UNIT-I

Topic-3

INDIAN SYSTEMS OF MEDICINE

The Indian System of Medicine is of great antiquity. It is the culmination of Indian thought of medicine which represents a way of healthy living valued with a long and unique cultural history, as also amalgamating the best of influences that came in from contact with other civilizations be it Greece (resulting in Unani Medicine) or Germany (Homeopathy) or our scriptures/sages which gave us the science of Ayurveda, Siddha as also Yoga & Naturopathy. Like the multifaceted culture in our country, traditional medicines have evolved over centuries blessed with a plethora of traditional medicines and practices. A separate Department of Indian Systems of Medicine and Homoeopathy (ISM&H) was set up in 1995 to ensure the optimal development and propagation of AYUSH systems of health care. The Department of ISM&H was re-named as the Department of AYUSH (an acronym for - Ayurveda, Yoga and Naturopathy, Unani, Siddha, Homoeopathy) in November 2003. With an increase in lifestyle related disorders there is a worldwide resurgence of interest in holistic systems of health care, particularly with respect to the prevention and management of chronic, non-communicable and systemic diseases. It is increasingly understood that no single health care system can provide satisfactory answers to all the health needs of modern society. Evidently there is a need for a new inclusive and integrated health care regime that should guide health policies and programs in future. India has an advantage in this global resurgence of interest in holistic therapies as it has a rich heritage of indigenous medical knowledge coupled with strong infrastructure and skilled manpower in modern medicine. Medical pluralism is here to stay and the AYUSH sector has a critical role to play in the new and emerging situation. The Department of AYUSH under Ministry of Health and Family Welfare, promotes and propagates Indian systems of Medicine and Homoeopathy, and is committed to infuse the wisdom of traditional medicine with the methodologies of modern science, scientifically validating the systems and presenting them in the scientific idiom, relating their efficacy to modern life styles.

The Department has, over the years, developed a broad institutional framework to carry out its activities. The National Medicinal Plants Board (NMPB) functions under the Department to coordinate activities relating to conservation, cultivation, marketing, export and policy making for the development of the medicinal plants sector. There are two statutory regulatory bodies, namely Central Council of Indian Medicine (CCIM) and Central Council of Homoeopathy (CCH) for laying down minimum standards of education, recommending recognition of medical qualifications, registering the practitioners and lying down of ethical codes. Four research councils, for Ayurveda and Siddha (CCRAS), Unani (CCRUM), Yoga and Naturopathy (CCRYN) and Homeopathy (CCRH) are responsible for the officially sponsored research activities. So far, eight National Institutes are existing at national level for teaching, research and clinical practices. For Standardization and testing of Drugs, various agencies have been put in plan by the Government of India. Four different Pharmacopoeia Committees are working for preparing official Formularies/Pharmacopoeias to evolve uniform standards in preparation of drugs of Ayurveda, Siddha, Unani and Homeopathy and to prescribe working standards for single drugs as well as compound formulations. A Drug Quality Control Cell is working in the Department to deal with the matters pertaining to licensing, regulation and control of drugs and the spurious manufacture of Ayurvedic, Unani and Siddha Drugs and other matters. Two apex Laboratories, namely, Pharmacopoeial Laboratory for Indian Medicine (PLIM) and Homoeopathic Pharmacopoeial Laboratory

(HPL) are functioning as Standard Setting-Cum-Drug-testing Laboratories for Indian Medicines and Homoeopathy respectively. Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), a Public Sector Undertaking, manufactures classical Ayurveda and Unani drugs. The Department also manages the CGHS Ayurveda Hospital at Lodhi Road, New Delhi. Bringing AYUSH into the mainstream health care delivery system of the country has long been a major policy objective of the Department. Under the NRHM, AYUSH facilities are being set up in PHCs and CHCs and are being manned by qualified AYUSH physicians appointed on contract basis. Since the creation of a separate Department, there has been a substantial increase in the infrastructural facilities under AYUSH systems in the country. Presently, there are 3195 hospitals with about 58321 beds, 24392 dispensaries, 720937 doctors, 514 educational institutions with admission capacity of about 25586 UG student and 2493 PG students and 8785 drug-manufacturing units under AYUSH systems. Under NRHM, AYUSH facilities have been co-located with 468 District hospitals, 2483 CHCs and 8520 PHCs.

AYUSH SYSTEMS

(i) Ayurveda

Ayurveda is a classical system of healthcare originating from the Vedas documented around 5000 years ago and currently recognized and practiced in India and many countries of the Indian subcontinent. It is one of the oldest healthcare systems that take a holistic view of the physical, mental, spiritual and social aspects of human life, health and disease. Scattered references of health, disease and use of natural sources for treatment were initially made in the Vedas (particularly in Rigveda and Atharvaveda) and around 5000 to 3000 B.C. the knowledge of Ayurveda was first comprehensively documented in the compendia called Charak Samhita and Sushruta Samhita. According to Ayurveda, health is considered as a basic pre-requisite for achieving the goals of life - Dharma (duties), Arth (finance), Kama (materialistic desires) and Moksha (salvation). As per the fundamental basis of Ayurveda, all objects and living bodies are composed of five basic elements, called the Pancha Mahabhootas, namely: Prithvi (earth), Jal (water), Agni (fire), Vayu (air) and Akash (ether). The philosophy of Ayurveda is based on the fundamental correlation between the universe and the man. Ayurveda imbibes the humeral theory of Tridosha- the Vata (ether + air), Pitta (fire) and Kapha (earth + water), which are considered as the three physiological entities in living beings responsible for all metabolic functions. The mental characters of human beings are attributable to Satva, Rajas and Tamas, which are the psychological properties of life collectively terms as ‘Triguna’. Ayurveda aims to keep structural and functional entities in a state of equilibrium, which signifies good health (Swasthya). Any imbalance due to internal or external factors leads to disease and the treatment consists of restoring the equilibrium through various procedures, regimen, diet, medicines and behavior change. The treatment approach in the Ayurveda system is holistic and individualized having preventive, curative, mitigative, recuperative and rehabilitative aspects. The preventive aspect of Ayurveda is called Svasth-Vritta and includes personal hygiene, daily and seasonal regimens, appropriate social behavior and use of materials & practices for healthy aging and prevention of premature loss of health attribute. The curative treatment consists of Aushadhi (drugs), Ahara (diet) and Vihara (life style). Ayurveda largely uses plants as raw materials for the manufacture of drugs, though materials of animal and marine origin, metals and minerals are also used.

