

EXPLORING THE GLOBAL POTENTIAL OF AYURVEDIC MEDICINE: BRIDGING TRADITIONAL WISDOM AND MODERN APPLICATIONS

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Received: 25 March 2025, Revised and Accepted: 28 May 2025

ABSTRACT

This comprehensive review explores the global potential of Ayurvedic medicine, bridging traditional wisdom with modern applications. Delving into Ayurveda's historical roots and philosophical foundations, the study traces its evolution and integration into diverse cultures, underscoring its enduring impact on global healthcare traditions. The narrative highlights Ayurveda's resurgence during India's fight for independence and its subsequent official recognition, evident in the establishment of institutes, councils, and research initiatives, signifying its growing significance in contemporary health care. The review extensively assesses the current status of Ayurveda, covering education, research, and Ayurvedic medicine production. It examines the globalization of Ayurveda, emphasizing its acceptance and integration into global healthcare practices. The importance of research and development in Ayurveda is underscored, specifically acknowledging institutions such as the Central Council of Ayurvedic and Siddha Research. The paper advocates for rigorous scientific validation through double-blind, placebo-controlled clinical trials to establish the pharmacological effects of Ayurvedic medicinal plants. Throughout, the review acknowledges the potential global significance of Ayurvedic medicine, with focused attention on promising medicinal plants. The conclusion urges future research to substantiate the clinical effectiveness of these plants, facilitating the integration of Ayurveda into mainstream global healthcare. Serving as a valuable resource, this review caters to scholars, practitioners, and policymakers, fostering a dialog between traditional wisdom and modern healthcare applications, thereby contributing to the global harnessing of Ayurvedic medicine's potential.

Keywords: Ayurvedic medicine, Central Council of Ayurvedic and Siddha Research, Traditional medicine, Natural products, Plant source.

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INTRODUCTION

Nature has been a source of medicinal materials for thousands of years, and a startling number of modern medications have been found to have natural roots. For thousands of years, people have turned to medicinal and fragrant plants, particularly those with ethnopharmacological applications, as a natural source of healing [1-3]. Oral tradition has been used to pass down the exact dosage of a plant and its manner of administration for treating particular ailments from one generation to the next. After that, it was documented in the form of ancient texts. The Sanskrit word "yurveda," which meaning "life-knowledge," is where the word "Ayurveda" originates. Products made from Ayurveda may not always be entirely natural and can include harmful amounts of metals [4,5].

ANCIENT CONTEXT

Since about 2600 BC, plants have played a significant role in traditional medicine. There are 1000 herbal products known to have been used in Mesopotamia, including oils derived from Cedrus libani, Commiphora acuminata Mattick, and Cupressus arizonica Greene. Glycyrrhiza glabra L. and Papaver somniferum L. are rich plants that are still used to cure parasite illnesses, swellings, and colds and coughs [6]. Egyptian medicine, which dates to approximately 2900 BC, asserts that traditional medicine is connected to historical practices. The Ebers Papyrus, though the most well-known document dating back to 1500 BC, includes over 700 medications, many of which are derived from herbal sources [7]. The practice of traditional Chinese medicine has been around for millennia [8] and is based on the herb Shennong (100 BC; 365 medications) and Tangurohi (AD 659; Medicines 850). It dates back to around 2000 years ago (1100 BC; Wu Shi Er Bing Fang; contains 52 drugs). However, the Romans and Greeks also had a significant impact on the subsequent growth of traditional medicine use in the ancient Western world (Greek physician Dioscorides, ~100 AD), who

documented the gathering, preservation, and appropriate application of traditional medicine in the "known world" of the day.

The treatment of illnesses and health needs has a long history in India, dating back to 5000 BC, when texts such as the "Atharva Veda" (1200 BC), "Yajurveda" (1400-1000 BC), and "Rigveda" (1700-1100 BC) discussed health issues. Later, texts such as the "Sushruta Samhita" (660 BC), the "Charaka Samhita" (990 BC), and the "Dhanvantari Nighantu" (1800 BC) extensively stressed and practiced the use of plants and polyherbs. Traditional Indian medicine refers to the usage of medications that are either indigenous to India or those are brought in from abroad and integrated into Indian culture. India is the only country where Ayurveda, Siddha, Unani, Yoga, Naturopathy, and Homoeopathy are officially recognized forms of traditional medicine. Despite the fact that homeopathy arrived in India in the 18th century, it completely permeated Indian culture and improved like any other traditional system, because of which it became rich and became part of Indian traditional medicine [16].

