



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Paper

Herbal Medicine: Current Status and the Future

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ARTICLE INFO

Published: 22 Aug 2026

Keywords:

Herbal medicine, primary
source, global demand,
plant-derived products

DOI:

10.5281/zenodo.22053767

ABSTRACT

Herbal medicine is one of the oldest and most widely practiced systems of healthcare, serving as a primary source of treatment for millions of people worldwide. It includes the use of medicinal plants and plant-derived products for the prevention and treatment of diseases. In recent years, the global demand for herbal medicines has increased due to growing interest in natural therapies, increased awareness of their therapeutic potential, and concerns regarding the adverse effects of synthetic drugs. Many modern pharmaceuticals have originated from medicinal plants, highlighting their importance in drug discovery and development.(1)Despite their widespread use, several challenges limit the acceptance of herbal medicines in mainstream healthcare. These include variability in the quality of raw materials, lack of standardization, adulteration, contamination, insufficient scientific validation, and inadequate regulatory frameworks in many countries. Advances in pharmacognosy, phytochemistry, biotechnology, and analytical techniques have significantly improved the quality control, safety assessment, and efficacy evaluation of herbal products. Modern research is also exploring the molecular mechanisms, pharmacological activities, and clinical applications of medicinal plants to establish evidence-based herbal medicine.(2)(3)The future of herbal medicine lies in integrating traditional knowledge with modern scientific research. Emerging technologies such as metabolomics, genomics, nanotechnology, artificial intelligence, and sustainable cultivation practices are expected to enhance the discovery, standardization, and commercialization of herbal products. Strong regulatory policies, Good Agricultural and Collection Practices (GACP), Good Manufacturing Practices (GMP), and well-designed clinical trials will further improve the safety, efficacy, and global acceptance of herbal medicines. Overall, herbal medicine has significant potential to contribute to modern healthcare by providing safe, effective, affordable, and sustainable therapeutic options while preserving traditional medicinal knowledge.(4)

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



INTRODUCTION

History of Herbal Medicine

Herbal medicine represents one of the oldest forms of healthcare and has played a fundamental role in the prevention and treatment of diseases throughout human history. The use of medicinal plants dates back thousands of years and has been documented in nearly every ancient civilization. Long before the advent of synthetic pharmaceuticals, natural products derived from plants served as the primary source of therapeutic agents. Traditional knowledge regarding the medicinal properties of plants was accumulated through empirical observation, cultural practices, and practical experience, and was⁽⁵⁾ transmitted orally across generations before being systematically documented in written texts.

Archaeological evidence suggests that the medicinal use of plants began during the prehistoric period, approximately 60,000 years ago. Early humans learned to identify therapeutic plants by observing animal behavior and through repeated experimentation. Medicinal plants were commonly employed for the treatment of wounds, infections, fever, digestive disorders, and pain. These remedies were prepared using simple methods such as crushing, boiling, chewing, or drying plant materials.⁽⁶⁾

The earliest written records of herbal medicine originated in ancient Mesopotamia, where the Sumerians documented the medicinal uses of numerous plant species on clay tablets written in cuneiform script. These records describe the preparation of herbal formulations and represent the beginning of organized medical knowledge.

Ancient Egypt made significant contributions to herbal medicine through the compilation of the Ebers Papyrus (circa 1550 BCE), one of the oldest surviving medical manuscripts. This document contains hundreds of herbal prescriptions and describes the therapeutic applications of medicinal

plants such as aloe Vera, garlic, castor oil, and myrrh. Egyptian physicians employed these remedies in the management of wounds, gastrointestinal disorders, infectious diseases, and dermatological conditions.⁽⁷⁾

The Indian system of Ayurveda, which originated more than 5,000 years ago, is regarded as one of the world's oldest continuously practiced systems of medicine. Classical Ayurvedic texts, including the Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya, provide comprehensive descriptions of medicinal plants, disease classification, diagnosis, and therapeutic approaches. Ayurveda emphasizes a holistic approach to health by maintaining the balance of the three doshas—Vata, Pitta, and Kapha—through diet, lifestyle modifications, and herbal therapies.⁽⁸⁾

Traditional Chinese Medicine (TCM), developed over 3,000 years ago, also contributed substantially to the evolution of herbal medicine. The classical text Shennong Ben Cao Jing documented hundreds of medicinal plants and introduced concepts such as Yin and Yang and Qi, which continue to guide traditional Chinese therapeutic practices.