Ayurvedic medicines are generally safe and have little or no known adverse side-effects, if manufactured properly and consumed judiciously following necessary dos and don’ts. Initially, clinical medicine of Ayurveda was developed into eight distinct specialties, i.e.

Kayachikitsa (Internal Medicine), Shalya Tantra (Surgery), Shalakya (Eye and ENT), Kaumar Bhritya (Pediatrics), Graha Chikitsa (Psychiatry), Agad Tantra (Toxicology), Rasayana (Gerontology) and Vajikarana (Science of virility), on the basis of which it is called 'Astang Ayurveda'. During the last 60 years of its development after India became independent, Ayurveda has come up to provide 22 specialized courses of study at postgraduation level. These specialties are Ayurveda Sidhanta (Fundamental Principles of Ayurveda), Ayurveda Samhita (Classical Texts of Ayurveda), Rachna Sharira (Anatomy), Kriya Sharira (Physiology), Dravya Guna Vigyan (Materia medica and Pharmacology), Rasa-Shastra (Pharmaceuticals using minerals and metals), Bhaishajya Kalpana (Pharmaceuticals), Kaumar Bhritya or - Bala Roga (Pediatrics), Prasuti Tantra avum Stri Roga (Obstetrics and Gynecology), Swasth-Vritta (Social ansd Preventive Medicine), Kayachikitsa (Internal Medicine), Rog Nidan avum Vikriti Vigyan (Diagnostics & Pathology), Shalya Tantra-Samanya (Surgery), Shalya Tantra–Kshar Karma avum Anushastra Karma (Parasurgical interventions & procedures), Shalakya Tantra-Netra Roga (Ophthalmology), Shalakya Tantra–Shiro-Nasa-Karna Avum Kantha Roga (Treatment of diseases of Head and ENT), Shalakya Tantra – Danta Avum Mukha Roga (Dentistry), Manovigyana avum Manas Roga (Psychology & Psychiatry), Panchakarma (Biopurification), Agad Tantra avum Vidhi Vaidyaka (Toxicology and Medical Jurisprudence), Sangyaharana (Anesthesiology) and Chhaya avum Vikiran Vigyan (Radiology).

Ayurveda holds the strength to treat diseases from holistic angle in accordance with the body-mind constitution and other physic psychological attributes of the patients and as such is proven to be effective in the treatment of chronic, metabolic and life style diseases for which satisfactory solutions are not available in conventional allopathy medicine. Over the years, Kshar Sutra and Panchakarma therapies of Ayurveda have become very popular among the public. Panchakarma is a unique therapeutic procedure for the radical elimination of diseasecausing factors and to maintain the equilibrium of tridosha. The Panchakarma therapy minimizes the chances of recurrence of the diseases and promotes positive health by rejuvenating body tissues and bio-purification. Kshar Sutra is a Para-surgical intervention using an alkaline thread for cauterization, which is scientifically validated to be effective in the treatment of fistula-in-ano and such surgical conditions as require excision of overgrown soft tissue like polyps, warts, non-healing chronic ulcers, sinuses and papillae.

(ii) Unani

The Unani System of Medicine originated in Greece and passed through many countries before establishing itself in India during the medieval period. This system is based on the teachings of Hippocrates and Gallen, developed into an elaborate Medical System by Arabs. It is based on well-established knowledge and practices relating to the promotion of positive health and prevention of diseases. The Unani system became enriched by imbibing what was best in the contemporary systems of traditional medicines in Egypt, Syria, Iraq, Persia, India, China and other Middle East countries. The system of medicine was documented in Al-Qanoon, a medical Bible, by Sheikh Bu-Ali Sina (Avicena, 980-1037 AD), and in Al-Havi by Razi (Rhazes, 850-923 AD) and in many other books written by the Unani physicians. The literature of the Unani system is mostly found in Arabic, Persian and Urdu languages. The Unani System is based on the Humoral theory i.e. the presence of blood, phlegm, yellow bile and black bile in a person. The temperament of a person can accordingly be sanguine, phlegmatic, choleric and melancholic depending on the presence and combination of humors. According to Unani theory, the humors and medicinal plants themselves are assigned temperaments. Any change in quantity and quality of the humors, brings about a change in the status of the health of the human body. A proper balance of humors is required for the maintenance of health. Treatment in Unani consists of three components namely preventive,

promotive and curative. Unani system of Medicine has been found to be efficacious in conditions like Rheumatoid Arthritis, Jaundice, Nervous Debility, and Skin Diseases like Vitiligo & Eczema, Sinusitis and Bronchial Asthma. For the prevention of disease and promotion of health, the Unani System emphasizes six essentials (Asbab-e-Sitta Zarooria):-

