SUṢAMĀ : Multidisciplinary Research Journal ISSN: 3107-4529
(International Peer-Reviewed & Refereed Journal)
Vol. 1, Issue-4, (Oct-Dec) 2025

Herbal Wealth of India: An Insight into Medicinal Plants and their Clinical Efficacy

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Abstract: India is home to around 17,000 species of higher plants, out of which nearly 7,500 are recognized for their medicinal value, making it the country with the highest percentage of medicinal plants relative to its total flora. Among India's traditional healing systems, Ayurveda stands as the oldest and most extensive, documenting the use of about 2,000 medicinal plant species. Siddha and Unani systems also contribute significantly to this rich herbal tradition. One of the foundational texts of Ayurveda, the *Charak Samhita*, details the preparation and use of around 340 herbal remedies. Today, roughly 25% of pharmaceutical drugs are directly derived from plants, with many others being synthetic versions modeled on natural plant compounds, highlighting the ongoing influence of botanical knowledge in modern medicine. This study offers a scientific perspective on India's diverse herbal resources by focusing on a selection of medicinal plants commonly used in both traditional and modern healthcare. The paper highlights important species such as *Withania somnifera* (Ashwagandha), *Azadirachta indica* (Neem), *Ocimum sanctum* (Tulsi), *Phyllanthus emblica* (Amla), and *Curcuma longa* (Turmeric), among others. For each of these plants, I delve into their chemical makeup, known therapeutic properties, and their relevance in clinical settings, drawing on the latest experimental research and clinical findings. By bridging traditional knowledge with modern pharmacological evidence, this work highlights the therapeutic potential of these plants in treating ailments such as inflammation, infections, metabolic disorders, and neurodegenerative diseases.

Keywords: Ayurveda, medicinal plants, unani system, phytochemicals, clinical efficacy, herbal pharmacology

Introduction

Throughout the history of life, plants have played a vital role as a source of medicine. As diseases have coexisted with humans since the beginning, plants have provided natural remedies due to the wide variety of chemical compounds they produce, many of which have therapeutic effects on the human body. In addition to offering food, clothing, and shelter, plants have been central to the evolution of modern civilization by contributing significantly to healthcare.

The World Health Organization (WHO) estimates that around 4 billion people—nearly two-thirds of the global population—currently rely on herbal medicine as their primary source of healthcare. Herbal remedies are a foundational element in the traditional medical practices of indigenous communities around the world and are commonly used in systems like Ayurveda, Homeopathy, Naturopathy, Traditional Chinese Medicine, and Indian medicine.

Herbal medicine can be broadly categorized into several major systems:

- **Traditional Chinese Herbalism**, a component of Traditional Oriental Med-

icine;

- **Ayurvedic Herbalism**, rooted in the ancient Indian system of Ayurveda;

Western Herbalism, which has its origins in ancient Greek and Roman practices, later spreading to Europe and the Americas.

Historical texts highlight the deep roots of medicinal plant use in India. The *Rigveda* (circa 5000 BC) mentions 67 medicinal plants, the *Yajurveda* 81 plants, and the *Atharvaveda* (4500–2500 BC) approximately 290 plants. The *Charaka Samhita* (around 700 BC) lists over 1,100 medicinal plants along with their therapeutic properties.

In today's fast-paced, mechanized world, allopathic (modern) medicine is often preferred for its rapid effects. However, increasing concerns over the high costs and potential side effects of synthetic drugs have led many people to return to natural and traditional remedies. Herbal medicines are gaining popularity for their holistic action, targeting the root causes of diseases, being easily accessible, and eliminating the need for multiple specialists. Currently, more than 80% of the global population depends on herbal products, which has led to a surge in the development of herbal-based industries and a rising demand for medicinal and aromatic plants.

India, known for its rich biodiversity, is a major source of medicinal and aromatic plants. About 70% of these plants are found in the tropical forests of the Western Ghats, the Terai region, the North-East, and the Himalayan ranges. Out of over 20,000 plant species known to have therapeutic properties, many have transitioned from wild plants to cultivated medicinal crops through sustainable agricultural practices.

