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# INDIAN SYSTEMS OF MEDICINE: A BRIEF PROFILE

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## Abstract

Medicinal plants based traditional systems of medicines are playing important role in providing health care to large section of population, especially in developing countries. Interest in them and utilization of herbal products produced based on them is increasing in developed countries also. To obtain optimum benefit and to understand the way these systems function, it is necessary to have minimum basic level information on their different aspects. Indian Systems of Medicine are among the well known global traditional systems of medicine. In this review, an attempt has been made to provide general information pertaining to different aspects of these systems. This is being done to enable the readers to appreciate the importance of the conceptual basis of these system in evolving the material medica. The aspects covered include information about historical background, conceptual basis, different disciplines studied in the systems, Research and Development aspects, Drug manufacturing aspects and impact of globalization on Ayurveda. In addition, basic information on Siddha and Unani systems has also been provided.

**Key words:** Indian System of Medicine, Ayurveda, Unani, Siddha, Indigenous systems of medicine, Traditional systems of medicine

## Introduction

It is a well-known fact that Traditional Systems of medicines always played important role in meeting the global health care needs. They are continuing to do so at present and shall play major role in future also. The system of medicines which are considered to be Indian in origin or the systems of medicine, which have come to India from outside and got assimilated in to Indian culture are known as Indian Systems of Medicine (Prasad, 2002). India has the unique distinction of having six recognized systems of medicine in this category. They are- Ayurveda, Siddha, Unani and Yoga, Naturopathy and Homoeopathy. Though Homoeopathy came to India in 18th century, it completely assimilated in to the Indian culture and got enriched like any other traditional system hence it is considered as part of Indian Systems of Medicine (Prasad, 2002). Apart from these systems- there are large number of healers in the folklore stream who have not been organized under any category. In the present review, attempt would be made to provide brief profile of three systems to familiarize the readers about them so as to facilitate acquisition of further information.

## Ayurveda

Most of the traditional systems of India including Ayurveda have their roots in folk medicine. However what distinguishes Ayurveda from other systems is that it has a well-defined conceptual framework that is consistent throughout the ages. In conceptual base, it was perhaps highly evolved and far ahead of its time. It was among the first medical systems to advocate an integrated approach towards matters of health and disease. Another important distinguishing feature of Ayurveda is that unlike other medical systems, which developed their conceptual framework based on the results obtained with the use of drugs and therapy, it first provided philosophical framework that determined the therapeutic practice with good effects. Its philosophical base is partly derived from '*Samkhya*' and '*Nyaya vaisheshika*' streams of Indian philosophy. This enabled it to evolve into rational system of medicine quite early in its evolution and to get detached from religious influence. It laid great emphasis on the value of evidence of senses and human reasoning (Ramachandra Rao, 7).

## Historical background

Ayurveda literally means the Science of life. It is presumed that the fundamental and applied principles Ayurveda got organized and enunciated around 1500 BC. *Atharvaveda,* the last of the four great bodies of knowledge- known as Vedas, which forms the backbone of Indian civilization, contains 114 *hymns* related to formulations for the treatment of different diseases. From the knowledge gathered and nurtured over centuries two major schools and eight specializations got evolved. One was the school of physicians called as '*Dhanvantri Sampradaya'* (Sampradaya means tradition) and the second school of surgeons referred in literature as '*Atreya Sampradaya'*. These schools had their respective representative compilations- Charaka Samhita for the school of Medicine and Sushruta Samhita for the school of Surgery. The former contains several chapters dealing with different aspects of medicine and related subjects. Around six hundred drugs of plant, animal and mineral origin have been mentioned in this treatise.

Sushruta Samhita primarily deals with different aspects of fundamental principles and theory of surgery. More than 100 kinds of surgical instruments including scalpels, scissors, forceps, specula etc. are described along with their use in this document. Dissection and operative procedures are explained making use of vegetables and dead animals. It contains description of about 650 drugs and discusses different aspects related to other surgery related topics such as anatomy, embryology, toxicology and rapeutics (http://www.indianmedicine.nac.in). Vagabhata's 'Astanga-Hridaya' is considered as another major treatise of Ayurveda. The above three documents are popularly known as '*Brihat trayees'* (the big or major three). In addition to these three scholarly and authoritative treatises a vast body of literature exist in the form of compilations covering a period of more than 1500 years (http://www.indianmedicine.nac.

Till the medieval period it was perhaps the only system available in the Indian sub-continent at that time to cater to the healthcare requirement of the people. It enjoyed the unquestioned patronage and support of the people and their rulers. This can be considered as the golden period of Ayurveda because most of the work related to basic concepts, enunciation of different principles, evolvement of different formulations occurred during this period. The patronage for the Ayurvedic system of medicine considerably decreased during the medieval period, which was marked by unsettled political conditions in the country and series of invasion by foreigners. The neglect became worse during British rule during which importance was given to Allopathy through official patronage. In the early part of 20th century interest in Ayurveda rekindled as part of national freedom movement. People's representatives even in British India and princely states started asking for suitable measures to develop Ayurveda on scientific lines (http://www.indianmedicine.nac.

After India gained Independence from the British rule 1947, the movement for revival of Traditional Systems of Medicine gained momentum. The systems got official

recognition and became part of the National Health care network to provide health care to the country's citizen. Government of India initiated a series of measures to improve the position of Ayurveda as one of the major health care systems vital for catering to the primary health care needs of the country. A number of hospitals and colleges for Ayurveda were established. The other major initiatives were establishment of a research Institute to take care of the R & D needs (Central Institute of Research in Indigenous System of Medicine (CIRISM)- in 1975), a Post Graduate Training Centre of Ayurveda in 1956- to impart Post graduate education; establishment of a University- named Gujarat Ayurved University at Jamnagar in the Gujarat State in 1967; creation of Central Council of Indian Medicine (CCIM) in 1972 for regulating Education and Registration in Ayurveda, Siddha and Unani systems of medicine. A research council named Central Council for Research in Indian Medicine, Homoeopathy and Yoga (CCRIMH) was established in 1971. Subsequently, this council was bifurcated to create three separate councils -Central Council for Research in Ayurveda & Siddha (CCRAS) , Central Council for Research in Unani Medicine (CCRUM), Central Council for Research in Homoeopathy (CCRH) and Central Council for Research in Naturopathy and Yoga (CCRNY) . National Institute of Ayurveda (NIA) was established at Jaipur in Rajasthan State. Recently another University has been established known as Rajasthan Ayurved University- Jodhpur (Rajasthan state). A draft national policy for the development of Indian System of Medicine has been prepared which is available on the web site of Department of Ayurveda - (http://www.indianmedicine.nac.