FUNDAMENTAL AND HISTORY OF AYURVEDA

Ayurveda is considered as earliest system of medicine and has Indian origin. Western studies showed 20-60% American as well as European population believe in complementary and alternative medicine in some particular diseases [5,13]. Health system of early human development was almost dependent on the use of nanoparticles (NPs). Trial and error of early humans with inedible plants that could cause vomiting, diarrhea, coma, other toxic reactions, or even death increased their knowledge. However, the exchange of knowledge from one generation to another allowed people to discover and obtain information about food and natural medicines [14]. The result was the growth of NP traditional knowledge and the expansion of knowledge from one generation to another. Until the beginning of the 20th century, the main source of drugs in medicinal preparations was mainly plant and herbal

sources. NPs in the form of plant extracts have been used as a source of traditional medicine. The history dated back to thousands of years. Human being tried to record this in ancient literature [15]. Food, shelter, clothing, tastes, fragrance, and medicine were being provided by plants. Since then, plants have become part of ancient human civilizations.

Combining the Sanskrit terms “ayur” (life) with “veda” (science or knowledge), Ayurveda literally translates as “science of life” [17]. Ayurveda’s roots are in the ancient knowledge of the Rigveda and the Atharva Veda, and it provides the rational ordering of a harmonious life. Ayurveda’s origins are lost in archaeological artefacts, but between 2500 and 500 BC, its concepts and practices were refined in India [18]. Indian Ayurveda was known for its generous advancements in the utilization of natural resources and its testing of common sense. Ayurvedic medicine is based on two main principles. Preserving the disease’s origin and increasing the patient’s awareness of it are their two main objectives. The central goal of Ayurvedic treatment is “Ayurveda deals with happy and unhappy life.” It explains what is appropriate and what is inappropriate in relation to life, and measures life expectancy and quality of life [19,20]. This all-inclusive medical care system is predicated on the notion that the human body is a network of the seven basic tissues (Rasa, Rakta, Mamsa, Meda, Asthi, Majja, and Shukra) as well as bodily waste products such as sweat, feces, and urine that are derived from the five basic components – fire, water, air, ether, and earth – as well as from the three dynamic energies or functional philosophies – vata, pitta, and kapha (Tridosha). Fig. 1 shows disease results from any imbalance or disruption of these basic biological principles [21,22]. Ayurveda does not only treat the illness but also treat the patient overall. The individuality of every person within the social society is emphasized by this medical system. Physiological states that may contribute to a particular disease, biopersonality, biosynthesis, and conservative state. In addition, contemporary logical methodologies assist research to tackle numerous challenges of servicing people. Minerals, metals, and/or plant and/or animal materials are frequently combined in Ayurvedic remedies.

In India, plants are crucial to the emergence and treatment of health issues. Background information in history literally translates that “the science of life” is Ayurveda. The fundamental ideas and practices of Ayurveda are thought to have been codified and spread circa 1500 BC. There are 114 hymns about medications that are used to treat different ailments in the Atharvaveda, and the final of the four great bodies of knowledge known as the Vedas, which are the foundation of Indian culture. The expertise gathered and treasured over the centuries gave rise to two major schools and eight specialties.

One was a medical school known as “Dhanvantari Sampradaya” (sampradaya meaning tradition), and another was a surgical school known in literature as “Atreya Sampradaya” [27,28]. The Charaka