(a) Pure air

(b) Food and water

(c) Physical movement and rest

(d) Psychic movement and rest

(e) Sleep and wakefulness

(f) Retention of useful materials and evacuation of waste materials from the body. There are four forms of treatment in Unani medicine- Ilaj bid Dawa (Pharmacotherapy), Ilaj bil Ghiza (Deitotherapy), Ilaj Bid Tadbir (Regimenal Therapy) and Ilaj bil Jarahat (Surgery). Regimenal Therapy (Ilaj Bid Tadbir) is a special technique/ physical method of treatment to improve the constitution of body by removing waste materials and improving the defense mechanism of the body and protect health. Some of the special techniques are Fasd (Blood-letting), Hijama (Cupping), Dalk (Massage), Taleeq-e-Alaq (Leeching), Hammame-Har (Turkish Bath), Riyazat (Exercise), Amal-eKai (Cauterization).

The Unani system of medicine offers various methods of treatment which are used for specific and complicated diseases. It emphasizes the use of naturally occurring, mostly herbal medicines and also uses some medicines of animal, marine and mineral origin. During the last 50 years, eight Post Graduate specialties have been developed-

(i) Kulliyat (Basic Principles of Unani Medicine)

(ii) Ilmul Advia (Pharmacology)

(iii) Ilmul Saidla (Pharmacy)

(iv) Tahaffuzi-wa-Samaji Tibb (Preventive and Social Medicine)

(v) Moalijat (Medicine)

(vi) Jarahiyat (Surgery)

(vii) Ilmul Qabalat-wa-Amraz-e-Niswan (Obstetrics and Gynecology)

(viii) Ilmul Atfal (Paediatrics)

National Institute of Unani Medicine is established in Bangalore to impart good P.G. education in Unani system.

(iii) Siddha

The Siddha System of medicine is one of the ancient systems of medicine in India having its close bedd with Dravidian culture. The term Siddha means achievements and Siddhars are those who have achieved perfection in medicine. Eighteen Siddhars are said to have contributed towards the systematic development of this system and recorded their

experiences in Tamil language. The Siddha system of Medicine emphasizes on the patient, environment, age, sex, race, habits, mental frame work, habitat, diet, appetite, physical condition, physiological constitution of the diseases for its treatment which is individualistic in nature Diagnosis of diseases are done through examination of pulse, urine, eyes, study of voice, Colour of body, tongue and status of the digestion of individual patients. System has unique treasure for the conversion of metals and minerals as drugs and many infective diseases are treated with the medicines containing specially processed mercury, silver, arsenic, lead and sulphur without any side effects. The strength of the Siddha system lies in providing very effective therapy in the case of Psoriasis, Rheumatic disorders, Chronic liver disorders, Benign prostate hypertrophy, bleeding piles, peptic ulcer including various kinds of Dermatological disorders of non-psoriatic nature.

During the last six decades, there has been continuous development in Siddha medical education and this has led to the establishment of the National Institute of Siddha at Chennai as apex Institute having six specialties in postgraduate teaching leading to the award of M.D(S) Degree. These are Maruthuvam (General Medicine), Sirappu Maruthuvam (Special Medicine), Kuzhanthai Maruthuvam (Paediatrics), Gunapadam (Pharmacology), Noi Nadal (Pathology) and Nanju Nool & Maruthuva Neethinool (Toxicology). For development of focused research in Siddha System of medicine Govt. has constituted Central Council for Research in Siddha (CCRS), an autonomous body by bifurcating Central Council for Research in Ayurveda and Siddha (CCRAS).

(iv)Yoga

The word "Yoga" comes from the Sanskrit word "yuj" which means "to unite or integrate." Yoga is about the union of a person's own consciousness and the universal consciousness. It is primarily a way of life, first propounded by Maharshi Patanjali in systematic form Yogsutra. The discipline of Yoga consists of eight components namely, restraint (Yama), observance of austerity (Niyama), physical postures (Asana), breathing control (Pranayam) restraining of sense organs (Pratyahar), contemplation (Dharna), meditation (Dhyan) and Deep meditation (Samadhi). These steps in the practice of Yoga have the potential to elevate social and personal behavior and to promote physical health by better circulation of oxygenated blood in the body, restraining the sense organs and thereby inducing tranquility and serenity of mind and spirit. The practice of Yoga has also been found to be useful in the prevention of certain psychosomatic diseases and improves individual resistance and ability to endure stressful situations. Yoga is a promotive, preventive rehabilitative and curative intervention for overall enhancement of health status. A number of postures are described in Yoga literature to improve health, to prevent diseases and to cure illness. The physical postures are required to be chosen judiciously and have to be practiced in the correct way so that the benefits of prevention of disease, promotion of health and therapeutic use can be derived from them. Studies have revealed that Yogic practice improves intelligence and memory and help in developing resistance to situations of stress and also help individuals to develop an integrated personality. Meditation can stabilize emotional changes and prevent abnormal functions of the vital organs of the body. Studies have shown that meditation not only regulates the functions of the sense organs but also strengthens the nervous system. Yoga today is no longer restricted to hermits, saints, sages but has gone to every home for the global health promotion. Yoga as a part of peoples' lifestyle has aroused a world-wide awakening and acceptance.

(v) Naturopathy

Naturopathy is rooted in the healing wisdom of many cultures and times based on principal of natural healing. The principals of natural healing. The principles and practices of Naturopathy are integrated in the life style, if the people observe living close to nature. Naturopathy is a cost effective drugless, non-invasive therapy involving the use of natural materials for health care and healthy living. It is based on the theories of vitality, boosting the self-healing capacity of the body and the principles of healthy living. Naturopathy is a system of natural treatment and also a way of life widely practiced, globally accepted and recognized for health preservation and management of illnesses without medicines.

