



CURRENT AND HISTORICAL PERSPECTIVES ON THE GLOBAL IMPORTANCE OF MEDICINAL PLANTS: A REVIEW

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ABSTRACT

There is no existence of life without plants. Plants are the essential foundation of medicine. Since the beginning of time, medicinal plants have been used to treat a wide range of ailments. According to several accounts, the association between humankind and his search for drugs in nature dates back thousands of years: Published papers, landmarks that have been restored, and even original plant medicines have all been discovered. As a result of several years of battles against illnesses, man learned to seek medicines in the barks, roots, fruit bodies, and other aspects of the plants. Scientific medicine has recognized their aggressive action, and a variety of plant-based medicines, known to ancient cultures and used for centuries, have been included in modern pharmacotherapy. As awareness of the emergence of ideas related to the use of medicinal plants as well as the development of consciousness has grown, pharmacists and doctors have been more able to respond to the issues that have arisen as a result of the spread of advanced facilities in the facilitation of man's life. The historical value of medicinal plants, their regional relevance around the world, some important empirical studies of medicinal plants, and leading plant-based medicines that are now used to treat different diseases, with or without systemic modifications, were all discussed in this article.

KEYWORD: Medicinal plants; Ethnobotany; Historical perspective; Geographical importance of medicinal plants; Traditional medicinal importance.

1. INTRODUCTION

Humans have depended on nature for their fundamental necessities throughout history, including medications, shelters, fuel, perfumes, clothing, flavors, fertilizers, and ways of transportation. For significant portions of the worldwide population, medicinal plants continue to play a major role in the healthcare system, particularly in poorer nations where herbal medicine has a long history of usage.^[1]

For thousands of years, plants have formed the underpinnings of traditional western medicinal practices. Plants will continue to give novel pharmaceuticals to humans. Any claim that plants have protective characteristics is incorrect because medicinal plant therapy is based on hundreds to thousands of years of laboratory results. Oils of *Papaver somniferum* (Poppy juice), *Cupressus sempervirens* (Cypress), *Glycyrrhiza glabra* (Licorice), *Commiphora* species (Myrrh), and *Cedrus* species were among the materials utilized in the earliest accounts, which date from around 2600 BC and

were written on clay tablets in cuneiform (Cedar). Today, they're also used to treat diseases including colds and coughs, as well as inflammation and parasite infections.^[2]

In Sri Lanka, Japan, India, China, Pakistan, and Thailand, traditional medicine is widely used. Orthodox tribal medicines account for about 40% of overall pharmaceutical use in China. Herbal remedies in Thailand make use of legumes from the *Caesalpiniaceae*, *Fabaceae*, and *Mimosaceae* families. Herbal drug transactions were reported to be worth more than US\$2.5 billion in the mid-1990s. In Japan, herbal medicinal preparations are more common than traditional pharmaceuticals.^[3] *Nothapodytes nimmoniana* (*Mappia foetida*), an Indian native tree, is widely used in Japan to treat cervical cancer. Plants are not only important in health care today, but they are also the best supply of healthy potential medicines.^[4]

Any of the major medicines that have revolutionized western medicine in the last 50 years have been isolated/derivatized from plants. These chemical additives have plant and animal drug-like medicinal effects. The WHO supports and encourages the use of natural medicines in national healthcare systems because they are readily available at a cost that is affordable to the average person, and they have been thoroughly studied, making them much safer than prescription synthetic medications.^[5] Thus, through scanning natural sources such as plant extracts for many pharmaceutically helpful medications that play a significant role in the treatment of human illnesses have been found using pharmacologically/biologically active substances.^[6] Phytochemical-pharmacological research has recently produced viable solutions to illnesses that the generic medication business has been unable to address. Among the more intriguing studies are those on *Artemisia annua*, *Catharanthus roseus*, *Taxus* spp., *Lantana camera*, and *Bacopa* spp. Previously thought to be poisonous or useless, these plants have recently been revealed to contain compounds with significant pharmacological value, and they are now regarded as essential medicinal herbs. Modern bioassays and bioassay-guided fractionation of medicinal plants used by conventional healers are commonly used in the hunt for bioactive molecules. As a result, many new therapeutically essential compounds have been isolated. Due to the diligent efforts of researchers, a significant number of potent medications, medicinal leads, and several novel pharmacologically active constituents have been produced from herbal drugs.^[7] In 1826, E. Merck of

Germany began commercializing plant-derived medicines when he manufactured morphine on an industrial scale.^[8] In 1991, natural goods or their derivatives made up almost half of the top-selling pharmaceuticals.^[9]

2. Islamic importance of medicinal plant

Islam is believed by people from various academic and intellectual backgrounds.^[10] The significance of the date palm (*Phoenix dactylifera*) is mentioned in this verse of the Holy Quran. "And you drive strong drink and goodly provision from the fruits of date palms and grapes." (Verse 67 of Surah-an-Nahl).^[11] The importance of garlic (*Allium sativum*) is stated in Surah Baqarah,^[2] verse no.61. In Verse 61, the value of garlic, cucumber, lentils, and onion is discussed, Surah Baqarah.^[2] Surah Ad-Dahr Chapter no. 76, Verse no. 17.^[12] describes the importance of ginger.