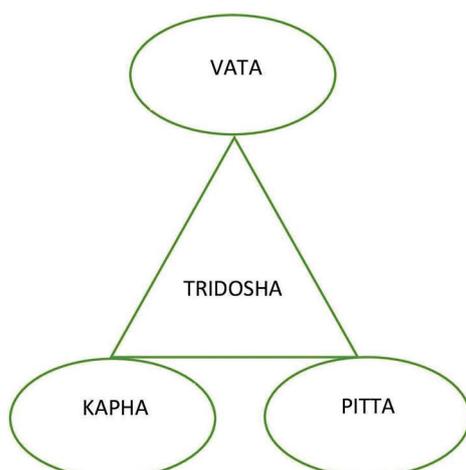


Fig. 1: Tridoshas in Ayurveda

Samhita for the medical school and the Sushruta Samhita for the surgical school were the respective typical collections of these schools. The first has multiple chapters covering different facets of medicine and associated subjects. This treatise mentions almost six hundred herbal, animal, and mineral treatments. The Sushruta Samhita primarily addresses a range of fundamental concepts and surgical theories. The use of over a hundred surgical instruments, such as forceps, scalpels, scissors, and more, is covered in this booklet. Using vegetables and dead animals as examples, dissection and surgical techniques are described.

It contains descriptions of about 650 drugs and deals with various aspects related to other surgical subjects such as anatomy, embryology, toxicology, and therapy [29].

One of the other famous Ayurvedic concepts is Vagbhata’s “Astanga-Hridaya.” The three documents listed above are referred to as “Brihat Trays” (three big or big ones). In addition to these three scholarly and authoritative treatises, there is a substantial body of work in the form of anthologies that spans more than 1500 years. It may have been the only system in place up until the Middle Ages to provide for the health needs of the Indian subcontinent’s population. It had the people and their rulers’ unwavering protection and support.

This might be regarded as the “golden age” of Ayurveda because the majority of the research done during this time was on fundamental ideas, articulating various tenets, and formulating new forms. Patronage of Ayurvedic treatment declined dramatically during the Middle Ages, a time marked by multiple foreign invasions and uncertain political conditions in the nation. During British rule, neglect increased as official encouragement of allopathy brought it to prominence. Interest in Ayurveda was rekindled at the start of the 20th century as a component of the national freedom movement. Representatives of the people, even in princely kingdoms and British India, began requesting sufficient funding for the advancement of Ayurveda science [29,30].

POST INDEPENDENT SCENARIO FOR AYURVEDA

In 1947, India won its freedom from British domination, and with it, the push to bring back traditional medical practices. After being formally acknowledged, the systems were integrated into the nation’s health network to offer medical care to its populace. To satisfy the nation’s basic healthcare needs, the Indian government has launched a number of measures to bolster Ayurveda’s standing as one of the most significant health systems. Ayurvedic colleges and hospitals have been developed.

The Central Institute of Research in Indigenous System of Medicine was established in 1955, which served as a research institute for needs related to research and development. Other significant initiatives included the establishment of Gujarat Ayurved University in Jamnagar, Gujarat in 1967 and the Central Council of Indian Medicine in 1972 to regulate training and registration in the Ayurvedic, Siddha, and Unani systems of medicine. 1971 saw the founding of the Central Council of Research in Medicine, Homoeopathy, and Yoga of India.

Afterward, this body was split up into three distinct councils: the Central body for Research in Naturopathy and Yoga, the Central Council for Research in Ayurvedic and Siddha Research (CCRAS), the Central Council for Unani Medicine, and the Central Council for Research in Homoeopathy. In Jaipur, Rajasthan, the National Institute of Ayurveda was founded. Recently, Rajasthan Ayurved University - Jodhpur (Rajasthan State) was founded as another university. On the Department of Ayurveda’s website, a draft National Policy for the Development of the Indian Medical System is available [31].

For the purpose of developing these systems, the Indian Union Government established “the Department of Indian System of Medicine and Homoeopathy (ISM and H)” in 1955. For the same reason, this department was renamed the Department of Ayurveda, Yoga, Naturopathy, Unani, Siddha, and Homoeopathy (Ayush) in November

2003. The Government of India established the Ministry of Ayush on November 09, 2014, with the goal of preserving the profound understanding of traditional Indian medical systems and enabling the best possible growth and dissemination of Ayush healthcare systems. The following are the Ministry of Ayush's main goals including raising the country's homoeopathic and Indian systems of medicine colleges' educational standards. Along with bolstering currently operating research facilities and guarantee time-bound research initiatives on diseases that have been recognized and for which these systems have a working solution and developing plans for growing, renewing, and promoting the therapeutic plants utilized in these systems, finally developing homoeopathic medicine and pharmacopoeial standards for Indian systems of medicine [31,32].