**The concept of health in Ayurveda**

In India, Ayurveda is considered not just as an ethnomedicine but also as a complete medical system that takes in to consideration physical, psychological, philosophical, ethical and spiritual well being of mankind. It lays great importance on living in harmony with the Universe and harmony of nature and science. This universal and holistic approach makes it a unique and distinct medical system. This system emphasizes the importance of maintenance of proper life style for keeping positive health. This concept was in practice since two millennium and the practitioners of modern medicine have now taken into consideration importance of this aspect. Not surprisingly the WHO's concept of health propounded in the modern era is in close approximation with the concept of health defined in Ayurveda (Kurup, 2004).

**The philosophical background**

The basic foundation is the fundamental doctrine according to which whatever present in the Universe (macrocosm) should be present in the body (the microcosm). It has been conceptualized that the universe is composed of five basic elements named *Prithvi* (Earth), *Jala* (Water), *Teja* (Fire), *Vayu* (Air) and *Akash* (Space/Ether). The human body is derived from them in which these basic elements join together to form what are known as 'Tridoshas' (humors) named as *Vata, Pitta and Kapha*. These humors govern and control the basic psycho-biological functions in the body. In addition to these three humors, there exist seven basic tissues (*saptha dhatus*)- *Rasa, Rakta, Mamsa, Meda, Asthi, Majja* and *Shukra*- and three waste products of the body *(mala)* such as faeces, urine and sweat. Healthy condition of the body represents the state of optimum equilibrium among the three doshas. Whenever this equilibrium is disturbed due to any reason- disease condition results. The growth and development of the body components depend on nutrition provided in the form of food. The food is conceptualized to be composed of the basic five elements mentioned above. Hence it is considered to be the basic source material to replenish or nourish the different components of the body after the action of bio-fire (*Agni*). The tissues of the body are considered as the structural entities and the humours are considered as physiological entities, derived from different combinations and permutations of the five basic elements (http://www.indianmedicine.nac.in).

**The concept of pathogenesis**

People are categorized in to different categories based on their psychosomatic constitution. Constitution specific daily *(Dinacharya*) and seasonal routines (*Ritucharya)* are prescribed to maintain positive health. Body may become afflicted with disease if these routines are not adhered to. This will lead to the loss of equilibrium among the three humors. The loss of equilibrium of the three humors can also occur as a consequence of dietary indiscrimination, undesirable habits, seasonal abnormalities, improper exercise or erratic application of sense organs and incompatible actions of the body and mind.

Disease condition may ensue due to other reasons also. For example any external factor like microorganism, changes in the climatic conditions may cause the accumulation of dosha leading to disturbance in the doshic equilibrium and vitiation of doshas. It is conceptualized that normally doshas are circulated through macro and micro-channels known as *srotas.* The *srotas* are the important medium through which the body tissues get their nutrition and also the metabolic end products are transported out of the tissue. If any blockade occurs (*srotorodha*) due to accumulation of doshas, the bi-directional flow of nutrients and end products (*malas*) gets affected. The doshas accumulated in the region react with the dushyas (reactants- in this case tissues) resulting in a condition known as *dosha dushya sammurchana*- this affects body metabolism. *Ama,* which is a semi-processed intermediary product of metabolism, gets accumulated. At this stage the prodromal symptoms of the disease gets manifested. Thus disturbances in the bio-channels are considered to be the main reason for the expression of diseased state of an organ or system.

**Diagnosis**

The diagnosis is always done by considering the patient as a whole object to be examined. The physician takes a careful note of the patient's internal physiological characteristics and mental disposition. He also studies other factors like- the affected bodily tissues, humors, the site at which the disease is located, patient's resistance and vitality, his daily routine, dietary habits, the gravity of clinical conditions, condition of digestion and details of personal, social, economic and environmental situation of the patient. The general examination is known as ten-fold examination- through which a physician examines the following parameters in the patient- 1. Psychosomatic constitution, 2. Disease susceptibility, 3. Quality of tissues, 4. Body build, 5. Anthropometry, 6. Adaptability, 7. Mental health, 8. Digestive power, 9. Exercise endurance and 10. Age. In addition to , examination of pulse, urine, stool, tongue, voice and speech, skin, eyes and overall appearance is also carried out (Kurup, 2002).

**Treatment aspects**

The treatment lies in restoring the balance of disturbed humors (doshas) through regulating diet, correcting life-routine and behavior, administration of drugs and resorting to preventive non-drug therapies known as 'Panchkarma' (Five process) and '*Rasayana'* (rejuvenation) therapy. Before initiating treatment many factors like the status of tissue and end products, environment, vitality, time, digestion and metabolic power, body constitution, age, psyche, body compatibility, type of food consumed are taken in to consideration.

**Types of Treatment**

The treatments are of different types- a- *Shodhana* therapy (purification treatment), b- *Shamana* therapy (palliative treatment), *Pathya Vyavastha* (prescription of appropriate diet and activity), *Nidan Parivarjan* (avoidance of causes and situations leading to disease or disease aggravation), *Satvajaya* (psychotherapy) and *Rasayan* (adaptogens- including immunomodulators, anti-stress and rejuvenation drugs) therapy. *Dipan* (digestion) and *Pachan* (assimilation) enhancing drugs are considered good for pacifying the vitiated doshas (humors).