3. Early modern age

Due to increasing poverty and population, a majority of the population in the developing world is struggling to raise living standards and improve healthcare delivery. According to an estimate, 70-80% of the developing world relies on conventional plant-obtained remedies, as pharmaceuticals are high priced.^[13] Increased interest in herbal formulations has been recorded all over the world as a result of the alleged "Green Wave" triggered by increasing bionomical consciousness. In the west, the use of medicinal plants has increased two-fold. To meet demand, the number of plant-derived medicines or health foods has gradually increased.^[14]

Table 1: Few historical observations of medicinal plants.

Medicinal plants	Historical importance
<i>Digitalis</i>	The active constituents, digoxin, and digitoxin are secondary metabolites (glycosides) derived from <i>Digitalis</i> species are still used to treat congestive heart failure. Today <i>Digitalis</i> is still the primary source of these glycosides. ^[15]
<i>Morphine</i>	Morphine was the first natural compound to be isolated in pure form from <i>Papaver somniferum</i> dried leaves. This initiative sparked a shift in emphasis toward the isolation of pure compounds, as well as the determination of pharmacological properties and structure determination. ^[16]
<i>Strychnine, cocaine, nicotine, papaverine, and quinine</i>	Strychnine, cocaine, nicotine, papaverine, and quinine are examples of natural substances that have been purified by man. ^[16]

Current modern age

In recent years, many novel compounds have been isolated from marine organisms and many of these substances have been shown to have fascinating biological activities.^[17] Currently, research is based on isolating pharmacologically active substances from

natural sources in the field of diseases for which there are no successful treatments. Herbal medicines are also seeing a revival as more people shift their focus away from modern medications and toward complementary herbal systems, also known as natural medicine.^[18]

Table 2: well-known plant-based medicines that are currently being used to treat a variety of ailments without any systemic changes.^[19]

Plant	Uses	Drug
<i>Rauwolfia serpentina</i>	Antihypertensive, tranquilizer	Reserpine. ^[20]
<i>Erythroxylum coca</i>	<i>Erythroxylum coca</i>	Cocaine. ^[21]
<i>Papaver somniferum</i>	Narcotic analgesic	Morphine. ^[22]

<i>Atropa belladonna</i>	Mydriatic, anhidrotic, antispasmodic	Atropine. ^[23]
<i>Mentha piperita</i>	Antipruritic, counter irritant, stimulant	Menthol. ^[24]
<i>Cinchona officinalis</i> ,	Analgesic, antipyretic, antimalarial	Quinine. ^[25]
<i>Pilocarpus jaborandi</i>	Treatment of glaucoma	Pilocarpine. ^[26]
<i>Glycyrrhiza glabra</i>	Anti-inflammatory, peptic ulcer treatment	Glycyrrhizic acid. ^[27]

Prominent drugs from plant origin

In the use of some biochemicals, the plant kingdom has a wide range of structural diversity. A variety of new pharmacophores have been discovered as a result of

phytochemical research on medicinal plants. Pharmacophores have proven to be invaluable in the development of new drugs.^[28-29]

Table 3: Derived drugs of some important medicinal plants.

Sr. no.	Botanical source	Drug	Therapeutic uses
1.	<i>Artemisia annua</i>	Artemisinin	Antimalarial drug. ^[30]
2.	<i>Taxus brevifolia</i>	Taxol	Anticancer drug. ^[31]
3.	<i>Papaver somniferum</i>	Opium alkaloids	Analgesic, antitussive. ^[32]
4.	<i>Catharanthus roseus</i>	Vinca alkaloids	Anticancer. ^[33]
5.	<i>Rauwolfia serpentine</i>	Reserpine	Antihypertensive. ^[20]
6.	<i>Cinchona spp.</i>	Quinine, Quinidine	Antimalarial. ^[25]
7.	<i>Digitalis purpurea</i> ,	<i>Digitalis</i> glycosides	Cardiotonic glycosides. ^[15]
8.	<i>Cassia Angustifolia</i>	Sennosides A and B	Laxative. ^[34]
9.	<i>Erythroxylum pervillei</i>	Pervilleine A	Anticancer. ^[35]
10.	<i>Aglaia foveolate</i>	Silvestrol	Silvestrol. ^[36]

All plants have primary and secondary metabolites. The therapeutic effects of medicinal plants are due to the Combination of “secondary metabolites”.^[37]

Future of medicinal plants

Medicinal plants have a bright potential because there are approximately half a million plants on the planet, the majority of which have not yet been tested for their medicinal properties, and their medical properties could be critical in the treatment of current or future studies.