AYURVEDIC PERCEPTION OF HEALTH

In India, Ayurveda is considered not only as ethnomedicine but also as a holistic system of medicine that considers the physical, psychological, philosophical, ethical, and spiritual well-being of the Individual and humanity. It is of great amalgamation of life with the universe and with nature and science. This universal and holistic approach makes it a unique and distinctive medical system. This system believes in maintaining a proper lifestyle to maintain positive health. This concept has been in practice for several millennia, and modern doctors have now considered the importance of this aspect. It is not surprising that the Modern WHO concept of health has close similarities to the concept Ayurvedic definition of health. The philosophical background is based on the basic doctrine that everything that exists in the universe (macrocosm) exists in the body (microcosm). The universe is composed of Pancha Mahabhuta which are Prithvi (Earth), Jala (Water), Teja (Fire), Vayu (Air), and Akash (Space/Ether). The human body originates from those in which these basic elements combine to form the so-called Tridoshas (humors) called Vata, Pitta, and Kapha [33,34]. These humors regulate and control the basic psychobiological functions of the body. In addition to these three humors, the body has seven basic tissues (sapta dhatus) – Rasa, Rakta, Mamsa, Meda, Asthi, Majja, and Shukra – and three wastes (mala) of the body such as excrement, urine, and sweat. A healthy state of the body represents an optimal state of balance between the three doshas. When this balance is disturbed for some reason, disease occurs. The growth and development of body components depend on the nutrition provided as food. Therefore, it is considered the main source that replenishes or nourishes the various components of the body after the action of biofire (Agni) [35,36].

AYURVEDIC THEORY OF ORIGIN AND DEVELOPMENT OF A DISEASE

People are classified into different categories based on their psychosomatic structure. A constitutional daily (Dinacharya) and seasonal routine (Ritucharya) is prescribed to maintain positive health. The body can get diseases if these routines are not followed. This leads to a loss of balance between the three humors. Imbalance of the three humors can also be caused by nutritional disorders, unwanted habits, seasonal deviations, less exercise or irregular use of the sense organs, and incompatible activities of body and mind [37].

Other causes can also cause this condition. For example, some external factors such as microorganism and changes in climatic conditions can cause accumulation of dosha, which leads to imbalance of doshas and corruption of doshas. It is a concept that doshas normally circulate through macro and micro channels called srotas. Srotas are an important medium through which the tissues of the body receive food and also the end products of metabolism are transported out of the tissues. When an obstruction (srotorodha) occurs due to an accumulation of doshas, it affects the two-way flow of nutrients and end products (malas). Doshas accumulated in the area react with dushyas (reagents – in this case tissues), resulting in a condition known as dosha dushya sammurchana that affects the body's metabolism. Ama, a semi-processed metabolic intermediate, accumulates. At this stage, prodromal symptoms of the disease appear. Thus, disturbances in biochannels are considered

the main reason for the appearance of a disease state in an organ or system [38,39].

AYURVEDIC CONCEPT OF DIAGNOSIS

Diagnosis is always made by looking at the patient as a whole. The doctor carefully considers the internal physiological characteristics and mental health of the patient. He also examines other factors such as the affected body tissues, humors, location of the disease, the patient's resistance and vitality, his daily routine, eating habits, severity of clinical conditions, state of digestion and personal, social details, and the economic and environmental situation of the patient. The general examination is called a tenfold examination, through which the doctor examines the following parameters of the patient: (1) psychosomatic structure, (2) susceptibility to diseases, (3) tissue quality, (4) body structure, (5) anthropometry, (6) adaptability, (7) mental health, (8) digestive capacity, (9) exercise endurance, and (10) age. In addition, pulse, urine, feces, tongue, voice and speech, skin, eyes, and appearance are also examined [40].