This therapy is supposed to dissolve the vitiated and accumulated doshas by improving the *agni* (digestive power) and restoring the deranged metabolic process. In severe conditions the above therapy has to be supplemented with purificatory processes like Panchakarma. In this therapy initially the accumulated vitiated dosha is liquefied by resorting to external and internal oleation of the patient; followed by sudation (*swedhana*) and elimination of vitiated dosha through emesis (V*amana*) or purgation *(Virechana*), *Basti* (*enema*- evacuating type) and *Nasya* (nasal insufflation).

*Shodhana* therapy provides purificatory effect through which therapeutic benefits can be derived. This type of treatment is considered useful in neurological and musculo-skeletal disorders, certain vascular or neuro-vascular states, respiratory diseases, and metabolic and degenerative disorders. *Shamana* therapy involves restoring normalcy in the vitiated doshas (humors). This is achieved without causing imbalance in other doshas. In this use of appetizers, digestives, exercise and exposure to sun and fresh air are employed. In the *Pathya Vyavastha* type of treatment certain indications and contraindications are suggested with respect to diet, activity, habits and emotional status. In *Nidan Parivarjan* type of treatment the emphasis is on avoiding known causes of the disease by the patient. In *Satvavajaya* type of treatment the emphasis is on restraining the mind from the desires for unwholesome objects and Rasayana therapy deals with the promotion of strength and vitality (http://www.indianmedicine.nac.

## Dietics in Ayurveda

Ayurveda lays great emphasis on the diet regulation. According to Ayurvedic concepts food has great influence over physical, temperamental and mental development of an individual. The food is the basic material for the production of the body and life supporting vital matter known as *Rasa.* The *rasa* is converted to body components and supports all types of life activities.

### Different disciplines of Ayurveda

Ayurveda is known as *Astanga Ayurveda*- means that which is made up of eight parts. The eight major divisions of Ayurveda are as follow as:
*ayachikitsa* (Internal Medicine) 2. *Kaumar Bhritya* (Pediatrics) 3. *Bhootavidya* (Psychiatry) 4. *Salakya* (Otorhinolaryngology and Ophthalmology) 5. *Shalya* (Surgery) 6. *Agada Tantra* (toxicology) 7. *Rasayana* (Geriatrics) and 8. *Vajikarana* (Aprhodisiacs and Eugenics)

### Present status of Ayurveda and other Indigenous Systems of Medicine in India
### Regulation of the practice of ISM & H

Eighteen major states have independent Directorate to look after ISM related issues. In six states the ISM is administrated under the Health Directorate of the State, in around six smaller states and Union Territories Officer in–charges look after the issues concerned with ISM. At present there are more than 6.11 lakh practioners of ISM & H. The number of Hospitals and dispensaries in this sector is more than 26,000 where free treatment facility is available. In addition large number of practioners in the un-organized folklore sector provide remedies to considerable portion of the population (://www.indianmedicine.nac.in )

## Education

At present there are more than 200 colleges, which offer a four and half year course leading to Bachelor Degree in Ayurvedic Medicine and Surgery, followed by one year internship. Similarly 2 colleges offer graduate degree in Siddha System of Medicine and 34 colleges offer degree in Unani System of Medicine and 130 colleges offer courses leading to degree in

Homoeopathy. The turnover of candidates from these colleges exceeds 9,000 per year. More than 30 Institutes offer postgraduate courses for Ayurveda and specialization is available in 16 disciplines. In addition there is National Academy of Ayurveda, which imparts PG education under the scheme of '*Guru Shishya parampara'*. This scheme has been created with a view to provide education on traditional lines like what used to be in ancient times. In ancient times students used to visit the abode of the teacher to serve him while learning the art of healing from him. At present around 750 Post graduate scholars are turned out every year (the duration of course is 3 years). The degree offered is M.D. (Ayu) and M.S. (Ayu). Recently Pharmacy colleges have been opened which offer D.Pharm (Ayu), B.Pharm (Ayu) and M.Pharm (Ayu) (for further details visit-http://www.ayurveduniversity.[illegible]). Training programmes [illegible]nly, in-house are conducted, through out the country to train para-ayruvedic staff. These trained technicians help in carrying out therapeutic process like panchakarma and ksarasutra (an effective surgical procedure for removing hemorrhoids) [illegible]milarly pharmacists are trained to shoulder responsibilities of running an ayurvedic pharmacy.

## Research and Development

The research activities are being carried out by Central Council for Research in Ayurveda & Siddha (CCRAS) and similar councils for Unani, Homoeopathy and Naturopathy & Yoga. The CCRAS is the premier agency involved in research and development (http://[illegible]w.ccras.com). It has 89 field units, which have been re-organized in to 30 institutes and units. The types of activities undertaken are clinical research- involving planned clinical trial of single and compound ayurvedic preparations and drug research which includes medico-botanical surveys, cultivation of medicinal plants, pharmacognostical studies, phytochemical studies, drug standardization, pharmacological and toxicological studies. A vast body of data is available in various published literature and data bases (Sharma *et* [illegible]000, 2001, 2002; Billore et al 2004; Satyavati et al, 1976, 1987, Satyavati, 2005; Mishra, 20[illegible], De et al 1993; Chatterjee and Pakrashi (1995-1997); Gupta and Tandon (2004) ; Wealth of India series ( 1959-69; 1985 and 2000) ; Dahanukar *et al* 2000; [illegible]togi and Dhawan (1982); [illegible]rvedic Pharmacopoeia Part- I in three volumes (Anonymous-1989, 1999 and 2000) ; Sivarajan and Balachandran (1999); Raghunathan and Mitra (1982) and five volumes (1-5) by [illegible]togi and Mehrotra (1990, 1991, 1993 ,1995 and 1998). Literary research, which involves publication of rare and classical manuscripts of ISM & H., is also carried [illegible] (http://[illegible]w.ccras.com).