CONCLUSION

As a result, scientific journals need to enable health care professionals to work diligently to explain the key active ingredients derived from medicinal plants. Furthermore, to define their role in the treatment of current diseases, as well as how they can be used to create or synthesize more successful drugs.

REFERENCES

- Dar, R. A., Shahnawaz, M., & Qazi, P. H. General overview of medicinal plants: A review. *The Journal of Phytopharmacology*, 2017; 6(6): 349-351.
- Gurib-Fakim, A. Medicinal plants: traditions of yesterday and drugs of tomorrow. *Molecular aspects of Medicine*, 2006; 27(1): 1-93.
- Harrison, P. Herbal medicine takes root in Germany. *Cmaj*, 1998; 158(5): 637-639.
- Hamburger, M., & Hostettmann, K. 7. Bioactivity in plants: the link between phytochemistry and medicine. *Phytochemistry*, 1991; 30(12): 3864-3874.
- Singh, P., & Singhi, C. L. CHEMICAL INVESTIGATION OF CLERODENDRON-FRAGRANS. *Journal of the Indian Chemical Society*, 1981; 58(6): 626-627.
- Rastogi, PR and Meharotra, BN In Compendium of Indian Medicinal Plants, 1990; I, 339, (1993) III: 194.
- Philipson, M. N. A symptomless endophyte of ryegrass (*Lolium perenne*) that spores on its host—a light microscope study. *New Zealand Journal of Botany*, 1989; 27(4): 513-519.
- Galbley, S., & Thiericke, R. Drug Discovery from Nature, Series: Springer Desktop Editions in Chemistry, 1999.
- Newman, D. J., Cragg, G. M., & Snader, K. M. Natural products as sources of new drugs over the period 1981– 2002. *Journal of natural products*, 2003; 66(7): 1022-1037.
- Khan, A. S., Khan, M. A., Din, H. A., Khan, H. U., & Tayyab, M. Some scientific facets of the Quran and Sunnah (of the Prophet Muhammad, Peace Be Upon Him) in the field of medicine. *Pak. Health*, 1994; 31(3-40): 7-10.
- Al-Hilali, M. T., & Khan, M. M. The Noble Quran: English Translation of the meaning and commentary. King Fahd Complex for the printing of Holy Quran. Madinah, KSA, 1985; 13.
- Ghaznavi, K. M. Tibbe-e-nabvi aur Jadid science, al-Faisal nasheeran wa tajeera-e-kutab. Urdu Bazar Lahore, Pakistan, 1991; 1: 228-236.