According to available data:

- Indian traditional medicine uses approximately 2,000 plant species.
- Ayurveda utilizes around 1,200 species.
- Siddha uses about 900.
- Unani incorporates 700.
- Amchi (Tibetan) medicine employs 600.

Tibetan systems use 500 species.

Globally, there are about 400 families of flowering plants, of which 315 are represented in India.

A significant portion of the medicinal plants used by Indian industries is still harvested from the wild, with only a few species under commercial cultivation. This highlights the need for focused efforts on cultivation and conservation to ensure sustainable supply and preserve biological diversity. Advanced technologies such as biotechnology, metabolic engineering, biofortification, nutraceuticals, molecular farming, and gene silencing can be employed to enhance the cultivation and yield of medicinal plants.

Asia, Africa, Latin America, and to a lesser extent Europe and the USA, are the primary producers of plant-based raw materials. According to a UNDP report, the global annual trade value of medicinal plants sourced from developing countries stands at approximately USD 32 billion. India alone exports around 38,000 tons of raw materials annually to countries such as the USA, Japan, Germany, France, Russia, Switzerland, and Hong Kong, generating substantial revenue.

India's export of medicinal plants has grown steadily—from Rs. 130 crores in

1992 to Rs. 215 crores in 2001, and more recently reaching Rs. 350 crores. Today, India ranks second only to China in the global export of medicinal plants, underscoring its pivotal role in the international herbal medicine market.

Plant-wise Report on Medicinal Species

1) Ashwagandha

Withania somnifera, commonly known as ashwagandha, Indian ginseng, or winter cherry, has been a cornerstone of Ayurvedic and traditional medicine for over 3,000 years. Traditionally, it has been used for a wide range of conditions including as an aphrodisiac, liver tonic, anti-inflammatory, and treatment for conditions such as senile dementia. Modern clinical studies and animal experiments support its use for treating bronchitis, asthma, ulcers, emaciation, insomnia, anxiety, cognitive and neurological disorders, inflammation, and Parkinson's disease. Additionally, its chemo preventive properties suggest it could benefit patients undergoing radiation and chemotherapy. Ashwagandha is also valued as an adaptogen, helping to reduce stress, nervous fatigue, and insomnia, and is known to enhance immunity, particularly in individuals with low white blood cell counts.

Medicinal Importance of Ashwagandha:

Ashwagandha is a highly revered herb in Ayurvedic medicine, known for its powerful adaptogenic properties. It helps the body resist stress and restore balance in various physiological functions. The root, which is the main medicinal part, contains active compounds such as withanolides, alkaloids, and sitoindosides that offer a wide range of therapeutic effects.

Ashwagandha is commonly used to combat anxiety, stress-induced disorders, and chronic fatigue. Its calming effect on the nervous system makes it a natural remedy for insomnia and nervous exhaustion. Additionally, it enhances cognitive function and is being studied for its potential benefits in neurodegenerative conditions like Alzheimer's and Parkinson's diseases.

The herb also has strong anti-inflammatory and antioxidant properties, making it beneficial for conditions such as arthritis, asthma, and inflammation-related disorders. In oncology, it is used as a supportive therapy for patients undergoing chemotherapy and radiation, as it may reduce side effects and improve immunity.

Ashwagandha also helps improve stamina, muscle strength, and reproductive health. It boosts the immune system and is often used to increase white blood cell counts in immunocompromised individuals. Its broad spectrum of benefits and minimal side effects have made Ashwagandha a globally respected herb in both traditional and modern herbal medicine.

2) Amla

Amla ***(Phyllanthus emblica L.)***, commonly known as Indian Gooseberry, is a deciduous tree belonging to the family Phyllanthaceae. It is one of the most important medicinal plants in traditional Indian medicine, particularly Ayurveda, where it is revered as a powerful Rasayana—a rejuvenating and anti-aging tonic. Known for its remarkable health benefits, amla is a rich source of vitamin C, antioxidants, and bioactive compounds that promote longevity and vitality. The fruit is sour, astringent, and slightly bitter in taste and is used in a variety of forms—raw, dried, powdered, or as juice or oil. It is also a key ingredient in many Ayurvedic formulations, including the well-known Triphala and Chyawanprash.