Besides research councils research activities are carried out in Post Graduate centers and Institutes of national importance like- Central Drug Research Institute (CDRI), Central Institute of Medicinal and Aromatic Plants (CIMAP), National Botanical Research Institutes (NBRI) etc and R & D centers attached to Ayurvedic drug manufacturing firms (Kurup- 2004). However the main tendency is to consider medicinal plants used in Ayurveda as source material for bio-prospecting of drugs. There are very few studies, which take in to consideration the ayurvedic concept behind a given formulation. Ayurveda has a very well developed drug formulation discipline known as '*Bhaishajya Kalpana'*, which provides great deal of information about methods of drug preparation, use of adjuvants, collection and processing drugs in a particular manner. Research efforts on this aspect and on basic principles of Ayurveda are yet to be undertaken in concerted manner.

### Drug manufacturing in Ayurvedic sector

Ayurvedic drugs are marketed in various forms. They are available in both classical forms (tablets, powder, decoction, medicated oil, medicated ghee, fermented products) and modern drug presentation forms like capsules, lotions, syrups, ointments, liniments, creams, granules etc. There are more than 8500 manufacturers of Ayurvedic drugs in the country and the gross turnover of drugs used in all the ISM & H systems is approximately around 1 billion US dollars. Drug manufacturing in this sector is regulated by Drugs and Cosmetic act (1940) and rules (1945) (Jain, 2001). Subsequently many chapters have been added to these acts over

the years. Three types of agencies are involved in the administration of the Acts and Rules enacted by the parliament. There is Drug Technical Advisory Board and Drug Consultative Committee to advise the Govt., The Drug Controller General of India who with the help of the supporting staff is in charge of licensing and enforcing different laws related to drug manufacturing and dispensing. At the state level Food and Drug Administration Commissioners shoulder this responsibility. Recently Good Manufacturing Process for ISM has been defined which have to be followed by all the agencies involved in the manufacturing of drugs in this sector (http://www.indianmedicine.nac.in ).

**Globalization of Ayurveda**

Globalization of Ayurvedic practice has gained momentum in the past two decades. Ayurvedic drugs are used as food supplements in USA, European Union and Japan. Many physicians practice Ayurveda in many parts of the world. Facilities are available in countries like USA, Argentina, Australia, Brazil, New Zealand, South Africa, Czech Republic, Greece, Italy, Hungary, Netherlands, Russia, UK, Israel, Japan, Nepal, Sri Lanka (Kurup, 2004) for imparting short and long-term training in Ayurveda.

The concepts of proper life styles, dietary habits, daily and seasonal routines followed in Ayurveda can be adopted with suitable modification to different countries in different parts of the globe after giving due consideration to the cultural milieu existing in those countries and also to the constitutional profile of their population. Attempts can also be made to utilize the medicinal plant resources of these countries for meeting the health care needs of their people after categorization of the plants according to Ayurvedic concepts. Drugs used in ISM can be used as adjuvant to the main drugs used in Allopathy. Non-drug therapeutic approaches such as *'Panchakarma'*, *'Ksarasutra'* etc can certainly be integrated into other health systems broadening the choices available to physicians and patients.

A recent review (Dahanukar et al., 2000) points out that more than 13,000 plants have been investigated during the past 5 years. Number of medicinal plants have been shown to possess important pharmacological activities in pre-clinical testing however the generated leads have not been adequately followed up with double blind, placebo controlled clinical trails. *Curcuma longa* Linn, *Boswellia serrata* Roxb. ex Coleb., *Picrorhiza kurroa* Royle ex Benth, *Terminalia chebula* Retz., *Emblica officinalis* Gaertn., *Bacopa monnieri* (Linn.) Pennel, *Tinospora cordifolia* Linn, *Phyllanthus niruri* Linn, *Celastrus paniculatus*, *Ocimum sanctum* Linn, *Gymnema sylvestre* R.Br., *Momordica charantia* Linn, *Commiphora wighti* (Arn.) Bhandari, *Withania somnifera* (Linn.) Dunal, *Pterocarpus marsupium* Roxb., *Tinospora cordifolia* (Willd). Miers. Ex Hook.f. & Thomson, *Trichopus zeylanicum*, *Terminalia arjuna* (Roxb.) Wight & Arn *etc* have great potential to develop in to drugs of global importance. Table-1 provides list of some of the important medicinal plants with good potential to develop at global level. This list is not exhaustive and is based mainly on the author's own preference. Many of the drugs in the list are not available in sufficient quantity in India but may be available in other countries especially Nigeria where *Commiphora* species are abundant- they can be the source of supply to Indian ISM based industry. One of the main lacunae is the lack of co-ordinated multi-disciplinary studies to prove their clinical efficacy beyond doubt. This aspect should be the main focus of future research endeavors.

**Siddha system of medicine**

Siddha system of medicine is practiced in some parts of South India especially in the state of Tamilnadu. It has close affinity to Ayurveda yet it maintains a distinctive identity of its own. This system has come to be closely identified with Tamil civilization. The term '*Siddha*' has come from '*Siddhi*'- which means achievement. *Siddhars* were the men who achieved supreme knowledge in the filed of medicine, yoga or *tapa* (meditation) (Narayanaswamy, 1975).

It is a well-known fact that before the advent of the Aryans in India a well-developed civilization flourished in South India especially on the banks of rivers Cauvery, Vaigai, Tamiraparani etc. The system of medicine in vogue in this civilization seems to be the

precursor of the present day Siddha system of medicine. During the passage of time it interacted with the other streams of medicines complementing and enriching them and in turn getting enriched. The materia medica of Siddha system of medicine depends to large extent on drugs of metal and mineral origin in contrast to Ayurveda of earlier period, which was mainly dependent upon drugs of vegetable origin.

According to the tradition eighteen Siddhars were supposed to have contributed to the development of Siddha medicine, yoga and philosophy. However, literature generated by them is not available in entirety. In accordance with the well-known self-effacing nature of ancient Indian *Acharyas* (preceptors) authorship of many literary work of great merit remains to be determined. There was also a tradition of ascribing the authorship of one's work to his teacher, patron even to a great scholar of the time. This has made it extremely difficult to clearly identify the real author of many classics.