Naturopathy advocates living in harmony with constructive principles of Nature on the physical, mental, social and spiritual planes. It has great promotive, preventive, curative as well as restorative potentials. Naturopathy promotes healing by stimulating the body's inherent power to regain health with the help of five elements of nature – Earth, Water, Air, Fire and Ether. It is a call to "Return to Nature" and to resort to a simple way of living in harmony with the self, society and environment. Naturopathy advocates 'Better Health without Medicines'. It is reported to be effective in chronic, allergic autoimmune and stress related disorders. The theory and practice of Naturopathy are based on a holistic view point with particular attention to simple eating and living habits, adoption of purificatory measures, use of hydrotherapy, cold packs, mud packs, baths, massages, fasting etc.

(vi) Homoeopathy

The Physicians from the time of Hippocrates (around 400 B.C.) have observed that certain substances could produce symptoms of a disease in healthy people similar to those of people suffering from the disease. Dr. Christian Friedrich Samuel Hahnemann, a German physician, scientifically examined this phenomenon and codified the fundamental principles of Homoeopathy. Homoeopathy was brought into India around 1810 A.D. by European missionaries and received official recognition by a resolution passed by the Constituent Assembly in 1948 and then by the Parliament. The first principle of Homoeopathy 'Similia Similibus Curentur', says that a medicine which could induce a set of symptoms in healthy human beings would be caapable of curing a similar set of symptoms in human beings actually suffering from the disease. The second principle of 'Single Medicine' says that one medicine should be administered at a time to a particular patient during the treatment. The third principle of 'Minimum Dose' states that the bare minimum dose of a drug which would induce a curative action without any adverse effect should be administered. Homoeopathy is based on the assumption that the causation of a disease mainly depends upon the susceptibility or proneness of an individual to the incidence of the particular disease in addition to the action of external agents like bacteria, viruses, etc.

Homoeopathy is a method of treating diseases by administering drugs which have been experimentally proved to possess the power to produce similar symptoms on healthy human beings. Treatment in Homoeopathy, which is holistic in nature, focuses on an individual's response to a specific environment. Homoeopathic medicines are prepared mainly from natural substances such as plant products, minerals and from animal sources. Homoeopathic medicines do not have any toxic, poisonous or side effects. Homoeopathic treatment is economical as well and has a very broad public acceptance. Homoeopathy has its own areas of strength in therapeutics and it is particularly useful in treatment for allergies, autoimmune disorders and viral infections. Many surgical, gynecological and obstetrical and pediatric conditions and ailments affecting the eyes, nose, ear, teeth, skin, sexual organs etc. are amenable to homoeopathic treatment. Behavioral disorders, neurological problems and

metabolic diseases can also be successfully treated by Homoeopathy. Apart from the curative aspects, Homoeopathic medicines are also used in preventive and promotive health care. In recent times, there is an emergence of interest in the use of Homoeopathic medicines in veterinary care, agriculture, dentistry, etc. Homoeopathic medical education has developed in seven specialties in post-graduate teaching, which are Materia Medica, Organon of Medicine, Repertory, Practice of Medicine, Pediatrics, Pharmacy and Psychiatry.

3.1 Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy

Ayurvedic system of medicine:

Ayurveda is one of the oldest systems of medicine originated from india. The word Ayurveda is made up of two parts Ayu + Veda. Ayu means life and Veda means Knowledge. Thus Ayurveda means "science of life".it deal both physical and mental health and also covers art of living. In Ayurveda health is defined as a well- balanced metabolism and happy state of being. It deals with all aspect of human life which are emanating from body, mind, extranal factors and natural intrinsic factors. In this system diseases are cured by using drugs, diets, exercise and surgery. Body (Sharira), mind (manas) and Soul (Atma) are the triploid of life in which equal attention should be given for the achievement of sound health.

Ayurveda classifies the body into three basic biological elements which are known as Vata, Pita, Kapha. These elements originate from five basic elements airs (Vayu), energy (Tej), space (Akash), Water (Jal) and Soil (Dharti). The biochemical combination of space and air form Vata. Pitta is composed of energy and water and Kapha is derived from the combination of water and soils.

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 field of medicine, yoga or tapa (meditation).

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.

Unani system of medicine

Unani medicine is a system of alternative medicine that originated in ancient Greece but is now practiced primarily in India. Involving the use of herbal remedies, dietary practices, and alternative therapies, Unani medicine addresses the prevention and treatment of disease. According to practitioners of Unani medicine, achieving a balance of the bodily fluids known as "the four humors" (blood, phlegm, yellow bile, and black bile) is essential to health. Another key principle of Unani medicine is that disease results from an imbalance in air, earth, water, and fire, four elements thought to comprise all that exists in nature, including the human body. In addition, Unani medicine is partly based on the principle that environmental conditions, including the quality of water and air,) can significantly impact health. In Unani medicine, conditions are often treated with herbal formulas containing a variety of natural substances. For example, a formula known as Khamira Abresham Hakim Arshad Wala contains such botanicals as saffron, cardamom, Indian bay leaf, and citron. Considered a tonic, Khamira Abresham Hakim Arshad Wala is said to enhance heart health and aid in the treatment of cardiovascular problems like high blood pressure and angina. Commonly prescribed treatments in Unani medicine also include dietary changes, leech therapy, and surgery.

