are more focused on local needs. The expansion of organizations dedicated to the study of medicinal and aromatic plants, the availability of new tools for biodiversity prospecting, characterization, and data analysis, and the transition of traditional conservation systems to more use-oriented initiatives should all be viewed as opportunities to reevaluate research objectives and collaboration, increase national synergies, and improve the environment for effective policymaking. Today's capacity to address the tensions between conservation and economic development will determine the future of medicinal and aromatic plants (Moerman, 2009).

Diversity of Medicinal Plants

India has vast diversity of medicinal plants which can be observed different literature has been observed Vegetables, fruits, cereals, and pulses were all listed separately. The Indian medicine-based and nutraceutical businesses use 178 species of medicinal plants in commercial numbers. The common name, part used, and medicinal characteristics of several trees, shrubs, climbers, and herbs, both wild and domesticated, are included in the table. The prices of crude pharmaceuticals fluctuate depending on supply and demand. The majority of therapeutic plants are found growing in disused agricultural land, along the edges of agricultural fields, and in undeveloped woodlands. The natural trees are destroyed to make way for cattle grazing and firewood. Some wild herbs are quite difficult to obtain. Some protected medicinal Gardens allow visitors to view some herbs. Maintaining a medicinal garden requires enthusiasm, additional resources, and skill. Has been reported and mentioned in Table 1 (Santhan, 2020).

Table no 01: Diversity of Medicinal plants Found in Different Habitat of India

Sl. No.	Particular	Name of Plants
1	Herbs available in Plains	Sida sp, Boerhavia diffusa, Tephrosia purpurea, Tribulus terrestris, Eclipta prostrata, Sphaeranthus indicus, Solanum xanthocarpum, Bacopa monnieri, Phyla nodiflora, Alternanthera sessilis, Cassia auriculata, Plumbago zeylanica, Tinopsis cordifolia, Gymnema sylvestre, Leptadenia reticulata, Solanum trilobatum, Aristolochia indica, Coccinea indica, Cynodon dactylon, Cyperus rotundus Enicostema axillare, Evolvulus alsinoides, Hybanthus enneaspermu Curculigo orchioides is growing Salacia chinensis, Solanum virginianum, Trapa natans, Tylophora indica, Coccinea grandis and Datura metal Medicago sativa is cultivated in rainfed fields. Mollugo cerviana, Nelumbo nucifera, Nigella sativa,
2	Plants found in the dry deciduous forests.	Albizia lebbeck, Azadirachta indica, Albizia amara, Syzygium cuminii, Adansonia digitata, Gmelina arborea. Pterocarpus marsupium , Santalum album, Sapindus emarginatus , Phyllanthus emblica L., Terminalia arjuna, T. bellirica , T. chebula, Wrightia tinctoria , Ficus benghalensis, Ficus racemosa, Ficus religiosa, Garcinia gummigutta, Holarrhena pubescens, Mappia foetida, Premna serratifolia, Sapindus emarginatus, Strychnos nux- vomica, Strychnos potatorum, Semicarpus anacardium Boswellia serata, Canarium strictum, Commiphora mukul, Gardenia gummifera, Shorea robusts, Vateria indica Firmiana simplex, Acacia nilotica are gum yielding trees. Ichnocarpus frutiscens, Corallocarpus epigaeus, Asparagus racemosus, Hemedesmus indicus, Gloriosa superba etc.
3	Plants available in The Himalayan region	Pinus tree, Prunus sp, Pyrus sp, Juglans regia (Wal nut), Cedrus deodar (Devdar), Berberis aristata, Punica granatum, Polygonum alatum, Inula racemosa, Saussurea costus, Pycorrhiza kurroa, Taxus wallichiana, Abies pindrow, A. spectabilis, Hypericum perforatum, Juniperus macropoda, Jurinea macrocephala, Skimmia lauriola are used as dhoop for aromatic fragrance. Aesculus indica, Aquaria agallocha, Betua utilis, Crocus sativus, Lycopodium clavatum, Podophyllum hexandrum, Rubia cordifolia, Smilax china, Swertia chirayita, Aconitum heterophyllum, Arnebia nobilis, Bergenia ciliata, Hedychium spicatum, Iris germanica, Lallelantia royaleana, Nardostachys grandiflora, Onosma echioides, Polypodium sps.
4	Plants found in The Indian Desert.	Prosopis spicigera, Withania somnifera, W. coagulens, Convolvulus pluricaulis, Pluchea lanceolata, Tecomella undulata, Salvadora persica, Clerodendrum phlomoides, Commiphora mukul, Leptadenia reticulata, Lawsonia inermis, Ziziphus mauritiana etc. are found in the desert areas of Rajasthan.
5	Plants found in the coastal area.	Morinda citrifolia, Salacia chinensis, Salvadora persica, Asparagus racemosus, Tribulus terrestris, Leptadenia reticulata, Cassia auriculata, Azadirachta indica, Premna corymbosa, Vitex negundo, Phyllanthus maderspatensis, Operculina turpethum, mangrove species
6	Western Ghats (Kerala, Tamilnadu, Karnataka & Maharashtra)	Spice crops such as Myristica fragrans, Sysygium aromaticum, Piper nigrum, Piper roxburghiana, Cinnamomum tamala, C. verum, Elettaria cardamomum, Swietenia mahagoni