**Philosophical foundation**

According to the Siddha concepts matter and energy are the two dominant entities, which have great influence in shaping the nature of the Universe. They are called *Siva* and *Sakthi* in Siddha system. Matter cannot exist without energy and vice-versa. Thus both are inseparable. The universe is made up of five proto-elements. The concept of five proto-elements and three doshas in this system of medicine is quite similar to Ayurvedic concept pertaining to them. However there are certain differences in the interpretation (Narayanaswamy, 1975). The concepts behind diagnostic measures also show great similarities differing in certain aspects only. Diagnosis in Siddha system is carried out by the well –known '*ashtasthana pareeksha'* (examination of eight sites) that encompasses examination of *nadi* (pulse), *kan* (eyes), *swara* (voice), *sparisam* (touch), *varna* (colour), *na* (tongue), *mala* (faeces) and *neer* (urine). These examination procedures are provided in greater detail in classical Siddha literature in comparison to classical literature of Ayurveda (Narayanaswamy, 1975).

## Principles of treatment

Similar to Ayurveda, Siddha system also follows ashtanga concept with regards to treatment procedures. However the main emphasis is on the three branches - *Bala vahatam* (pediatrics), *Nanjunool* (toxicology) and *Nayana vidhi* (ophthalmology). The other branches have not developed to the extent seen in Ayurveda. The surgical procedures, which have been explained in great detail in Ayurvedic classics, do not find mention in Siddha classics. The therapeutics in both the systems can be broadly categorized into *samana* and *sodhana* therapies. The latter consists of well-known procedures categorized under panchakarma therapy. This therapy is not that well developed in Siddha system, only the vamana therapy has received attention of the Siddha physicians (Narayanaswamy, 1975).

## Materia medica

The concept pertaining to drug composition, the concept of *rasapanchaka* (concept explaining drug properties) is almost similar in both the systems of medicine. One of the major characteristic features of Siddha materia medica is utilization of mineral and metal-based preparations to greater extent in comparison to the drugs of vegetable origin.

The mineral and metal-based drugs in Siddha System are categorized under the following categories: 1. *Uppu (Lavanam)*- drugs that are dissolved in water and get decrepitated when put into the fire giving rise to vapor. 2. *Pashanam* : drugs that are water insoluble but give off vapors when put in to fire 3. *Uparasam*: Similar to pashanam chemically but have different actions. 4. *Ratnas and uparatnas*, which include drugs based on precious and semi-precious stones 5. *Loham* - metals and metal alloys that do not dissolve in water but melt when put in to fire and solidify on cooling. 6. *Rasam*: drugs that are soft, sublime when put in to fire changing into small crystals or amorphous powders. 7. *Gandhakam:* sulphur is insoluble in water and burns off when put into fire. From the above basic drugs compound preparations

are derived. From the animal kingdom thirty-five products have been included in the materia medica. It is much similar to preparations used in Ayurveda. Numbers of plant-based preparations are also used in Siddha system of medicine they are quite similar in profile to those mentioned in Ayurveda.

## Unani system of medicine

### Historical background

Unani medicine has its origin in Greece. It is believed to have been established by the great physician and philosopher- Hippocrates (460-377 BC). Galen (130-201 AD) contributed for its further development. *Aristotle* (384-322 BC) laid down foundation of Anatomy & physiology. *Dioscorides* – the renowned physician of the 1st century AD has made significant contribution to the development of pharmacology, especially of drugs of plant origin. The next phase of development took place in Egypt and Persia (the present day Iran). The Egyptians had well evolved pharmacy; they were adept in the preparation of different dosage forms like oils, powder, ointment and alcohol etc. (http://www.indianmedicine.nac.in).

The Arabian scholars and physicians under the patronage of Islamic rulers of many Arabian countries have played great role in the development of this system. Many disciplines like chemistry, pharmaceutical procedures like distillation, sublimation, calcinations and fermentation were developed and refined by them. There are many well-known names- only some names have been mentioned in this article. Jabir bin Hayyan (717-813 AD) a Royal physician of his time has worked on the chemical aspects; Ibne Raban Tabari (810-895 AD) is the author of the book- *Firdous ul Hikmat* and introduced concept of official formulary. *Abu Bakar Zarakariya Razi* (865-925 AD) has authored a book known as "*Alhawi fit tibb".* He has worked in the field of immunology. Of course the name of Bu Ali Sina (Avicenna 980-1037 AD) is always referred in all matters related to Unani. He was a renowned global level scholar and philosopher. He had great role in the development of Unani medicine in the present form. His book *Alqanoon or (The canon of medicine)* was an internationally acclaimed book on medicine, which was taught in European countries till the 17th century. Many physician of Arab descent in Spain have also contributed to the development of the system. Some of the important names are-*Abul Qasim Zohravi (Abulcasus* 946 – 1036 AD) he is the author of the famous book on surgery "*Al Tasreef*"-(http://www.indianmedicine.nac.in).

The Arabs were instrumental in introducing Unani medicine in India around 1350 AD. The first known Hakim (Physician) was Zia Mohd Masood Rasheed Zangi. Some of the renowned physicians who were instrumental in development of the system are- Akbar Mohd Akbar Arzani (around 1721 AD)- the author of the books- *Qarabadin Qadri* and *Tibbe Akbar*; Hakim M. Shareef Khan (1725-1807)- a renowned physician well-known for his book *Ilaj ul Amraz*. Hakim Ajmal Khan (1864-1927) a great name among the 20th Century Unani physicians in India. He was a multifaceted personality besides being a physician he was a scientist, politician and a freedom fighter. He was instrumental in the establishment of Unani and Ayurvedic College at Karol Bagh, Delhi. He was a keen researcher and has supervised many studies on *Rauwolfia serpentina*- the source plant for many well-known alkaloids like reserpine, Ajamaloon etc. Another great contributor is Hakim kabeeruddin (1894-1976), he has translated 88 Unani books of Arabic and Persian languages into Urdu. The first institution of Unani medicine was established in 1872 as Oriental College at Lahore in the undivided India. Thereafter many institutions came into existence.