Indian traditional medicine

Traditional medicine refers to the knowledge, skills, and practices developed through centuries of experience and used for maintaining health, preventing disease, and treating illness. India has one of the richest traditional healthcare heritages, with documented use dating back more than 5,000 years. These systems are based on natural products, healthy lifestyle practices, dietary management, and holistic approaches to health. According to the WHO, traditional medicine emphasizes personalized, nature-based care and is increasingly being integrated into health systems where supported by evidence. The Government of India promotes these systems through the Ministry



of AYUSH, which supports education, research, regulation, and healthcare delivery in traditional medicine.(9)

Medicinal Plant	Botanical Name.	Major Uses
Tulsi.	Ocimum sanctum	Respiratory disorders, immunity
Neem	Azadirachta indica.	Antimicrobial, skin diseases
Turmeric	Curcuma longa	Anti-inflammatory, wound healing
Ashwagandha.	<u>Withania</u> somnifera	Adaptogen, stress management
Amla	Phyllanthus emblica.	Antioxidant, nutritional supplement
Ginger	Zingiber officinale	Digestive disorders, nausea
Giloy	Tinospora cordifolia	Traditionally used for immune support
Aloe Vera	Aloe barbadensis	Skin care wound management

Traditional medicine is commonly used to support the management of

Diabetes mellitus.
Hypertension.
Arthritis.
Digestive disorders
Respiratory diseases
Skin disorders.
Stress and anxiety.
Liver disorders.
Obesity.
General wellness

Evidence for effectiveness varies by therapy and condition; therefore, treatments should be evaluated using high-quality clinical research and should not replace proven medical care for serious illnesses.

Japanese traditional medicine
Traditional medicine has been used for centuries

to prevent and treat diseases using natural products and holistic approaches. Among the various Asian traditional medical systems, Japanese traditional medicine, known as Kampo, occupies a unique position. Unlike many traditional systems, Kampo has become fully integrated into modern medical practice in Japan.(10)



Kampo medicine focuses on maintaining harmony among body systems through carefully standardized herbal formulations. These medicines are manufactured under strict pharmaceutical quality standards and prescribed by medical doctors in hospitals and clinics.(11)

Traditional Chinese medicine

Traditional Chinese Medicine (TCM) is a comprehensive medical system that originated in ancient China and continues to play an important role in healthcare worldwide. Unlike conventional medicine, which often focuses on diagnosing and treating specific diseases, TCM emphasizes maintaining balance within the body to prevent illness and restore health.

TCM is based on the belief that disease develops when the body's natural balance is disturbed by internal or external factors. Treatment therefore aims to restore harmony rather than simply suppress symptoms. (4) According to the World Health Organization, traditional and complementary medicine is widely used across many countries, and evidence-based integration into healthcare systems is an important global priority. (12)

Current Scenario of Herbal Industry

According to the Ministry of AYUSH, Exports of all AYUSH components and Herbal Products has seen a 27% growth during 2021 as to the previous Financial year. In contrast, Imports grew about 28% during the same financial year. [6] Ministry of AYUSH also informed about export of AYUSH and herbal Products in the financial year 2020- 21 to be as \$539.57million as compared to \$425.80 million in 2019-20. Among the states Gujarat came out as the highest Exporter of AYUSH and herbal components in 2020-21 with a 32.3% growth than The 2019- 20(\$189.59 million) resulting in an escalated exporting value of

\$246.78 Million. Maharashtra came second with \$71.82 million export growing at a 14.1% Rate as compared to \$62.93 million in 2019-20. Rajasthan with third largest export Of \$55.19 million with a growing rate of 61.5% as compared to the previous year's Export around \$34.17 million. (13)

