

A Study on Medicinal Plants and Traditional Medicine

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Abstract - Long before the prehistoric era, people used plants for medicinal purposes. Chinese writings, Egyptian papyrus, and ancient Unani manuscripts all discussed the use of herbs. There is evidence that over 4000 years ago, Unani Hakims, Indian Vaidas, and cultures from the Mediterranean and Europe used herbs as medicine. Herbs were used in healing rituals by indigenous cultures in Rome, Egypt, Iran, Africa, and America, while other cultures developed traditional medical systems like Unani, Ayurveda, and Chinese Medicine that systematically used herbal therapies.

Keywords - Meditational plant, Traditional Medicine

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INTRODUCTION

Researchers' interest in nature seems to be piqued as a potential source of chemotherapeutic drugs. Over half of the drugs still being tested in clinical trials throughout the world include natural substances or variations of them. Over the past forty years, powerful medications have been extracted from flowering plants, including pilocarpin (from *Pilocarpus* spp.) to treat glaucoma and the "dry mouth," reserpine and other *Rauwolfia* alkaloids that are antihypertensive and relaxing, and diosgenin (from which all anovulatory antibodies are derived) (Cragg and Newman, 2005; Newman et al., 2000; Farnsworth et al., 1985;). About half of the world's blooming plant species are found in tropical forests (125 000). There seems to be an overabundance of drug-producing plants in tropical rain forests. They continue to provide natural product chemists beneficial substances to use as raw materials in the creation of new goods. Only around 1% of tropical species have had their therapeutic potential studied, yet there is a tremendous opportunity to find new chemicals (Cragg and Newman, 2005). There are far fewer species that are only found in tropical rain forests. Up to now, around 50 medications have been derived from tropical plants. The potential for unknown medications for use in western medicine has been considered as one of the most persuasive justifications for preserving tropical forests. Therefore, the higher yearly extinction rate should be really having an impact (GuribFakim, 2006).

MEDICINAL PLANTS: GENERAL VIEW

Over the years, the plants have been used as medicines. Early in the 12th century, as antibiotics and painkillers had not yet been discovered, herbal medicine was the primary form of therapy. Herbal medicine, which is based on the rapid therapeutic action of synthetic medications, progressively lost popularity among patients with the introduction of the allopathic medical system (Singh 2007). We are aware of plants' significance. In recent years, there has been a growing understanding of the significance of medicinal plants. The plant world offers a treasure trove of potential medications. Plant-based medicines are readily accessible, less priced, efficient, safe, and hardly cause adverse effects. The World Health Organization (WHO 2005) said that the greatest place to get a range of medications is from medicinal plants.

In wealthy nations, almost 80% of people utilise traditional medicines. Tannins, alkaloids, sugars, terpenoids, steroids, and flavonoids are some of the bioactive components found in medicinal plants that have defined physiological effects on humans (Arun Kumar & Muthuselvam 2009, Edoga et al. 2005 and Mann 1978).

The main or more accurately secondary metabolism of living things produces compounds. The secondary metabolites are exceedingly varied chemically and taxonomically, and their functions are not well understood. They are extensively employed in a variety of fields, including human treatment, veterinary care, agriculture, and

scientific study (Vasu et al. 2009). Numerous phytochemicals from various chemical classes have been shown to have inhibitory effects on various kinds of microorganisms in in vitro experiments (Cowan 1999). Since the beginning of time, the plant product has been used in phytomedicine. Barks, leaves, flowers, roots, fruits, and seeds may all be used to make this (Criagg & David 2001). Knowing the chemical components of plants is advantageous since it will help with the production of complicated chemical compounds (Mojab et al. 2003, Parekh & Chanda 2007, Parekh & Chanda 2008).

Because of this resurgence of interest, research on plants of medicinal worth is astoundingly expanding at the worldwide level, drawing attention to the significance of medicinal plants and the traditional health system in addressing the world's health care issues. The majority of emerging nations have incorporated traditional medical practises into their society. All medicines have historically been made from plants, whether in the form of straightforward raw plant components, rough extract combinations, etc (Krishnaraju et al. 2005).