ASPECTS OF TREATMENT

Treatment is based on restoring the balance of the disturbed humors (dosha) by adjusting diet, correcting life habits and behavior, giving medicines, and using preventive non-medical treatments known as "Panchkarma" (five processes) and "Rasayana" (rejuvenation) therapy. Many factors are considered before starting treatment, such as the condition of tissues and end products, environment, vitality, time, digestion and metabolism, constitution, age, psyche, physical fitness, and type of food consumed. Types of treatment are of different types – (a) Shodhana therapy (purification therapy), (b) Shaman therapy (palliative therapy), Pathya Vyavastha (prescribing proper diet and activity), Nidan Parivarja (prevention of the main causes and situations of illness or worsening of illness), treatment with Satvajaya (psychotherapy), and Rasaya (adaptogens, including immunomodulators, anti-stress, and rejuvenating drugs). Medicines that improve Dipa (digestion) and Pacha (assimilation) are considered good for pacifying disturbed doshas (moods). This therapy is believed to dissolve vicious and accumulated doshas, improving agni (digestive power) and restoring disturbed metabolic processes. In severe conditions, the above treatment should be supplemented by cleansing processes such as Panchakarma. In this therapy, the initially accumulated damaged dosha is liquefied using external and internal oil treatments of the patient, followed by sweating (swedhana) and removal of the affected dosha by vomiting (Vamana) or purging (Virechana), Bastilla (evacuating enema), and Nasya (nasal insufflation). Shodhana therapy provides a cleansing effect through which therapeutic benefits can be obtained. This type of therapy is considered beneficial for neurological and musculoskeletal conditions, certain vascular or neurovascular conditions, respiratory disorders, and metabolic and degenerative disorders. Shamanic therapy involves restoring the normalization of the damaged doshas (moods). This is achieved without creating an imbalance in the other doshas. This use by beginners requires digestion, exercise, and exposure to sun and fresh air. Pathya Vyavastha type of treatment refers to certain indications and contraindications related to diet, activity, habits, and emotional state. Nida Parivarjan-style treatment focuses on avoiding the known causes of the patient's illness. Satvavajaya type of therapy emphasizes restraining the mind from craving unhealthy objects and Rasayana therapy deals with promoting strength and vitality [29,41-43].

DIETARY ADVICE IN AYURVEDA

Ayurveda places great emphasis on dietary regulation. According to Ayurvedic concepts, food has a great influence on the physical, temperamental, and mental development of a person. Food is the basic material for the body and the production of essential substances necessary for life known as Rasa. Rasa transforms into body parts and supports all vital functions [44,45].

PRESENT EDUCATION SYSTEM FOR AYURVEDA IN INDIA

Present Status of Ayurveda and Other Indigenous Medical Systems of India: ISM Regulation and Practice. In six states, ISM is under the State Health Department, in about six smaller states the Union Territory Officer deals with ISM matters. More than 611,000 therapists are currently working with ISM and H. There are more than 26,000 hospitals and nursing homes with free treatment facilities in this sector. In addition, many practitioners in the unorganized population sector provide remedies to a significant section of the population. Education currently, there are more than 200 colleges offering 4 and 6-month course leading to a License in Ayurvedic Medicine and Surgery, followed by a year-long training [4,20-25]. Similarly, 2 colleges offer degrees in Siddha system of medicine and 34 colleges in Unani system of medicine and 130 colleges offer courses leading to a degree in homeopathy. The turnover of candidates from these universities is more than 9000 per year. More than 30 institutes offer postgraduate courses in Ayurveda and specialization is available in 16 departments. There is also a National Academy of Ayurveda which imparts PG education under the Guru-Shishya parampara scheme. This system was created with the aim of providing traditional education as in ancient times. In ancient times, students would go to a teacher's residence to serve him by learning the art of healing from him. At present, approximately 750 graduate students leave each year (course duration is 3 years). The degree offered is M.D. (Ayu) and M.S. (Ayu). Schools of Pharmacy offering D.Pharm (Ayu), B.Pharm (Ayu), and M.Pharm (Ayu) have recently been opened (for more details visit <http://www.ayurveduniversity.com>). Training programs are mostly organized in-house across the country, training Paraayurveda personnel. These trained technicians help perform healing processes such as panchakarma and ksharasutra (an effective surgical procedure to remove hemorrhoids). Similarly, pharmacists are trained to bear the responsibility of running an Ayurvedic pharmacy [46].