Introduction

Her compared ball medicine is still the mainstay of about 75 - 80%of the world population, mainly in the developing countries, for primary health care (Kamboj, 2000). This is primarily because of the general belief that herbal drugs are without any side effects besides being cheap and locally available(Gupta and Raina, 1998). According to the World Health Organization (WHO), the use of herbal remedies throughout the world exceeds that of the conventional drugs by two to three times (Evans, 1994). The use of plants for healing purposes predates human history and forms the origin of much modern medicine. Many conventional drugs originated from plant sources: a century ago, most of the few effective(14) drugs were plant based. Examples include aspirin (willow bark), digoxin (from foxglove), quinine (from cinchona bark), and morphine (from the opium poppy) (Vickers and Zollman, 1999).Medical history from the beginning of time is filled with descriptions of persons who used herbs to heal the sick of the society. However, parallel to the onset of the industrial revolution we witnessed the rise of allopathic medicine. Herbal medicine was also an effective healing method, but was viewed less enthusiastically (Tithe, 1998).herbal products were discarded from conventional medical use in the mid 20th century, not necessarily because they were ineffective but because they were not as economically profitable as the newer synthetic drugs (Tyler, 1999). In the early 19th century, scientific methods become more advanced and preferred, and the practice of



botanical healing was dismissed as quackery. In the 1960s, with concerns over the iatrogenic effects of conventional medicine and desire for more self-reliance, interest in “natural health” and the use of herbal products increased. Recognition of the rising use of herbal medicines and other non-traditional remedies led to the establishment of the office of Alternative Medicine by the National

Institute of Health USA, in 1992. Worldwide, herbal medicine received a boost when the WHO encouraged developing countries to use traditional plant medicine to fulfill needs unmet by modern systems (Winslow and Kroll(15)

HERBAL MEDICINES AND THEIR ACTIVITY IN HUMAN DISEASES

Botanical names	Parts used	Botanical name	Parts used
Acorus calamus	Rhizome.	Aloe Vera	Dried leaf
Argemone mexicana.	Fruit	Adhatoda vasica	Whole plant
Curcuma amada	Rhizome.	Cinnamomum iners .	Bark and leaf
Curcuma longa	Rhizome.	Curcuma aromatica	Rhizome
Curcuma aromatica .	Wild turmeric.	Garcinia indica.	Fruit
Cassia lanceolata.	Leaves	Gloriosa superba.	Tuber and seed
Rubia cordifolia	Madder root	Ricinus communis	Seed Symplocos
Piper longum	Fruit	Phyllanthus amarus	Fruit
Myrica nagi	Leaf	Strycnos nux-vomica	Bark and seed
Withania somnifera	Vegetable rennet	Myrica nagi	Bark
Glycyrrhiza glabra	Root.	Juniperus communis	Fruit
racemosa	Bark.	Rauvolfia serpentina.	Root
Swertia chirata	Whole plant	Ocimum sanctum	Leaf and essential oil
Terminalia chebula.	Bark and seed.	Tylophora purpuria.	Root
Zingiber officinale	Rhizome	Vinca rosea	Leaf, seed and stem

Herbal Medicines Used for Skin Care

The skin serves as the body's first line of defense against environmental insults, ultraviolet

radiation, microorganisms, and chemical agents. Healthy skin maintains body temperature, prevents dehydration, and provides immune protection.



Common skin disorders include:

Acne vulgaris

Psoriasis

Eczema

Dermatitis

Skin infections

Burns

Wounds

Hyperpigmentation

Premature aging

Modern dermatological drugs provide rapid relief but may produce side effects such as:

Skin thinning

Allergic dermatitis

Dryness

Pigmentation changes

Antibiotic resistance

Medicinal plants have therefore become increasingly popular because they provide natural alternatives with multiple pharmacological activities.(16)

Aloe Vera (*Aloe barbadensis* Miller)

Aloe Vera has gained enormous popularity as a plant used in the treatment of dermatological and cosmetology problems because it offers myriad benefits and properties for the skin [28]. Among many, moisturizing and hydration are the well-known properties. It is very good at maintaining the skin's moisture. Aloe vera is considered a natural humectant, and it works to maintain moisture and prevent the skin from getting dry. Hence it is largely incorporated into cosmetics and products such as lotions, creams, gels intended for sensitive and dry skin. Aloe vera's anti-inflammatory and anti-microbial characteristics make it good for wound healing products and treatment for minor burn and skin irritation.(17)