Medicinal Importance of Amla:

Amla is highly valued in traditional and modern medicine for its wide-ranging therapeutic benefits, primarily due to its exceptionally high vitamin C con-

tent and powerful antioxidant properties. It strengthens the immune system, supports healthy digestion, enhances liver function, and helps regulate blood sugar levels, making it beneficial for managing diabetes. Amla also promotes cardiovascular health by reducing cholesterol and improving heart muscle function. Its anti-inflammatory and anti-aging properties make it effective in treating joint pain, skin conditions, and promoting healthy hair growth. Additionally, it aids in detoxification, boosts metabolism, supports eye health, and may have anti-cancer potential due to its rich content of polyphenols and bioactive compounds.

3) Brahmi

Centella asiatica is a frost-tender, herbaceous perennial suited for USDA hardiness zone 8. It retains foliage year-round, flowers from July to August, and sets seed from August to September. The plant bears hermaphroditic flowers (containing both male and female reproductive organs) and is insect-pollinated and self-fertile.

It can thrive in a variety of soil types—sandy, loamy, or clay—and tolerates acidic, neutral, or alkaline pH levels. The plant grows well in both semi-shade and full sun, but it requires consistently moist or wet conditions, making it well-suited for marshy or waterlogged environments.

Medicinal Importance of Bramhi:

Bramhi has a long history in traditional medicine systems such as Ayurveda and Traditional Chinese Medicine. It is valued for its potential to improve cognitive function, promote wound healing, and reduce inflammation. The plant also treats skin conditions, enhances memory, alleviates anxiety, and supports circulatory health. Its therapeutic properties are largely attributed to compounds such as asiaticoside, madecassoside, and other triterpenoids.

4) Isabgol

Isabgol **(*Plantago ovata*)**, also known as psyllium husk, is derived from the seeds of the Plantago ovata plant, which belongs to the Plantaginaceae family. Native to Western Asia and India, it thrives in arid and semi-arid regions. The plant produces small, white flowers and is cultivated mainly for its mucilaginous seed husks. Isabgol is widely known and used in Indian households and Ayurvedic medicine for its digestive health benefits. It is a natural dietary fiber source and plays a crucial role in maintaining gastrointestinal health.

Medicinal Importance of Isabgol

Isabgol is best known for its laxative properties and is commonly used to relieve constipation and improve bowel regularity. The husk swells in water, forming a gel-like substance that aids in stool formation and promotes easy passage. It also helps in managing conditions like irritable bowel syndrome (IBS) and hemorrhoids. Additionally, Isabgol is beneficial in reducing cholesterol levels and controlling blood sugar in diabetic patients due to its high soluble fiber content. It contributes to weight management by inducing a feeling of fullness. Isabgol is safe for long-term use and has minimal side effects, making it a popular natural remedy in both traditional and modern medicine**.**

5) Kalmegh

Kalmegh, or ***Andrographis paniculata***, is a bitter herbaceous plant that belongs to the Acanthaceae family. Native to India and Sri Lanka, it is also known as "King of Bitters." The plant typically grows in moist, deciduous forests and is characterized by its green leaves and small, purple flowers. Kalmegh has been a cornerstone in Ayurveda, Unani, and Siddha medicine systems for its powerful healing proper-

ties. The plant is widely recognized for its ability to boost immunity and combat infections, particularly in liver-related disorders.

Medicinal Importance of Kalmegh

Kalmegh is primarily known for its hepatoprotective and immune-enhancing properties. The active compound andrographolide exhibits strong anti-inflammatory, antioxidant, and antiviral effects. It is widely used in the treatment of liver disorders such as jaundice, hepatitis, and liver toxicity. Kalmegh also supports digestion and acts as a natural detoxifier, flushing out harmful toxins from the body. It helps in managing fever, flu, and respiratory infections due to its antipyretic and antimicrobial action. In traditional medicine, Kalmegh is used to treat skin diseases, diabetes, and chronic fatigue. Its bitter taste reflects its potency in cleansing the system and strengthening the immune response.