Potential of Medicinal Plants

India has long been regarded as the land of spices. In the past, it had garnered interest from all around the world as a source of spices. Even today, Indian spices rank among the key commodities traded by India. The

gums are exudates from plants. Gums have a long history that coincides with the advancement of human civilization in the fields of medicine, confections, and printing. People are fascinated by various hues of colour. The culinary, textile, cosmetic, and leather industries are always in high demand for natural colourants and dyes. As veterinary medications, ayurveda unani, homoeopathy, and herbal remedies are also used in the treatment and management of animal sickness (Zareen, 2000).

Antimicrobial Potential

As per the literature most of the wild Indian medicinal plants were reported for antimicrobial activities, these plants were using since from the ancient time for infectious, parasitic, inflammatory, communicable diseases as an Indian traditional healing system. Plant like *Azadirachta indica*, *Syzygium aromaticum*, *Piper nigrum*, *Piper roxburghiana*, *Cinnamomum tamala*, *C. Nelumbo nucifera*, *Nigella sativa*, *Withania somnifera*, *W. coagulens*, *Tinopsisora cordifolia*, *Rhus semialata* were enlisted in antimicrobial potential due to their broad-spectrum biological action against various microorganisms. Currently, these plant drugs are available in market by ayurvedic medicine for many of the problems such as cough, cold, fever, nausea, flu, etc to treat in acute level. Plants are rich in a wide variety of secondary metabolites, such as tannins, terpenoids, alkaloids, and flavonoids, which have been found in vitro to have antimicrobial properties. Pharmacology of these plants and their products commercialized as biological drug for various applications for animal as well as plant diseases (Cowan, 1999; Sreedharan et al., 2020).