The study of plant-derived lead compounds has been the subject of a major increase in natural product publications during the last 30 years (Cragg & Newman 2012, Fabricant & Farnsworth 2001). In industrialised civilizations, the use of plants as medicines dates back to the extraction and creation of a number of pharmaceuticals from these plants, as well as the usage of folk medicine in the past (Shrikumar & Ravi 2007). Secondary plant metabolites may have nutritional significance and play vital roles in human health, according to a growing body of research (Hertog et al. 1993). These green fractions' extraction and characterisation of various active phytochemicals led to the development of several medicines with high activity profiles (Mandal et al. 2007). Because of their synergistic effects, crude extract from medicinal plants is thought to be more physiologically active than isolated components (Jana & Shekhawat 2010). In order to protect themselves from being eaten by various bacteria, insects, and herbivores, plants produce secondary metabolites (Cowan 1999).

As a result, there are still many more undiscovered possibilities for novel active chemicals that need to be found. Ayurvedic and Unani, two medical systems, are part of the rich cultural legacy of medicine in India. State and federal bodies for medicinal plants have been established to encourage individuals, especially farmers, to embrace the production of therapeutic plants. The purpose of the herbal gardens is to educate the general public about the rich legacy of Indian healing. The different organisations, including the Central Research Drug Institute (CDRI), the National Institute of Pharmaceutical Education and Research (NIPER), and the Central Institutes of Medicinal and Aromatic Plants (CIMAP), play a crucial role in setting standards for the Ayurvedic medical system.

BIOLOGICAL STUDIES OF MEDICINAL PLANTS

Antimicrobial Activity

The Ayurvedic traditional health care system makes extensive use of medicinal herbs (Ghani 2006). Nearly 80% of people living in rural areas rely on medicinal herbs for their basic medical needs. Pharmaceutical businesses are now giving medicinal plants greater consideration while creating new Phytomedicine. The goal of the study in the development of antimicrobial drugs is to determine if pathogenic bacteria are susceptible to any plant agent. Due to the widespread use of commercial medications used to treat infectious diseases, numerous drug resistance has now emerged. In addition to this issue, antibiotics may sometimes have negative consequences on the host, such as hypersensitivity, immune system suppression, and allergic responses (Ahmad et al. 1998).

There is an ongoing demand for fresh, efficient therapeutics (Bhavani & Ballow 2000). Therefore, it is necessary to create substitute medicinal plant-based antibacterial medications for the treatment of infectious disorders. Residents who live in rural farming communities, people from remote tiny villages, and members of indigenous tribes utilise herbal medicine to cure common diseases in India's less developed northern regions. It is vital to assess herbal remedies for the treatment of infectious disorders caused by common pathogens scientifically (Kirbag & Zengin 2009).

There are ever more microbial strains that are resistant to many drugs, as well as ones that are less susceptible to medicines. The indiscriminate use of broad-spectrum antibiotics, immunosuppressive medications, intravenous catheters, organ transplantation, and persistent HIV infection outbreaks have all been linked to this rise (Graybill 1988, Ng 1994, Dean & Burchard 1996, Gonzalez 1996). Additionally, synthetic medications are often adulterated and have negative effects in underdeveloped nations in addition to being costly and ineffective for the treatment of ailments. In order to manage microbial infections, it is necessary to proactively look for novel infection-fighting methods (Sieradzki et al. 1999). Some of these medicinal plants were shown to be potential sources of antibacterial compounds after being subjected to screening.

➤ Antimicrobial agents

A chemical or biological substance known as an antimicrobial agent is used to either kill or stop the development of bacteria. Many of these agents already exist, and they affect microbes as a result of certain chemicals found in plants. The secondary metabolites from medicinal plants, which include sterols, alkaloids, glycosides, saponins, flavonoids, tannins, and carbohydrates, are abundant and

have exceptional antibacterial properties (Cowan 1999). Investigation of the structure, synthesis, use, and biological significance of these molecules in pure form is required for the study of natural products. The secondary metabolites seem to have a major role in reproductive benefits as intraspecific and interspecific attractants as well as protection against infections and predators.

Treatment of human and veterinary diseases is one of the most significant uses of natural products. At least 119 chemical compounds that come from 90 plant species may now be categorised as significant medications that are used in one or more nations. The treatment of illnesses with pure pharmaceutical substances is a relatively recent concept, even if the use of natural goods as therapeutic agents certainly predates the beginning of written history since the first people employed the varied but specialised plants to cure sickness.