R&D IN AYURVEDA

Research is carried out by the CCRAS and the respective Councils of Unani, Homeopathy and Naturopathy, and Yoga. CCRAS is a leading research and development agency (<http://www.ccras.com>). It has 89 sector units reorganized into 30 agencies and units. The activities carried out are clinical studies which include clinical studies of planned single and combined Ayurvedic preparations and pharmaceutical studies which include medicinal and botanical studies, medicinal plant cultivation, pharmacognostic studies, phytochemical studies, and medicinal standards, pharmacological and toxicological studies. A large amount of information is available from various published literature and databases (Sharma et al. 2000, 2001, 2002; Billore et al. 2004; Satyavati et al., 1991, 1987; Satyavati, 2005; Mishra, 2004; De et al., 1993) and Pakrashi (1995–1997), Gupta and Tandon (2004), Wealth of India series (1959–1969; 1985 and 2000), Dahanukar et al. 2000, Rastogi and Dhawan (1982), Ayurvedic Part of the Pharmacopoeia Trilogi (Aneia Trilogi, 1989, 1999, and 2000), Sivarajan and Balachandran (1999), Raghunathan and Mitra (1982) and five volumes (1-5) Rastogi and Mehrotra (1990, 1993, 1991, and literature reviews), which include rare and classic studies. There are also published manuscripts from ISM and H. (<http://www.ccras.com>) In addition to the commissions, research activities are carried out in nationally important graduate centers and institutes, e.g., Central Drug Research Institute, Central Institute of Medicinal and Aromatic Plants, National Botany Research Institutes, etc., and R&D centers associated with companies producing Ayurvedic medicines [40,47-63]. However, the biggest trend is to consider medicinal plants used in Ayurveda as starting material for bio-research of medicines. There is very little research on the Ayurvedic concept behind a particular formula. Ayurveda has a very well-developed branch of medicinal preparations known as "Bhaishajya Kalpana" which offers a lot of information on methods of preparation of medicines, use of excipients, collection and use of medicines in a certain way. Research on this aspect and the basic principles of Ayurveda is still being done together.

MANUFACTURING IN AYURVEDIC SECTOR

Ayurvedic medicines are marketed in different forms. They are available both in classic forms (tablets, powder, decoction, medicated oil, medicated ghee, fermented products) and in modern medicated packages such as capsules, creams, syrups, ointments, liniments, salves, and granules. There are more than 8500 Ayurvedic drug manufacturers in the country and the total sales of drugs used in all ISM and H systems are approximately one billion dollars in Table 1. The production of medicines in this field is governed by the Drugs and Cosmetics Act (1940) and Rules (1945) (Jain, 2001). Several chapters have been added to these laws over the years. There are three types of agencies that deal

Table 1: Top Indian Ayurvedic companies and their leading products

S. No.	Name of company	Best seller product	Medicinal use
1	Patanjali Ayurved	Divya Madhunashini Vati extra power	For diabetes control
		Divya Peedanil gold tablet	For pain relief
		Patanjali Giloy Ghanvati	For Immunity improvement
2	Nutica Herbocare	Allerwin	For allergic reaction
		Aloefit	For general health
3	Baidyanath Ayurved	Cardiliv capsule	For cardiac health
		Rogan Badam Shireen almond oil	Source of antioxidants, vitamins and provides essential omega-6 acid.
4	Dabur India Ltd	Bhringraj Asav	Ayurvedic blood purifier
		Punarnawarist	For healthy liver
		Dabur Lal Tail	Massaging oil for child
5	Hamdard India	Dabur Red toothpaste	For gum health
		Dabur Chyawanprash Awaleha	Immunity booster
6	Zandu Care	Hamdard	Source of antioxidants, vitamins and provides essential omega-6 acid
		Raughan-E-Badam Shireen sweet almond oil	Herbal Cough and Cold Syrup
		Hamdard Joshina syrup	Blood purifier
7	Kerala Ayurveda Ltd	Hamdard Safi syrup	Pain reliever
		Zandu Balm	For gut health
8	Vicco Laboratories	Chyawanprash	Immunity booster
		Kerala Ayurveda	For delay premature graying with Neeli,
		Neelibringadi Keram daily hair oil	Oil to detan with nalpamara
9	Himalaya	Kerala Ayurveda Nalpamaradi Keram face and body	Its external use decreases joint inflammation and muscle fatigue
		Kerala Ayurveda Mahanarayana thailam	Tooth health and cleaning
10	Charak Pharma	Vicco vajradanti	Toothpaste
		Vicco turmeric cream	Immunity booster
9	Himalaya	Ashwagandha tablet	Liver protective
		Liv 52 tablet	Anti-infective therapy
10	Charak Pharma	Septilin	Liver tonic
		Livomyn syrup	Aphrodisiac
10	Charak Pharma	Vigomax forte tablets	Menopausal relief
		Evanova capsule	