Antioxidant Potential

In current day therapeutic studies, most of the researchers suggest that ayurvedic biological medicine for any treatments, hence, I global scenario two-thirds of the plant diversity have potential medicinal values, in particular, antioxidant potential to use it in any diseases. Antioxidants reduce the oxidative stress in cells and are therefore useful in the treatment of many human diseases, including cancer, cardiovascular diseases and inflammatory diseases. This article emphasize mainly on wild Indian medicinal plants for antioxidant potential, hence, extracts of the aerial parts, flowers, petals, leaves, barks, stems, roots, fruits, seeds, rhizome, etc identified as important medicinal plant parts. In this context, wild Indian medicinal plant species like *Simarouba glauca*, *Leucas aspera*, *Diospyros abyssinica*, *Pistacia lentiscus*, *Geranium sanguineum L.*, *Sargentodoxa cuneata* Rehd. Et Wils, *Polyalthia cerasoides* (Roxb.) Bedd, *Citrus medica L.*, *Crataeva nurvala Buch-Ham.*, *Euphorbia mili*, *Acacia auriculiformis A. Cunn*, *Teucrium polium L.*, *Dracocephalum moldavica L.*, *Urtica dioica L.*, *Ficus microcarpa L. fil.*, *Bidens pilosa* Linn. Radiata, *Leea indica*, *Uncaria tomentosa* (Willd.) DC, *Salvia officinalis L.*, *Momordica charantia L.*, *Rheum ribes L.*, *Zephyranthes citrina*, and *Pelargonium endlicherianum* were listed as potent antioxidant species in plant diversity. The literature is a evident for the pharmacological properties by these plants antioxidant potential to apply it in any physiological ailments and they are considering either preventive medicine or nutraceutical in many conditions (Krishnaiah et al., 2011, Haleshappa et al., 2020, 2021, 2020a, Kolgi et al., 2022. Sreedharan et al., 2020, Patil et al., 2017, 2023).

Aromatic oils

An essential oil is an aromatic compound made from a plant material that possesses the primary smell characteristic of the subject material. Typically, plants are steam distilled to extract the essential oils (Zareen, 2000).

Concrete

A concrete is a substance ready for perfumery. The non-resinous or low resinous natural raw materials are used to make concrete. Nearly all of the natural ingredients used to make concrete come from plants, such as bark, flowers, herbs, leaves, roots, etc (Zareen, 2000).

Perfume

The terms per and fumus are the root of the word fragrances. The word "incense" comes from the Greek word "incendo," which denotes a pleasant fragrance or scent or a substance that generates a nice odour (Zareen, 2000).

Flavour

It is described as the perception of food through all the senses. Although taste and smell are unquestionably the most crucial senses for savouring food, it is also obvious that vision, touch, and hearing affect how a flavour is experienced (Zareen, 2000).

Balsam

The balsam may be a physiological or pathological result of the plant. It is a natural raw material secreted by a tree or plant. Balsams are resinous masses, semi-solids, or viscous liquids that are somewhat soluble in hydrocarbons but totally soluble in ethyl alcohol. They are insoluble in water (Zareen, 2000).

Supply of Wild Medicinal Plants

In India's traditional markets, traditional herbal crude drug dealers known as Pansaris in the north and Pachamarunna Kada in the south handle the majority of medicinal and aromatic plants or crude drugs (roots, stem, wood, bark, leaves, flowers, seeds, fruits, whole plants, etc.). The unprocessed medications are offered for sale under ayurveda, unani, Siddha, or regional names. The traders have dependable suppliers of their own. Particularly when they deal with material that comes from forests, some suppliers keep their names and addresses a trade secret. In practically every town and city in India, there are stores or business establishments that deal with medicinal plant material. Some villages also have these establishments. The large business houses are in the foot hill towns/cities and Delhi, Amritsar, Lucknow, Kanpur, Bombay, Trichur, Bangalore, Madras and Calcutta. While ordering the wild medicinal plant materials care needs to be taken for the authenticity of the material. The quality of the medicinal plant material is usually high when these have been derived from the cultivated plants of standard varieties (Zareen, 2000).

Conclusion

Medicinal plants in ancient time we are using for purpose of the medicine in India and it has long been regarded as the land of spices. In the past, it had garnered interest from all around the world as a source of spices. Even today, Indian spices rank among the key commodities traded by India. Wild medicinal plants of India also gained lot of commercial importance after reporting by their various biological application such as antimicrobial and antioxidant potential. It is due to safer therapeutic approach, the global rise in interest in herbal remedies for healthcare, it has identified as most of the treatment as nutraceutical or pharmacological and hence its conservation is pivotal and receiving more attention in global scenario.

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