After Independence Unani received boost in the form of Government support through various agencies involved in the development of ISM. At present there are more than 30 colleges offering degree course in Unani medicine and the approximate number of physician turn out is around 20,000. There are around 177 hospitals. A National Institute of Unani Medicine has been established at Bangalore in Karnataka state in 1983 in collaboration with the Govt. of Karnataka- for catering to both academic and R & D requirements. Central Council for Research in Unani Medicine (CCRUM), is the premier agency involved in R & D activities (http://www.indianmedicine.nac.in).

**Table 1:** Some well-known Indian medicinal plants and their uses

| **Botanical name** | **Parts used** | **Therapeutic s** |
|---|---|---|
| *rus calamus* Linn ( Araceae) | Rhizome | Nervine tonic; anti-spasmodic (Satyavati et al ., 1976; Bose et al., 1960) |
| *Aegle marmelos (*L.) Corr. (Rutaceae) | Fruit | Hypoglycemic; chemopreventive (Vyas et al., 1979; Dixit et al., 2006) |
| *Allium sativum* Linn (Alliaceae) | Bulbs | Anti-inflammatory; anti-hyperlipidemic, fibrinolytic (Dixit et al., 2006) |
| *Aloe barbadensis* Mill., and *Aloe vera* Tourn. Ex Linn. (Alliaceae) | Gel | Skin diseases- mild sunburn, frostbite, scalds; wound healing (Baliga, 2006) |
| *Andrographis paniculata* (Burm.f.) Wallich ex Nees (Acantahceae) | Whole plant | Cold; flu – hepatoprotection (Koul and Kapil-1994; Sharma et al., 2002a) |
| *Asparagus racemosus* Willd (Alliaceae) | Roots | Adaptogen, galactogogue (Dahanukar et al., 1997;Gupta and Mishra, 2006) |
| *Bacopa monnieri* (L) Pennel (Scorphulariaceae) | Whole plant | Anti-oxidant; memory enhancing (Singh and Dhawan, 1997) |
| *Berberis aristata* DC (Berberidaceae) | Bark, fruit, root, stem, wood | Anti-protozoal, hypoglycemic, anti-trachoma (Dutta and Iyer, 1968; Sharma et al., 2000a) |
| *rhavia diffusa* L. (Nyctaginaceae) | Roots | Diuretic; anti-inflammatory and anti-arthritic (Sharma et al., 2000b; Harvey, 1966) |
| *Boswellia serrata* Roxb. (Burseraceae) | Oleo resin | Anti-rheumatic; anti-colitis and anti-inflammatory, anti-cancer. (Sharma et al., 2000c) |
| *Butea monosperma* (Lam.) Taub (Fabaceae) | Bark, leaves, flowers, seeds and gum | Adaptogen; abortifacient, anti-oestrogenic, anti-gout, anti-ovulatory (Sharma et al., 2000d) |
| *Calotropis gigantea* (Linn) R. Br. (Asclepiadaceae) | Flowers, whole plant, root, leaf | Anti-inflammatory, spasmolytic, asthma (Sharma et al., 2000e) |
| *Callicarpa macrophylla* Vahl. (Verbenaceae) | Leaves, roots | Uterine disorders (Sood, 1995) |
| *Cassia fistula* Linn (Leguminosae) | Resin | Laxative, anti-pyretic, worm infestation (Joshi, 1998) |
| *Celastrus paniculatus* Willd (Celastraceae) | Whole plant | Brain tonic; memory enhancer; in the treatment of depression (Tanuja Doshi, 1991; Joglekar and Balwani, 1967) |
| *Centella asiatica* (Linn) Urban (Umbelliferae) | Whole plant | Tranquilizer; memory enhancer; wound healing- (Sharma et al., 2000 f; Suguna et al ., 1996) |
| *Chlorophytum boriavillianum* Santapau & RR Fernandus (Alliaceae) | Roots | Aphrodisiac (Farooqi et al., 2001) |
| *Cissus quadrangularis* L (Vitaceae) | Whole plant, root, stem and leaf | Bone fracture; inflammation (*Deka* et al., 1994) (Udupa & Prasad, 1964b) |
| *Clerodendrum serratum* (Linn) Moon (Verbenaceae) | Root, leaf, Stem | Malaria; anti-asthmatic, anti-allergic (Gupta and Gupta, 1967) (Sivarajan and Balachandran 1999a) |
| *Commiphora mukul* ( Hooker Stedor) Engl. (Burseraceae) | Resin | Hypolipidemic; obesity, rheumatoid arthritis (Satyavati, 1991) |