6) Neem

Neem **(*Azadirachta indica)*** is a highly valued tree belonging to the mahogany family (*Meliaceae*), and one of the two species in the *Azadirachta* genus. Often referred to as the **"Wonder Tree"** neem has been an integral part of Indian agriculture, medicine, and traditional practices for centuries. It is renowned for its natural pest-repellent properties and is widely used as a bio-pesticide and organic fertilizer. In Ayurveda and other traditional medicinal systems, neem is prized for its therapeutic properties in treating a wide range of ailments. Additionally, neem is extensively used in the production of herbal cosmetics and personal care products due to its antibacterial and anti-inflammatory properties.

Medicinal Importance of Neem:

Neem holds a significant place in traditional medicine due to its diverse pharmacological properties. Various parts of the neem tree—leaves, bark, seeds, fruit, and flowers—are used in herbal remedies. Neem is effective against infections, including skin conditions like eczema, acne, and ringworm. Also used to treat inflammation, arthritis, and pain-related disorders. Neem leaves are often consumed to purify the blood and support liver health. Neem leaf extract is known to help manage blood sugar levels. It enhances the immune response and is used to strengthen overall health. Neem is traditionally used to treat fevers, especially malaria, and expel intestinal parasites.

7) Sadabahar

Periwinkle, scientifically known as ***Catharanthus roseus***, is a flowering plant belonging to the Apocynaceae family. Native to Madagascar, it is now widely cultivated in tropical and subtropical regions worldwide, including India. It is commonly referred to as "Sadabahar" in Hindi due to its evergreen nature. The plant bears attractive pink, white, or purple flowers and is often grown ornamentally. Beyond its beauty, Periwinkle is renowned for its immense medicinal value, especially in modern pharmacology. It contains important alkaloids that have led to ground-breaking cancer treatments.

Medicinal Importance of Sadabahar:

Periwinkle is known for producing vinca alkaloids, such as vincristine and vinblastine, which are used in the treatment of various cancers including leukemia, Hodgkin's disease, and lymphoma. These alkaloids inhibit cell division, making them powerful agents in chemotherapy. Besides its anticancer properties, periwinkle is used in traditional medicine to manage diabetes, high blood pressure, and infections. Its extracts help improve blood circulation and are used as mild sedatives. In Ayurvedic and traditional Chinese medicine, it is employed for treating

skin diseases, sore throats, and toothaches. Despite its benefits, the plant is toxic if consumed in large amounts and should only be used under medical supervision.

8) Shatavari

Shatavari (***Asparagus racemosus***), is a climbing plant belonging to the Asparagaceae family. It is native to India and parts of the Himalayas and thrives in tropical and subtropical forests. The plant has needle-like leaves, small white flowers, and tuberous roots that are medicinally valuable. In Sanskrit, "Shatavari" means "a woman with a hundred husbands," highlighting its traditional use as a female reproductive tonic in Ayurveda. It is considered a Rasayana herb, promoting longevity, vitality, and overall well-being.

Medicinal Importance of Shartavari:

Satavar is widely regarded for its rejuvenating and adaptogenic properties, especially for women's health. It helps regulate hormonal balance, enhance fertility, and manage menstrual and menopausal issues. The plant's root extract is used to increase lactation in nursing mothers and is considered a galactagogue. Satavar also boosts immunity, improves digestion, and reduces inflammation. It has anti-ulcer, antioxidant, and anti-anxiety properties, making it effective for gastrointestinal health and stress management. In men, Satavar supports reproductive health and vitality. As a natural tonic, it is beneficial for overall physical and mental wellness, especially during times of stress or hormonal changes.