with the administration of laws and regulations enacted by parliament. To advise the Government of India, there is a Pharmaceutical Advisory Council and a Drug Advisory Committee, which, with support staff, are responsible for licensing and enforcement of various laws relating to the manufacture and distribution of drugs. At the national level, this responsibility belongs to the commissioners of the Food and Drug Administration. Recently, Good Manufacturing Process has been defined for ISM to be followed by all agencies involved in drug production in this sector [29,64-66].

GLOBALIZATION OF AYURVEDA

The globalization of Ayurvedic practice has accelerated over the past two decades. Ayurvedic medicines are used as dietary supplements in the United States, the European Union, and Japan. Many doctors practice Ayurveda in many parts of the world. Services are available, for example, in the United States, Argentina, Australia, Brazil, New Zealand, South Africa, Czech Republic, Greece, Italy, Hungary, the Netherlands, Russia, Great Britain, Israel, Japan, Nepal, and Sri Lanka [40] short and long-term Ayurvedic training. The concepts of proper lifestyle, food habits, and daily and seasonal routines followed in Ayurveda can be adopted with appropriate modifications in different countries located in different parts of the world, after due consideration of the cultural environment and also the constitutional environment of those countries' population profile. Medicinal plant remedies from these countries can also be tried to fulfill the health needs of people after classifying the plants according to Ayurvedic concepts. Medicines used in ISM can be used as an adjuvant with the main allopathic medicines. Non-medical approaches such as "Panchakarma" and "Ksarasutra" can certainly be integrated into other healthcare systems, thus expanding options for doctors and patients. A recent review (Dahanukar *et al.*, 2000) notes that more than 13,000 plants have been studied in the past 5 years [67]. Several herbs have been shown to have important pharmacological effects in preclinical trials, but the results obtained in double-blind, placebo-controlled clinical trials have not been adequately monitored. *Curcuma longa* Linn, *Boswellia serrata* Roxb. ex Colebr., *Picrorhiza kurroa* Royle ex Benth, *Terminalia chebula* Retz., *Emblica officinalis* Gaertn., *Bacopa monnieri* (Linn.) Pennell, *Boerhavia diffusa* Linn, *Phyllanthus niruri* Linn, *Celastrus paniculatus*, *Ocimum* Gym. R Linnrs, *Momordica charantia* Linn, *Commiphora wightii* (Arn.) Bhandari, *Withania somnifera* (Linn.) Dunal, *Pterocarpus marsupium* Roxb., *Tinospora cordifolia* (Willd.) Miers. Formerly Hook.f. and Thomson, *Trichopus zeylanicus*, *Terminalia arjuna* (Roxb.) Wight and Arn, etc., have great potential to develop into medicines of global importance. Table 1 lists important medicinal plants with good potential for global development. This list is not exhaustive and is mainly based on the author's own preferences. Many of the drugs on the list are not available in sufficient quantities in India but may be available in other countries, particularly Nigeria, where *Commiphora* species are abundant, a source of supply for India's ISM-based industry. One of the main disadvantages is the lack of coordinated multidisciplinary studies that would prove their clinical effectiveness without doubt. This aspect should be the main focus of future research [68-73].

CONCLUSION

Ayurveda, rooted in ancient wisdom, continues to evolve and adapt to modern healthcare needs. Its holistic approach and emphasis on balance align with contemporary wellness trends. The globalization of Ayurveda presents opportunities for cross-cultural integration, enriching global healthcare with traditional wisdom. Future research should focus on validating the clinical effectiveness of Ayurvedic formulations to bridge the gap between traditional knowledge and evidence-based medicine.

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