13. Ahmad, M., Khan, M. A., Marwat, S. K., Zafar, M., Khan, M. A., Hassan, T. U., & Sultana, S. Useful medicinal flora enlisted in Holy Quran and Ahadith. *Am Eurasian J Agric Environ Sci*, 2009; 5(1): 126-40.
14. Robertshawe, P. Yaniv Z, Bachrach U (eds). Handbook of Medicinal Plants. Journal of the Australian Traditional-Medicine Society, 2007; 13(4): 242-243.
15. Grabley, S., & Sattler, I. Natural products for lead identification: nature is a valuable resource for providing tools. *Modern methods of drug discovery*, 2003; 87-107.
16. Mans, D. R. From forest to pharmacy: Plant-based traditional medicines as sources for novel therapeutic compounds. *Acad J Med Plants*, 2013; 1(1): 101-10.
17. Silverman, R. B., & Holladay, M. W. The organic chemistry of drug design and drug action. Academic press.
18. Williams, J. T., & Ahmad, Z. Priorities for medicinal plants research and development in Pakistan, 1999.
19. Pettit, G. R., Hogan Pierson, F., & Herald, C. L. Anticancer drugs from animals, plants, and microorganisms. John Wiley & Sons, Inc, 1994.
20. Lobay, D. Rauwolfia in the treatment of hypertension. *Integrative Medicine: A Clinician's Journal*, 2015; 14(3): 40.
21. Docimo, T., Reichelt, M., Schneider, B., Kai, M., Kunert, G., Gershenzon, J., & D'Auria, J. C. The first step in the biosynthesis of cocaine in *Erythroxylum coca*: the characterization of arginine and ornithine decarboxylases. *Plant molecular biology*, 2012; 78(6): 599-615.
22. Siliste, C., & Siliste, R. N. How to Induce Arrhythmias with Atropine. In *Arrhythmia Induction in the EP Lab* Springer, Cham, 2019; 49-61.
23. Mahendran, G., & Rahman, L. U. Ethnomedicinal, phytochemical and pharmacological updates on Peppermint (*Mentha× piperita* L.)—A review. *Phytotherapy Research*, 2020; 34(9): 2088-2139.
24. Lin, Y. H., Fang, L. H., & Du, G. H. *Pilocarpine*. In *Natural Small Molecule Drugs from Plants* Springer, Singapore, 2018; 309-312.
25. Bahmani, M., Rafieian-Kopaei, M., Jeloudari, M., Eftekhari, Z., Delfan, B., Zargarani, A., & Forouzan, S. A review of the health effects and uses of drugs of plant licorice (*Glycyrrhiza glabra* L.) in Iran. *Asian Pacific Journal of Tropical Disease*, 2014; 4(S2): S847-S849.
26. Andrade-Neto, V. F., Brandão, M. G. L., Stehmann, J. R., Oliveira, L. A., & Krettli, A. U. Antimalarial activity of Cinchona-like plants used to treat fever and malaria in Brazil. *Journal of Ethnopharmacology*, 2003; 87(2-3): 253-256.
27. Patil, J. G., Ahire, M. L., Nitnaware, K. M., Panda, S., Bhatt, V. P., Kishor, P. B. K., & Nikam, T. D. In vitro propagation and production of cardiotonic glycosides in shoot cultures of *Digitalis purpurea* L. by elicitation and precursor feeding. *Applied microbiology and biotechnology*, 2013; 97(6): 2379-2393.
28. Dewick DM. Medicinal Natural Products. A Biosynthetic Approach. John Inc Wiley & Sons., New York, 2002; 1.
29. Gullo, V. P., McAlpine, J., Lam, K. S., Baker, D., & Petersen, F. Drug discovery from natural products. *Journal of Industrial Microbiology and Biotechnology*, 2006; 33(7): 523-531.
30. Weathers, P. J., Towler, M., Hassanali, A., Lutgen, P., & Engeu, P. O. Dried-leaf *Artemisia annua*: Practical malaria therapeutic for developing countries?. *World journal of pharmacology*, 2014; 3(4): 39.
31. Kingston, D. G., Samranayake, G., & Ivey, C. A. The chemistry of taxol, a clinically useful anticancer agent. *Journal of Natural Products*, 1990; 53(1): 1-12.
32. Heydari, M., Hashem Hashempur, M., & Zargarani, A. Medicinal aspects of opium as described in Avicenna's Canon of Medicine. *Acta medico-historica Adriatica: AMHA*, 2013; 11(1): 101-112.
33. Moon, S. H., Pandurangan, M., Kim, D. H., Venkatesh, J., Patel, R. V., & Mistry, B. M. A rich source of potentially bioactive compounds with anticancer activities by *Catharanthus roseus* cambium meristematic stem cell cultures. *Journal of ethnopharmacology*, 2018; 217: 107-117.
34. Siegers, C. P., von Hertzberg-Lottin, E., Otte, M., & Schneider, B. Anthropoid laxative abuse—a risk for colorectal cancer?. *Gut*, 1993; 34(8): 1099-1101.
35. Mi, Q., Cui, B., Silva, G. L., Lantvit, D., Lim, E., Chai, H., ... & Pezzuto, J. M. Pervilleine A, a novel tropane alkaloid that reverses the multidrug-resistance phenotype. *Cancer Research*, 2001; 61(10): 4030-4037.
36. Kim, S., Hwang, B. Y., Su, B. N., Chai, H., Mi, Q., Kinghorn, A. D., ... & Swanson, S. M. Silvestro, a potential anticancer rocaglate derivative from *Aglaia foveolata*, induces apoptosis in LNCaP cells through the mitochondrial/apoptosome pathway without activation of executioner caspase-3 or-7. *Anticancer Research*, 2007; 27(4B): 2175-2183.
37. Capasso, L. 5300 years ago, the Ice Man used natural laxatives and antibiotics. *The Lancet*, 1998; 352(9143): 1864.