9) Sarpgandha

Sarpgandha, also known as Indian snakeroot ***or Rauvolfia serpentina***, is a perennial, evergreen shrub native to the Indian subcontinent. It belongs to the Apocynaceae family and thrives in moist, tropical forests. The plant is characterized by its small, white or pinkish flowers and long, slender roots, which are the main source of its medicinal value. Sarpgandha has been widely used in traditional Indian medicine, especially in Ayurveda, for centuries. Due to its powerful alkaloids, particularly reserpine, Sarpgandha has gained global recognition for its therapeutic potential in treating various nervous and cardiovascular conditions**.**

Medicinal Importance of Sarpagandha:

Sarpgandha is highly valued for its sedative, antihypertensive, and tranquilizing properties. Its roots contain several alkaloids, with reserpine being the most prominent, which help in controlling high blood pressure and treating insomnia. It is often used in cases of mental disorders, anxiety, and psychosis due to its calming effects on the central nervous system. Sarpgandha also aids in relieving stress and tension by regulating neurotransmitter activity. In Ayurveda, it is prescribed for treating snake bites, insect stings, and fever. The plant must be used with caution, however, as overdoses or improper use can lead to adverse effects like depression or low blood pressure.

10) Tulsi

Tulsi, also known as holy basil, is a sacred and revered plant native to tropical Asia, particularly India, where it is commonly grown in household courtyards and worshipped for its spiritual and medicinal value. Robust Tulsi varieties also grow wild in many parts of Asia and Africa. The plant is a perennial shrub, often grown annually from seeds or propagated through cuttings.

Medicinal Importance of Tulsi:

Tulsi balances bodily energies by reducing *Vata* and *Kapha* while increasing *Pitta*. It acts on multiple systems, including the plasma, blood, nerves, marrow, reproductive, respiratory, and digestive systems. In traditional Ayurvedic medicine,

Tulsi has been used as a diaphoretic, expectorant, and liver protector. It is commonly prescribed for colds, coughs, bronchitis, bronchial spasms, sinus infections, tuberculosis, indigestion, nausea, ringworm, ear infections, and general stress disorders.

Tulsi helps clear excess *Kapha* from the lungs and nasal passages, enhancing breathing and sensory perception. It also pacifies high *Vata* in the colon, promoting nutrient absorption, strengthening nerve tissue, and improving memory. The plant is known for its mosquito-repellent qualities and natural antibiotic properties.

Conclusion:

India, often referred to as the botanical garden of the world, possesses a vast and diverse array of medicinal plants, which have played a vital role in healthcare for centuries. The country's rich tradition of Ayurveda, Siddha, and Unani medicine is deeply rooted in the therapeutic use of herbs which continue to gain recognition for their clinical efficacy and pharmacological properties. These herbs exhibit a wide range of therapeutic actions including immunomodulatory, anti-inflammatory, antioxidant, hepatoprotective, and adaptogenic effects.Scientific research and clinical studies increasingly validate traditional claims, highlighting the relevance of these botanicals in modern medicine. As chronic and lifestyle-related diseases rise globally, the demand for plant-based, holistic remedies has grown substantially. Indian medicinal plants offer safer, cost-effective alternatives with fewer side effects compared to synthetic drugs. However, despite their potential, challenges persist in terms of standardization, quality control, and scientific documentation.For India to truly harness its herbal wealth, there is a pressing need for integrative research, stricter regulatory frameworks, and sustainable cultivation practices. Bridging traditional knowledge with modern scientific validation will not only enhance the credibility of herbal therapies but also pave the way for global acceptance and therapeutic innovation. India's herbal legacy, if nurtured and developed wisely, holds immense promise for contributing to global healthcare in the 21st century.