Unani medicine is largely based on principles proposed by such physicians as Hippocrates and Galen. In addition, a number of Arab and Persian scholars (including the Arab philosopher and physicist Avicenna) have contributed to the development of Unani medicine. The word "Unani" means "Greek" in Arabic. Unani medicine was introduced in India around the tenth century.

Homeopathy system of medicine

Homeopathy is an alternative medical practice in which extremely dilute amounts of certain natural substances are used to treat various ailments. Homeopathy is also known as homeopathic medicine and was developed in Germany more than 200 years ago. Homeopathic treatments are highly individualized, and there is no uniform prescribing standard for homeopathic practitioners. There are hundreds of different homeopathic remedies, which can be prescribed in a variety of different dilutions for thousands of symptoms. The holistic nature of homeopathy means each person is treated as a unique individual. Their body, mind, spirit and emotions are all considered in the management and prevention of disease. Taking all these factors into account a homeopath will select the most appropriate medicine. Homeopathic medicine based on the individual's specific symptoms and personal level of health to stimulate their own healing ability. Homeopathic medicines are safe to use as they rarely cause side-effects. This means when used appropriately under the guidance of a qualified homeopath they can be taken by people of all ages, including babies, children and pregnant or breastfeeding women. Every science has certain fundamental principles which guide the whole system. Homeopathy as a science of medical treatment has a philosophy of its own and its therapeutics is based on certain fundamental principles. This include-

1. Law of Similia

Homeopathy is a system of medicine founded on a definite law 'Similia Similibus Curantur' which means 'like cures like'.

2. Law of Simplex

It's means that only one single, simple medicinal substance is to be administered in a given case of time.

3. Law of Minimum

The suitableness of a medicine for any given case does not depend on its accurate homeopathic selection alone, but likewise on the proper size of dose too. Under this principle practitioners give medicine to the patients in very.

3.2 Preparation and standardization of Ayurvedic formulation

Preparation and standardization of Aristas

Aristas

Arista, an Ayurvedic preparation, is effectively used to treat many diseases. It is obtained by soaking the crude drugs, either in powdered form or as decoction, in jaggery solution. While doing so, it undergoes fermentation to produce alcohol, which helps to extract the phytoceuticals from the crude drugs. Though the requirement for herbal medicines are increasing, the major drawbacks encountered by the herbal drug companies include lack of proper documentation, validation and determination of biomarkers besides the non-existence of rigid quality control profiles for herbs and their formulations. This creates an urgent need for standardization of herbal drugs, which enhances the quality, safety and efficacy of their use for various ailments. The present investigation deals with standardization of Saraswataristam which is majorly used as stimulant, soporific, emmenagogue, nervine tonic, and cardio tonic, stomachic, carminative and diuretic. It is also used in the treatment of central nervous system disorders and dermatological problems. The main objective of the study includes formulation of Saraswataristam, subjected to phytochemical, physico-chemical, microbiological, toxicological and pharmacological evaluations using modern analytical tools.

Preparation

Asava Arishta is special Ayurvedic medicine made by soaking herbs (the drugs), either in the form of dry powder or decoction–liquid (Kashaya/ kwatha), in a solution of jaggery or sugar. It is kept such for a specified period of time so that it undergoes a process called Sandhana kriya (fermentation) this fermentation generates alcohol which facilitates the extraction of the active principles contained in the herbs or drugs. The alcohol is self-generated and acts as a preservative. The alcoholic content is limited to a maximum of 11% as per the standardization. To prepare Arishta, the mentioned herbs or drugs are coarsely powdered (Yavakuta churna) and then decoction (Kashaya/kwatha) is prepared from them. The prepared decoction (Kashaya) is then strained and kept in a safe place in the fermentation vessel, pot, or barrel. Jaggery (gud), sugar or honey, according to the formula, is separately dissolved, boiled, filtered and added in the fermentation vessel where decoction is kept. Mentioned Prakshepa Dravyas are made into fine powder and added to that vessel. In the end, an herb called Dhataki Pushpa, (if included in the formula) is added. The mouth of the vessel is completely covered with an earthen lid. The edges of the lid are sealed with clay-smeared cloth in seven consecutive layers. The container is then kept in a heap of paddy. Use of paddy is to ensure a constant temperature during the period of fermentation and also it accelerates the fermentation process.

After the specified period, the earthen lid is removed carefully, and the contents of the vessel are examined to ascertain the process of fermentation (Sandhana karma) has been completed

or not. The content or fluid is then decanted and strained and kept as it is for two to three days. It is again strained to mix sediments properly and packed in a glass or pet bottles.

Standardization

Asavas and Aristas are alcoholic preparations, prepared either by soaking the powdered drugs or the decoction of a drug, in a solution of jaggery along with a fermenter for a specified period of time, during which it undergoes fermentation to produce alcohol. These self-generated alcohols facilitate the extraction of active principles present in the drug and also serve as a preservative.

Various methods applied for standardization of herbal drugs are depicted. Due to complexity of most Ayurvedic formulations, use of only conventional methods for standardization is not adequate for their evaluation. The Ayurvedic Pharmacopoeia of India and Pharmacopoeial standards for Ayurvedic formulations mention only the study of physicochemical parameters and thin-layer chromatography of raw materials and formulations, which are not sufficient for proper standardization in present era Therefore, modern analytical methods such as high performance thin layer chromatography (HPTLC), high performance liquid chromatography (HPLC), gas chromatography (GC) and hyphenated techniques such as liquid chromatography-mass spectroscopy (LC-MS), liquid chromatography-nuclear magnetic resonance spectroscopy (LC-NMR) and gas chromatography-mass spectroscopy (GC-MS) are applied to ascertain the quality of herbal products. Fingerprints obtained from HPTLC, HPLC are used as important tools for identification of marker compounds in the phytoconstituents and for quality control development of herbal formulations. Development and application of analytical techniques help in rapid analysis of herbal formulation in industry and assist in maintaining the therapeutic efficacy and safety of Ayurvedic preparations.