Flavonoids have been discovered to be efficient antibacterial agents against a variety of pathogens since plants are known to synthesis them in response to microbial infections (Dixon et al. 1983). Their capacity to interact with soluble extracellular proteins as well as bacterial cell walls is likely what causes them to be active. Because they are present in oolong green teas, catechin flavonoids have been the subject of substantial investigation. These teas have been known to have antibacterial properties for some time (Toda et al. 1989) and to contain a variety of catechin components. Streptococcus mutants (Tsuchiya et al., 1996), In vitro vibriocholerae (Borris, 1996), and other bacteria and microorganisms were all suppressed by these substances (Sakanaka et al. 1992). As shown in Table 1, flavonoid compounds also have inhibitory effects against certain antibacterials.

Table 1: Examples of some medicinal plants with confirmed antibacterial properties

Common name / Botanical name	Used part	Preparation	Type of study	References
Amla (<i>Emblica officinalis</i>)	leaves	Aqueous extract	In vitro antibacterial	Sonia Bajaj & Srinivasan (1999)
Bael (<i>Aegle marmelos</i>)	leaves	Aqueous extract	In vitro antibacterial	
Gritkumari (<i>Aloe vera</i>)	leaves	Aqueous extract	In vitro antibacterial	
Henna (<i>Lawsonia inermis</i>)	leaves	Aqueous extract	In vitro antibacterial	
Mint (<i>Mentha piperita</i>)	leaves	Aqueous extract	In vitro antibacterial	
Neem (<i>Azadirachta indica</i>)	leaves	Aqueous extract	In vitro antibacterial	

Sada Bahar (<i>Vincea rosea</i>)	leaves	Aqueous extract	In vitro antibacterial
Tulasi (<i>Ocimum sanctum</i>)	leaves	Aqueous extract	In vitro antibacterial

Another class of substances with antibacterial action is the alkaloids. It is often discovered that the diterpenoid alkaloids from plants in the Ranunculaceae family exhibit antibacterial action (Omulokoli et al. 1997). Solamargine, a glycol alkaloid from the Solanum khasianum and other alkaloids may be effective against HIV infection and intestinal illness linked to AIDS (McMahon et al. 1995). (Mcdevitt et al. 1996). Even while certain secondary metabolites may not have a noticeable effect on any living things, they may be collaborating with other compounds in the plant to provide it the protection it needs to thrive (Abeywardhana et al. 2014).

Antidiabetic Activity

Due to their natural origins and lack of side effects, herbal medicines have seen an exponential surge in popularity over the last several years in both developed and developing nations. The majority of conventional medications now in use come from organic substances, minerals, and medicinal plants. The 21,000 plants that are used as medicines worldwide are recorded by the World Health Organization (WHO). 150 of these 2500 species, or around 25 percent, are employed economically on a sizable basis in India. India, often referred to as the world's botanical garden, is the country that produces the most medicinal plants. The manufacture of medical drugs and plants used to treat various chronic conditions across the globe were the main topics of the present study.

More than 100 million individuals worldwide today suffer with diabetes mellitus (DM), the most prevalent endocrine illness. As the world's population grows, the incidence of obesity and physical inactivity also rises, adding to the number of diabetics (Nair et al. 2006). The fast urbanisation, considerable rise in spending power, convenience of living, and metro life, which are some causes of stress, must result in health problems and an increase in the number of persons with these illnesses (Sarah et al. 2004). Diabetes treatment is expensive, but the effects are less severe in those with well-controlled blood sugar levels (Jared Diamond 2011). Due to their high cost and adverse effects, synthetic medications are not always recommended for the treatment of diabetes; thus, traditional and alternative medicine must be developed (Arulrayan et al. 2007, Table 2).

Table 2: Examples of some medicinal plants with confirmed antidiabetic properties

Botanical name	Used part	Preparation	Active compounds	Type of study	Ref
<i>Bidens pilosa</i> L.	Whole plant	Aqueous extract	Polyacetylenic glucosides	Diabetic mice	Hsu et al. (2009)
<i>Swertia punicea</i>	Whole plant	Aqueous extract	Methylsartianin, bellidiflorin	Diabetic mice	Tain et al. (2010)
<i>Capparis Moon</i>	Fruits	EtOH extract	Gallotannins (acid derivatives)	L6 cells	Kanaujia et al. (2010)
<i>Galega Officinalis</i>	Leaves	Aqueous extract	Glargine	Diabetic Rats	Goldstein (2008), Lemus et al. (1999)
<i>Syzygium cumini</i>	Seeds, Leaves, and Flower	EtOH extract	Mycaminose	Diabetic Rats	Trojan Rodrigues et al. (2011), Kumar et al. (2008)
<i>Ocimum sanctum</i>	Whole plant	Aqueous extract	Polyphenol, Caffeic acid	In vitro antidiabetic	Wongasa et al. (2012)
<i>Solanum xanthocarpous</i>	Fruit	Aqueous extract	Polyphenol, Caffeic acid	In-vitro antidiabetic	
<i>Aquilaria sinensis</i>	Leaves	EtOH extract	Mangiferin, IRI-Flophenone 2-OL-rhamnopyranoside,	Compound isolation	Feng et al. (2011)