Neem (*Azadirachta indica*)

Neem has long been regarded as one of the most important medicinal plants and its importance in

dermatology is huge due to its diverse effects on skin treatment. It has been used in traditional medicine such as Ayurveda since ages, and it is known as "natural skin purifier". The application of neem is vast in treatment of acne and pimple as it is capable of cleansing(18) skin and preventing recurrence of pimples. Face washes, soaps and creams that are for the skin type 'oily and acne prone' often contain neem. It is used for various skin infections and inflammatory skin disorders due to its antibacterial, antifungal and anti-inflammatory properties.

Turmeric (*Curcuma longa*)

Turmeric (*Curcuma longa*) is also a vital herbal remedy widely used in skin care for cosmetic and medicinal purpose. It has been utilized since ancient times in systems like Ayurveda for treating and enhancing skin health and curing various skin disorders [32]. It is frequently applied to help in treatment of acne and skin spots, and make the skin clean, clearer and with fewer blemishes. It is often used in form of face mask or in cosmetic preparation intended for acne treatment. This is due to the fact that it contains curcumin as the



active constituent which offers numerous skin protective effects due to its antioxidant and anti-inflammatory Property(19)

Ashwagandha (Withania somnifera)

Ashwagandha (*Withania somnifera* (L.) Dunal) is one of the most important medicinal plants in Ayurveda and is commonly known as Indian Ginseng or Winter Cherry. It belongs to the family Solanaceae and has been used for more than 3,000 years in traditional Indian medicine. The name "Ashwagandha" is derived from the Sanskrit words **Ashwa** (horse) and **Gandha** (smell), referring to the characteristic odor of its roots and the belief that it imparts the strength and vitality of a horse.

Ashwagandha is classified as a Rasayana herb in Ayurveda, meaning it promotes longevity, rejuvenation, and overall health. It is widely used as an adaptogen, helping the body resist physical, emotional, and environmental stress. Modern research has confirmed many of its pharmacological properties, including antioxidant, anti-inflammatory, immunomodulatory, neuroprotective, antidiabetic, anticancer, cardioprotective, and skin-protective activities.(20)

Tulsi (Ocimum sanctum)

Tulsi (*Ocimum sanctum* L.), currently accepted botanically as *Ocimum tenuiflorum* L., is one of the most sacred and widely used medicinal plants in Ayurveda. It belongs to the Lamiaceae (Mint) family and is commonly known as Holy Basil. Tulsi has been used in traditional Indian medicine for over 3,000 years and is regarded as the "Queen of Herbs" because of its broad therapeutic properties.

Tulsi is valued for its adaptogenic, antioxidant, antimicrobial, anti-inflammatory, immunomodulatory, cardioprotective,

hepatoprotective, antidiabetic, and skin-protective activities. The leaves, seeds, roots, and essential oil are used in traditional medicine and herbal formulations for the prevention and treatment of numerous diseases.(21)

Ginger (Zingiber officinale)

Ginger (*Zingiber officinale* Roscoe) is one of the oldest and most widely used medicinal plants in the world. It belongs to the Zingiberaceae family and is valued for its culinary, medicinal, and cosmetic uses. The underground stem (rhizome) is the medicinally important part of the plant. Ginger has been used for over 2,500 years in Ayurveda, Traditional Chinese Medicine (TCM), Unani, and other traditional systems for the treatment of digestive disorders, nausea, inflammation, respiratory diseases, arthritis, and skin problems. The medicinal properties of ginger are mainly attributed to its bioactive compounds, including gingerols, shogaols, zingerone, paradols, and volatile oils. These compounds possess antioxidant, anti-inflammatory, antimicrobial, antiemetic, analgesic, cardioprotective, antidiabetic, anticancer, and skin-protective activities.(22)

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HOW TO CITE: Punam Patil, Dr Manoj Patil, Jayshree Borse, Sayali Deshmukh, Shubham Chavan. Herbal Medicine: Current Status and the Future, Int. J. of Pharm. Sci., 2026, Vol 4, Issue 8, 3503-3510, <https://doi.org/10.5281/zenodo.22053767>