Thin layer chromatography (TLC) is a common fingerprinting technique used to identify the phytoconstituents present in the drugs and thus, helps in differentiation of various plant species simultaneously HPTLC is an important modern analytical method, where low or moderate polar compounds can be analyzed. Pharmaceutical industries widely use this technique for method development, identification and detection of adulterants and substituents in the Ayurvedic formulations. Preparative and analytical HPLC methods are used for isolation, purification and quantification of phytoconstituents in the herbal formulation. Better resolution, sensitivity and rapid analysis are the important parameters considered in HPLC analysis. The combination of HPLC and MS is currently the most powerful technique for the quality control of Chinese herbal medicine. GC is used in characterization of volatile compounds due to its powerful separation efficiency and sensitive detection. Compounds present in essential oils are identified and quantified by GC-MS analysis. LC-MS is another important analytical technique for determination of quality of the drug. LC-NMR is used in pharmacokinetics, toxicity studies, drug metabolism and drug discovery process due to its rapidity and sensitivity of detection. LC-NMR technique is also used to detect adulterants in Chinese herbal medicine.

Preparation and standardization of Asawas

Asawas

The Asava is prepared same as that of Arishta, but the difference is here we do not prepare decoction (kashaya/ kwatha) from the herbs or finely powdered drugs. Jaggery or honey as mentioned in the formula is dissolved, boiled and filtered. Then this is poured into the fermentation pot, vessel or barrel. The mentioned fine powders of the herbs (drugs) are added in the solution of jaggery. The vessel is covered with a lid and its edges are sealed with clay-smeared cloth in seven consecutive layers as described in Arishta preparation method. And then the rest process is same as that of Arishta. The Jaggery or sugar is dissolved in the required quantity of water, boiled and cooled. This is poured into the fermentation vessel. Fine powder of the drugs is added in the container which is covered with a lid and the edges are sealed with clay smeared cloth wound in seven consecutive layers. A constant temperature is maintained for fermentation by keeping the container either in a special room, in an underground cellar or in a heap of paddy. After a specified period the lid is removed and the contents examined to ascertain whether fermentation has been completed. The fluid is first decanted and then strained after two or three days. When the fine suspended particles settle down, it is strained and bottled.

Preparation

The Jaggery or sugar is dissolved in the required quantity of water, boiled and cooled. This is poured into the fermentation vessel. Fine powder of the drugs is added in the container which is covered with a lid and the edges are sealed with clay smeared cloth wound in seven consecutive layers. A constant temperature is maintained for fermentation by keeping the container either in a special room, in an underground cellar or in a heap of paddy. After a specified period the lid is removed and the contents examined to ascertain whether fermentation has been completed. The fluid is first decanted and then strained after two or three days. When the fine suspended particles settle down, it is strained and bottled.

The method of preparing asava arishtas is known as sandhana kalpana in Ayurveda. General Methods used in the Extraction of Medicinal Plants in asava and arishta are infusion and decoction. In this process, the crude drug is boiled in a specified volume of water for a time; it is then cooled and strained or filtered. This procedure is suitable for extracting water-soluble, heat-stable constituents. This process is typically used in preparation of Ayurvedic extracts called “quath” or “kawath”. The starting ratio of crude drug to water is fixed, e.g. 1:4 or 1:16. The volume is then brought down to one-fourth its original volume by boiling during the extraction procedure. Then, theconcentrated extract is filtered and used as such or processed further Infusion. Fresh infusions are prepared by macerating the crude drug for a short period of time with cold or boiling water. These are dilute solutions of the readily soluble constituents of crude drugs. The basic equipment required for preparation of arishta and asava an earthen pot sufficiently large and glazed, porcelain jar of suitable size; a lid to close the vessel, a cloth ribbon to seal the vessel; a paddle like stirrer; a clean cloth of fine and strong texture for filtering, vessel to keep the juices or boil the drugs . The major components are divided into 4 types according to their specific role in the process. This includes the main herbs from which the extract or decoction is taken out. They yield drugs, which are pharmacologically and therapeutically much important in the given medicine and

the name of the medicine is derived from these herbs denoting their importance. The flavouring agents used in asava and arishta not only contributing to the flavour of the medicine but having their own pharmacological action too. The fermentation initiator provides inoculum for the fermentation to start. The medium of sugars is required for fermentation.

Standardization

Standardization of Ayurvedic formulations is an important step for the establishment of a consistent biological activity, a consistent chemical profile, or simply a quality assurance program for production and manufacturing of herbal drugs. WHO specific guidelines for the assessment of the safety, efficacy and quality of herbal medicines as a prerequisite for global harmonization are of outmost importance. An overview covering various techniques employed in extraction and characterization of herbal medicines as well as herbal Nano medicines standardization is reported. In addition, phytosomes increased bioavailability, bhasma as a metal Nano carrier drug delivery system, potential of metabolomics in the development of improved phytotherapeutic agents, DNA based molecular markers in distinguishing adulterants, and SCAR markers for authentication and discrimination of herbs from their adulterants are reported. Processed metals including Mercury, Gold, Silver, Lead, Zinc, Copper etc. were used very frequently by seers of the Indian tradition in different disease conditions with great authority. Recent advances in the study of minerals include petrological studies to analyze the physical and chemical changes in particular.