Larvicidal Activity of Medicinal Plants

Infectious diseases spread by mosquitoes continue to be a leading cause of death in people throughout the globe, with more than 700 million people affected by these illnesses each year (Taubes 1997). In nations with tropical and subtropical climates, mosquito-borne illness has an economic effect that includes a loss in commercial and labour outputs. However, vector-borne illnesses are present everywhere in the globe (Fradin & Day 2002). The dengue virus's vector, *Aedes aegypti*, is extensively dispersed across tropical and subtropical regions. Since 1970, there has been a fourfold rise in dengue disease incidence, putting almost half of the world's population at risk. In 1990, 1.5 billion people, or about 30% of the world's population, resided in areas with an estimated 50% or higher risk of dengue transmission (Hales et al. 2002). Infection with the chikungunya virus first appeared in the South-West Indian Ocean Islands in 2005. It then migrated to India and caused a continuing epidemic involving more than 1.5 million people, including tourists who had previously visited this region (Taubitz et al. 2007).

Around 120 million people worldwide are infected with the lymphatic filariasis vector, *Culex quinquefasciatus*, and 44 million of these individuals have typical chronic symptoms (Bernhard 2003). *Acorus calamus*, *Trigonostemon redioides*, *Homalomena aromatic*, and PE extracts of *Derris elliptica* have all been employed by certain workers to suppress different mosquito species. *Solanum xanthocarpous* (Mohan et al. 2005), *Piper nigrum* (Rasheed et al. 2005 and Siddiqui & Husain 1993), *Argemone Mexicana* (Sakthivadivel & Thilagavathy 2003), MK (Harve & Kamath 2004), and JAL are some examples of plants (Al-Shaibani et al. 2008). The development of biologically active plant materials as larvicides is constantly needed because

synthetic insecticides have led to some ecological issues, including the emergence of insect strains that are resistant to them, ecological imbalance, and harm to mammals. These materials are anticipated to lessen the buildup of harmful residues in the environment. Natural goods are selected since they are naturally biodegradable and less damaging to nontarget creatures.

Medicinal Plants Future

The future of medicinal plants is bright since there are around 500,000 plants in the globe, the majority of which have not yet been studied for their potential as medicines for current or future illnesses.

TRADITIONAL MEDICINE OF INDIA

On India, the healthcare system is deeply rooted in the use of plants as a source of treatment. India is home to around 60% of the world's medical users. Only in wealthy nations, where modern medications are mostly utilised, and not in rural parts of developing nations, are these employed for primary healthcare. The Indian medical systems require meticulous documentation and testing, and the majority of practitioners create and administer their own remedies. Herbal medicines are expanding in the west at a roughly same pace as rural parts of developing nations. The public, academic community, and government are becoming more interested in traditional medications as a result of the rising side effects of adverse drug responses and the cost of the new approach of pharmacy.

There are over 45000 different types of medicinal plants in India, with a concentration in the North-East region, the Eastern Himalayas of West Bengal, the Western Ghats, the Andaman and Nicobar Islands, and the Rarh region. Although there are only 3000 officially recognised medicinal herbs, more than 6000 are still utilised for traditional treatments. India is regarded as the world's botanic garden and the largest producer of medicinal plants. Alternative medications are utilised in a variety of methods for those who dislike or are unable to benefit from conventional pharmaceuticals. Ayurveda and Kabiraji (herbal medicine), two popular forms of alternative treatment, are practised widely in India. It employs a range of techniques and supplies to aid in the recovery or improvement of sick persons. Ayurveda has parts that use plant-based medications.

CONCLUSION

Many herbs are traditionally used to treat illnesses associated with various seasons. To save lives of people, they must be promoted. Currently, these herbal products stand in stark contrast to synthetic

drugs, which are stigmatised as being dangerous to both humans and the environment. Although herbs have been valued for their therapeutic, flavouring, and aromatic properties for centuries, the modern era's synthetic products temporarily overshadowed their significance. The blind reliance on synthetics has ended, though, and people are turning back to natural products in the hopes of finding safety and security. It's time to advertise them worldwide.

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