**Table 1:** Continued

| **Botanical name** | **Parts used** | **Therapeutic uses** |
|---|---|---|
| *Crateva nurvala* Buch-Ham (Capparidaceae) | Stem bark, leaf | Urinary disorders including stones (Anand et al., 1995) |
| *Crocus sativus* Linn (Iridaceae) | Stigma | Aphrodisiac, anti-stress, anti-oxidant (Billore et al., 2004a) |
| *Curculigo orchioides* Gaertn. (Amaryllidaceae) | Root stock | Spermatogenesis enhancer (Joshi, 2005) |
| *Curcuma longa* Linn (Zingiberaceae) | Rhizome | Anti-inflammatory, wound healing enhancer; chemopreventive agent; anti-oxidant, anti-cancer (Tripathi et al., 1973), (Narasimhan et al., 2006) |
| *Desmodium gangeticum* (Linn) DC (Papillionaceae) | Root | Anti-oxidant; anti-rheumatic- (Sharma et al., 2001a) (Govindarajan and Vijayakumar-2006) |
| *Eclipta alba* (Linn) Hask (Compositae) | Whole plant | Hepatoprotecive / promotes hair growth (Chandra et al., 1987) |
| *Emblica officinalis* Gaertn. (Euphorbiaceae) | Fruit | Adaptogen, anti-oxidant (Vyas and Apte-1977; Rao and Siddiqui 1964). |
| *Eugenia jambolana* Lam. (Myrtaceae) | Seed, bark, leaf | Hypoglycemic, anti-inflammatory, anti-diarrhoeal, anti-pyretic. (Sharma et al., 2001b) |
| *Ficus religiosa* Linn (Urticaeae) | Bark | Anti-ulcer (gastric ulcer); anti-inflammatory, hypoglycemic agent- (Ambike and Rao, 1967; Sharma et al., 2001c) |
| *Gymnema sylvestre* R. Br. (Asclepiadaceae) | Roots and leaves | Anti-diabetic; anti-hyperglycemic (Narasimhan et al., 2006) |
| *Gloriosa superba* Linn (Liliaceae) | Tuber | Spasmolytic, oxytocic; source plant for colchicine- (Sharma et al., 2002b) |
| *Glycyrrhiza glabra* Linn (Papillionaceae) | Stem | Expectorant; peptic ulcer treatment (Mitra and Rangesh, 2004a) |
| *Hedychium spicatum* Buch- Ham. Ex. Smith (Zingiberaceae) | Rhizome | Soothening, Expectorant, anti-tussive Anti-asthmatic (Chaturvedi and Sharma, 1975) |
| *Hippophae rhamnoides* L (Elaeagnaceae) | Fruits | Extensively used in the treatment of circulatory disorders, wound healing enhancer, duodenal ulcer etc. (Arora et al., 2006) |
| *Holarrhena antidysenterica* (Linn) Wall ex DC (Apocynaceae) | Stem bark, leaf, seed | Anti-spasmodic, anti-colitis, hypoglycemic. (Mitra and Rangesh, 2004b) |
| *Inula racemosa* Hk.f (Asteraceae; Compositae) | Roots | Used in gastro intestinal disorders, diuretic, expectorant and allergic disorders etc (Mishra, 2004a) |
| *Leptadenia reticulata* (Retz.) Wt. & Arn. (Asclepiadaceae) | Root, leaf, fruit | Galactogogue, vasodilator, anabolic. (Anjaria et al., 1975) |
| *Momordica charantia* Linn (Cucurbitaceae) | Root, leaf, fruit, seed | Anti-diabetic (Ahmad et al., 2001) |

**Table 1:** Continued

| **Botanical name** | **Parts used** | **Therapeutic s** |
|---|---|---|
| Mucuna pruriens (Linn.) DC (Fabaceae; Papilionaceae) | Seeds, root, leaf | Parkinson's disorder, Male sexual disorders. (Nath et al., 1981; Satyavati et al., 1987c) |
| *Myristica fragrans* Houtt (Myristicaceae) | Seed, aril, oil | Aphrodisiac, hypolipidemic, anti-inflammatory (Sharma et al., 2002c) |
| *Ocimum sanctum* Linn (Lamiaceae) | Whole plant, root, leaf, seed | Adaptogen; anti-oxidant, hypoglycemic, immunomodulator, radio-protector (Uma Devi, 2006) |
| *Oroxylum indicum* (Linn) Vent. (Bignoniaceae) | Root, root bark, leaf, fruit, seed | Anti-inflammatory, Diuretic (Gujral et al., 1955) |
| *Phyllanthus amarus* Schum. And Thonn. (Euphorbiaceae) | Whole plant | Hepatoprotective (Premalatha Balachandran and Rajgopal Govindarajan, 2004) |
| *Picrorhiza kurroa* Royle ex. Benth (Scorphulariaceae) | Tubers | Hepatoprotective; adaptogen. (Narasimhan et al., 2006) |
| *Piper longum* Linn (Piperaceae) | Fruit, root | Cough, asthma, fever (Satyavati et al., 1987a; Kohli and Salma Aiman, 2006) |
| *Piper nigrum* Linn (Piperaceae) | Fruit | Cough, asthma, fever (Satyavati et al ., 1987a) |
| *Plumbago zeylanica* Linn (Plumbaginaceae) | Root, root bark | Anti-pyretic, anti-cancer, anti-coagulant, cytotoxic. (Sharma et al ., 2000g); Krishnaswamy and Purushothaman, 1980) |
| *Pterocarpus marsupium* Roxb. (Fabaceae) | Bark, leaves, gum, flower | Hypoglycemic, anti-fungal. (Pandey and Sharma, 1975; Satyavati et al., 1987b) |
| *Pueraria tuberosa* (Roxb. Ex Willd). DC (Fabaceae) | Tuberous root | Anti-implantation, estrogenic, anti-inflammatory, dysmenorrhoea, DUB. (Billore et al ., 2004b) |
| *Rubia cordifolia* L (Rubiaceae) | Root | Anti-inflammatory, anti-tumor, hypoglycemic etc.(Sharma et al., 2002d) |
| *Rauvolfia serpentina* Benth (Apocynaceae) | Root | Hypertension; mental disorders (Kohli and Salma Aiman, 2006) (Chauhan et al., 2006) |
| *Saraca asoca* (Roxb.) de Wilde (Caesalpiniaceae) | Stem bark, flower, seed | Post menopausal syndrome and Gynecolo-gical disorders (Narasimhan et al ., 2006; Manjusha Vinjamury et al., 2004) |
| *Saussurea lappa* (Decne,) Sch. Bip (Asteraceae) | Roots | Analgesic; aphrodisiac; asthma (Chaurasia, 2006) |
| *Solanum xanthocarpum* Sch. And Wendl. Syn *S. virginianum* Linn (Solanaceae) | Whole plant | Asthma and related respiratory disorders (Sinha et al., 2006) |
| *Swertia chirata* Buch- Ham (Gentianaceae) | Whole plant | Anti-malarial; hypoglycemic; febrifuge etc (Dixit et al., 2006; Hamsaveni Gopal et al ., 1981). |