Preparation and standardization of Ghutika

Ghutika

Medicine made into circular shape mass dosage form, is called as Gutika. This can be compared with pills in modern pharmaceutics. Vati is made in the shape of flat circular mass and it is similar to tablet. If the Gutika or Vati medicine is modified into long oval solid shape form, then it is called as Varti. This is commonly used for local administration in anal canal, vaginal canal, penis, eye for different diseases. Medicine moulded into big circular mass form is known as Vataka. Aushadhi churna is mixed with Sarkara and moulded like Pinda (circular mass) then it is called as Pinda or Pindi. Modaka will be having circular shape and having big size, possessing weight around 20 g, 50 g.

Types of Vati

In the Ayurvedic Pharmaceutical text two types of Vati preparation methods are mentioned, these are-

(i) Agnisadhya Vati
(ii) Anagnisadhya Vati

In case of Agni Sadhya vati preparation, the sugar or Jaggery (guda) or Guggulu is made like lehya on mild fire then the powders of the ingredients are added to the Paka (lehya) which become soft mass paste like then vati is to be made by rolled into circular in shape. By this process Vati is prepared without heat. The powders of ingredients are either pounded with Guggulu and guda, adding with any suggested liquid or honey to prepare the vati or triturated with any suggested liquid or honey to make into vati.

Preparation

General method of preparation: The drugs of plant origin are dried and made into fine powders separately. The minerals are made into Bhasma or Sindura, unless otherwise mentioned. In case where Parada and Gandhaka are mentioned, Kajjali is made first and other drugs are added with it one by one according to the formula. These are put into a Khalva and ground to a soft paste with the prescribed fluids. When more than one liquid is mentioned for grinding they are used in succession. When the mass is properly ground and is in a condition to be made into Pills, Sugandha dravyas are added and ground again. The criteria to determine the final stage of the formulation before making pills is that, it should not stick to the fingers when rolled in between two fingers. Pills may be dried in the shade. In case where sugar or Jaggery is mentioned, paka of these should be made on mild fire and removed from the oven. The powders at these ingredients are added to that Paka and briskly mixed. When still warm, Vatakas should be rolled and dried in Shade. For the preparation of Vati Sarngadhara has mentioned the ratio of ingredients that Sita should be taken 4 times, Guda should be taken 2 times, Guggulu and Madhu should take equal quantity and other liquids taken 2 times more than that of Curna used for Vati.

Standardization

Standardization expression is used to describe all measures, which are taken during the manufacturing process and quality control leading to a reproducible quality. It also encompasses the entire field of study from birth of a plant to its clinical application. It also means adjusting the herbal drug preparation to a defined content of a constituent or a group of substances with known therapeutic activity respectively by adding excipients or by mixing herbal drugs or herbal drug preparations.

Evaluation of a drug means confirmation of its identity and determination of its quality and purity and detection of its nature of adulteration. Standardization of herbal drugs is not an easy task as numerous factors influence the bio efficacy and reproducible therapeutic effect. In order to obtain quality oriented herbal products, care should be taken right from the proper identification of plants, season and area of collection and their extraction and purification process and rationalizing the combination in case of polyherbal drugs. The herbal formulation in general can be standardize schematically as to formulate the medicament using raw materials collected from different localities and a comparative chemical efficacy of different batches of formulation are to be observed. The preparations with better clinical efficacy are to be selected. After all the routine physical, chemical and pharmacological parameters are to be checked for all the batches to select the final finished product and to validate the whole manufacturing process.

The World Health Organization (WHO) has appreciated the importance of medicinal plants for public health care in developing nations and has evolved guidelines to support the member states in their efforts to formulate national policies on traditional medicine and to study their potential usefulness including evaluation, safety, and efficacy. Lasunadi vati is official in Ayurvedic formulary of India and is prescribed for the treatment of diarrhea, Irritable bowel syndrome. It contains two drugs i.e. Kutaja (Holarrhena antidysentrica) and Ativisa (Aconitum heterophyllum). This study reports on the standardization of Kutajaghana Vati based on macroscopic, microscopic, physic-chemical parameters and Thin Layer Chromatographic study (TLC).

In order to have a good coordination between the quality of raw materials, in process materials and the final products, it has become essential to develop reliable, specific and sensitive quality control methods using a combination of classical and modern instrumental method of analysis. Standardization is an essential measurement for ensuring the quality control of the herbal drugs. “Standardization” expression is used to describe all measures, which are taken during the manufacturing process and quality control leading to a reproducible quality. Kutajaghana vati is official in Ayurvedic formulary of India and is prescribed for the treatment of diarrhea, Irritable bowel syndrome. It is a polyherbal preparation containing two ingredients. In this research paper, an attempt has been made to develop standardization methods of Kutajaghana vati. In-house preparation and the marketed drug have been standardized on the basis of macroscopic, microscopic, physic-chemical parameters and Thin Layer Chromatographic study (TLC). The set parameters were found to be sufficient to evaluate the Vati and can be used as reference standards for the quality control/quality assurance.