References

- AgriDyne Technologies, Inc. (March, 1994). Greenhouse Grower. *Floritech report: Tough on pests, easy on crops—and the environment*. AgriDyne Technologies, Inc., Salt Lake City, UT.
- Alok, S., Jain, S. K., Verma, A., Kumar, M., & Mahor, A. (2013). Plant profile, phytochemistry and pharmacology of Asparagus racemosus (Shatavari): A review. *Asian Pacific Journal of Tropical Disease*, **3(3)**: 242–251.
- Bhattacharya, S. K., & Chakrabarti, A. (1997). Current status of herbal drugs in India: An overview. *Journal of Medicinal and Aromatic Plant Sciences*, **19(1)**: 1–18.
- Bone, K. (1996). *Clinical Applications of Ayurvedic and Chinese Herbs: Monographs for the Western Herbal Practitioner*. Australia: Phytotherapy Press, pp. 137–141.
- Ciddi, V. (2004). Azadirachtin from cell cultures of *Azadirachta indica* A. Juss. *Indian Journal of Pharmaceutical Sciences*, 66(6): 842–844.
- Chaudhary, R.D. *Herbal Drug Industry*. First Edition. pp. 373–375.
- Davis, L., & Kuttan, G. (2000). Immunomodulatory activity of *Withania somnifera*. *Journal of Ethnopharmacology*, 71:193–200.
- Devi, P. Uma, & Ganasoundari, A. (1999). Modulation of glutathione and antioxidant enzymes by *Ocimum sanctum* and its role in protection against radiation injury. *Indian Journal of Experimental Biology*, 37(3):262–268.

- Ellenberger, W.P., & Ellenberger, S.R. (1993). Selective removal of aflatoxin from azadirachtin-containing compositions. *United States Patent 5229007*, Application No: 870294.
- European Medicines Agency. (2006). Guideline on quality of herbal medicinal products/traditional herbal medicinal products. *EMEA/CVMP/814/00 Rev 1*. Retrieved from: http://www.emea.europa.eu/pdfs/human/qwp.
- Gnanapragasam, A., et al. (2006). Adriamycin induced myocardial failure in rats: Protective role of *Centella asiatica*. *Molecular and Cellular Biochemistry*, [Epub ahead of print].
- Jyoti Sethi, Sushma Sood, Shashi Seth, & Anjana Talwar. (2004). Evaluation of hypoglycemic and antioxidant effect of *Ocimum sanctum*. *Indian Journal of Clinical Biochemistry*, 19(2):152–155.
- Marlett, J. A., McBurney, M. I., & Slavin, J. L. (2002). Position of the American Dietetic Association: Health implications of dietary fiber. *Journal of the American Dietetic Association*, **102(7)**: 993–1000.
- Mishra, S. K., Sangwan, N. S., & Sangwan, R. S. (2007). Andrographis paniculata (Kalmegh): A review. *Pharmacognosy Reviews*, **1(2)**: 283–298.
- Mukherjee, P.K. (2007). *Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals*. Reprint. New Delhi: Business Horizons.
- National Research Council. (1992). *Neem: A Tree for Solving Global Problems*. National Academy Press, Washington, DC.
- Ragavan, R.S. (2006). Quality assurance in herbal products. *Herbal Tech Industry*, pp. 10–11.
- Raina, M.K. (Year not specified). Quality control of herbal and herbo-mineral formulations. *Indian Journal of Natural Products*, 19(1):11–15.
- Samanta, M.K., Srinath, Mukherjee, P.K., & Suresh, B. (1999). Herbal Drug Development – A Modern Approach. *Indian Journal of Pharmaceutical Education*, 33(4):202–204.
- Sathiyamoorthy, P. (2006). Analysis of Indian medicinal plants for heavy metal toxicity. *Herbal Tech Industry*, pp. 12–15.
- Sen, S., & Chakraborty, R. (2017). Revival, modernization and integration of Indian traditional herbal medicine in clinical practice: Importance, challenges and future. *Journal of Traditional and Complementary Medicine*, **7(2)**: 234–244.
- Shetty, B.S., et al. (2006). Effect of *Centella asiatica* (L.) on normal and dexamethasone-suppressed wound healing in Wistar albino rats. *International Journal of Lower Extremity Wounds*, 5(3):137–143.
- Tulsi. (n.d.). Web page published by National Medicinal Plant Board, Ministry of Health and Family Welfare, Department of AYUSH, Government of India. Available from: http://nmpb.nic.in/tulsi.htm
- Tulasi Home Remedies. Web page on the Internet. Available from: http://www.kuruppampady.com/homeremedies_Tulasi.php
- Vu Van Do, Nguyen Tien Thang. (2005). Extraction, purification and determination of the contents of azadirachtin from neem seed kernels (*Azadirachta indica* A. Juss). *TC Sinh học*, 27(2):57–60.

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