| **Table 1:** Continued | | |
|---|---|---|
| **Botanical name** | **Parts used** | **Therapeutic uses** |
| *Symplocos racemosa* Roxb. (Symplocaceae) | Bark | Anti-diarrhoeal (Sharma et al., 2002e) |
| *Taxus baccata* Linn (Taxaceae) | Source of taxol | Used in the treatment of metastatic breast cancer (Chauhan et al., 2006) |
| *Tecomella undulata* (Sm.) Seem. (Bignoniaceae) | Bark, seeds | Anti-bacterial, hypoglycemic, hepatoprotective (Billore et al., 2004c) |
| *Terminalia arjuna* (Roxb.) Wt. & Arn. (Combretaceae) | Bark | Heart diseases (Karunakaran Gauthaman and Mishra, 2004) |
| *Terminalia chebula* Retz., and *Terminalia bellerica* Roxb. (Combretaceae) | Fruits | Laxative, anti-oxidants (Narasimhan et al ., 2006) |
| *Terminalia arjuna* (Roxb.) Wt. & Arn. (Combretaceae) | Bark | Heart diseases (Karunakaran Gauthaman and Mishra, 2004) |
| *Tinospora cordifolia* (Willd.) Hook.f. and Thoms., (Menispermaceae) | Stem | Adaptogen, immunomodulator. (Dahanukar et al., 1997; Thatte et al., 1994) |
| *Tribulus terrestris* Linn. (Zygophyllaceae) | Whole plant | Diuretic, anti-urolithiatic, cytoprotective (Chakraborty and Neogi 1978; Sangeetha et al., 1993) |
| *Vetiveria zizanioides* (L.) Nash (Poaceae) | Root | Vetiver oil for cosmetics. (Suhsil Kumar et al., 1997) |
| *Vitex negundo* Linn (Verbenaceae) | Leaves, root, bark, flowers, seed | Anti-inflammatory, anti-arthritic, immunodmodulator (Nair and Saraf, 1995) |
| *Withania somnifera* (Linn.) Dunal (Solanaceae) | Root | Adaptogen, anti-rheumatic etc. (Singh and Sushil Kumar, 1998) . |
| *Zingiber officinale* Rosc (Zingiberaceae) | Rhizome | Fever, cough, asthma; anti-emetic (Sharma et al, 2002f) |

**Basic principles**

According to the basic principles of Unani the body is made up of four basic elements i.e. Earth, Air, Water, Fire which have different Temperaments i.e. Cold, Hot, Wet, Dry. They give raise, through mixing and interaction, to new entities. The body is made up of simple and complex organs. They obtain their nourishment from four humors namely- blood, phlegm, black bile and yellow bile. These humors also have their specific temperament. In the healthy state of the body there is equilibrium among the humors and the body functions in normal manner as per its own temperament and environment. Disease occurs whenever the balance of humors is disturbed.

In this system also prime importance is given for the preservation of health. It is conceptualized that six essentials are required for maintenance of healthy state. They are i. ii. Food and drink, iii. Bodily movements and response, iv. Psychic movement and repose, v. Sleep and wakefulness and vi. Evacuation and retention. Specific requirement for each of these six essentials have been discussed- (Syed Khaleefathullah, 2002).

The human body is considered to be made up of seven components, which have direct bearing on the health status of a person. They are 1. Elements *(Arkan)* 2. Temperament (*Mijaz).* 3. Humors (*Aklat*) 4. Organs (*Aaza)* 5. Faculties (*Quwa*) 6. Spirits (*Arwah*). These components

are taken in to consideration by the physician for diagnosis and also for deciding the line of treatment (Syed Khaleefathullah, 2002).

**Diagnosis**

Examination of the pulse occupies a very important place in the disease diagnosis in Unani. In addition examination of the urine and stool is also undertaken. The pulse is examined to record different features like- size, strength, speed, consistency, fullness, rate, temperature, constancy, regularity and rhythm. Different attributes of urine are examined like odor, quantity, mature urine and urine at different age groups. Stool is examined for color, consistency, froth and time required for passage etc.

**Treatment**

Disease conditions are treated by employing four types of therapies- a- Regimental therapy, b- Dietotherapy, c-Pharmacotherapy and d- Surgery. Regimental therapy mainly consists of drug less therapy like exercise, massage, turkish bath, douches etc. Dietotherapy is based on recommendation of patient specific dietary regimen. Pharmacotherapy involves administration of drugs to correct the cause of the disease. The drugs employed are mainly derived from plants some are obtained from animals and some are of mineral origin. Both single and compound preparations are used for the treatment.

**Published literature in the field of ISM & H**

A large number of studies have been carried out on number of medicinal plants used in ISM of medicine. Central Drug Research Institute undertook a series of studies (Anonymous - 1991) under drug screening programme. Number of compilation have been published providing information about pharmacological activity profile of medicinal plants, publications are also available on the chemical profile of number of medicinal plants, Ayurvedic pharmacopoeia has been published – three volumes have come out so far, CCRAS has published a series of books under its Data base preparation project. There is an international publication on scientific validation of Ayurvedic therapies. Besides these books large number of review articles have been published in national and international Journals providing names of drugs used in particular type of disease conditions or screened for particular type of pharmacological activities.

If the situation prevailing in this sector is analyzed taking into consideration different aspects- it becomes clear that there is a perceptible trend towards increased usage of drugs used in Indian Traditional Systems especially those which are based on herbal products not only in India but in different parts of the world. However, one of the basic problems that still remained to be solved is related to proving efficacy of the products used in these systems on the basis of controlled clinical trial and complementary pharmacological studies. It is difficult to ensure consistency in the results and components in the products. This is traced mainly to lack of standardization of the inputs used and the process adopted for preparation of the formulations. Government of India has taken these aspects in to consideration and has initiated many projects for standardization of single and compound formulations along with standardization of operating procedures for important formulations. Though standardization is very difficult it is not an un-attainable goal. Once this is done it would help in promoting wider use of these drugs especially in chronic degenerative disorders. Further non-drug therapies and preventive and life management techniques are also receiving increased attention. Thus this sector seems to be poised for remarkable growth in the coming years (Kurup, 2004).

The above presentation can be considered only as brief introduction to the above systems. Lot of literature and information is available in the published literature citation of which would make this write up voluminous hence not attempted. However the websites referred above provide sufficient information for a beginner. Full complement of information

can be obtained by contacting appropriate bodies. No attempt has been made to provide information about Yoga and Naturopathy systems because they are mainly non-drug therapies. Similarly Homoeopathy system has not been discussed since it is well known out side Indian sub-continent.

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