Preparation and standardization of Churna

Churna

Churna is defined as a fine powder of drug or drugs in Ayurvedic system of medicine. Drugs mentioned in patha, are cleaned properly, dried thoroughly, pulverized and then sieved. The churna is free flowing and retains its potency for one year, if preserved in airtight containers. Triphala churna, Trikatu churna, Drakeshadi churna and Sudharsana churna are some of examples. Churna formulation is similar to powder formulations in Allopathic system of medicine. In recent days churna is formulated into tablets in order to fix the dose easily. These forms of medicament are prescribed generally because of their particle size. Smaller the particle size greater is the absorption rate from g.i.t and hence the greater is bioavailability. It is prescribed by the Ayurvedic physician for treating conditions such as diabetes, indigestion, constipation etc. Indigestion is a common ailment affecting the general population and in allopathy system antacids are commonly prescribed. Since the usage of such aluminium containing antacids cause deleterious effects like Alzheimer’s disease upon long term usage, we explored an alternative and safe remedy for indigestion. Hence we prepared a churna with natural ingredients commonly used by mankind for culinary purposes. Thus the present study examined the favourable influence of four spices formulated into churna said to have digestive property.

Preparation

The drugs are cleaned and dried properly. They are finely powdered and sieved. If more than one drug are present then each one is separately powdered, sieved, accurately weighed and then all mixed together. The powder is fine to the extent of at least 80 mesh sieves. It should not adhere together or become moist. The finer powder has better therapeutic value.The dose is 2-3 gm, which may be increased or decreased according to age and severity of disease. It is administered with water, milk, fruit juices or any other suitable liquid depending on the nature of disease. It may be given by mixing with gur or honey in equal quantity, with sugar twice the quantity and with milk four times the quantities as that of drug.

Standardization

In the few decades, there has been exponential growth in the field of herbal medicines. Most of the traditional system of medicine is effective but they lack standardization. So there is a need to develop a standardization technique. Standardization of herbal formulation is essential in order to assess the quality, purity, safety and efficacy of the drug. Dabur Triphala

Churna is used for immune system stimulation, improvement of digestion, relief of constipation, gastrointestinal tract cleansing, and relief of gas, treatment of diabetes and treatment of eye disease. The present research study deals with standardization of Dabur Triphala Churna [ex. Emblica officinalis (Garetn.) (Amla), Terminalia bellirica (Gaertn.)Roxb. (Baheda) and Terminalia chebula (Retz.) (Harada)].

The standardization of this formulation, the organoleptic characters, physical properties, the various physico-chemical properties such as moisture content, ash values, extractive values were carried out. Heavy metal content studies were also carried out to ascertain the quality, purity and safety of this herbal formulation. The quality control of herbal crude drug & formulation is important in justifying their acceptability in modern system of medicines. Standardization of synthetic drugs offers no problem with very well defined parameters of analysis. It is not uncommon to have as many as five or more different herbal ingredients in one single formulation. The batch to batch variation starts from the collection of the raw materials itself in absence of any reference standard for identification. Standardized products and services are valuable. User confidence builder's being perceived as-

- Safe
- Healthy
- Secure
- High quality
- Flexible

Standardization brings important benefits to business including a solid foundation upon which to develop new technologies and an opportunity to share and enhance existing practices. Standardization also plays a pivotal role in assisting Governments, Administrations, Regulators and the legal profession as legislation, regulation and policy initiatives are all supported by standardization.

Preparation and standardization of Lehya

Lehya

Lehya are semisolid Malt/Jam like preparation of drugs, prepared by adding jaggery or sugar and boiled with the prescribed liquid till the correct constituency is obtained. Then spices and Ghee are added and stirred well. After cooling honey is also added. This means preserving the water extract of medicines in Sugar media.

Preparation

Avaleha or Lehyam is one of the forms of Ayurvedic medicine which is semi-solid in consistency. It is prepared from mentioned drugs or herbs with the addition of Gur (jaggery), Sharkara (sugar or sugar candy) and boiled with prescribed Swarasa (drug juice) or Kwatha/ Kashayam (decoction). Avaleha is also termed as Modaka, Guda, Khanda, Rasayana, Leha, Lehyam etc.

The lemon fruits were fried in an earthen pan and the juice was extracted. To the extracted juice twice the amount of sugar was added and boiled till it attains pakam (a semisolid form). The weighed amount of drugs in powdered form was added one by one slowly mixing well till it attains Lehya pakam. The Ghee was added finally and mixed well and the resulting Lehyam was stored in a clean container for further analysis.

In all types of Avaleha preparations, there generally have following ingredients-

1. Kashaya (decoctions or other liquids)
2. Gur/ Guda/ Sharkara (Jaggery, sugar or sugar candy)
3. Churna (Powders or pulps of certain drugs)
4. Ghrita (Ghee) or Tailam (oil)
5. Madhu (honey).

Procedure

- First, Gur/ Guda/ Sharkara (Jaggery, sugar or sugar candy) is dissolved well in the decoction or liquid and strained to remove the foreign particles.
- This solution is then boiled over a moderate fire.
- When the Paka (Phanita) is tantuvat (thread like) when pressed between thumb and index finger or when it sinks down in a glass of water without getting easily dissolved, it should be removed from the fire.
- Churna (fine powders) of herbs are then added in small quantities and stirred continuously and vigorously to form a homogenous mixture.
- Ghita (Ghee) or Taila (oil), if mentioned, is added while the preparation is somewhat hot and mixed well.
- Madhu (honey), if mentioned is added at the last when the mixture or preparation is cool and mixed well.

Standardization

Standardization is an important aspect for maintaining and assessing the quality and safety of the polyherbal formulation as these are combinations of more than one herb to attain the desire therapeutic effect. The polyherbal formulation has been standardized on the basis of organoleptic properties, physical characteristics, and physicochemical properties. TLC & HPTLC fingerprint profile are used for identification of formulation as well as for deciding the purity and strength and also for fixing standards for the Ayurvedic formulation. The Ashwagandhadilehya was prepared classically. The lehya was evaluated organoleptically as well as physicochemical characterization such as color, odor, taste, pH, loss on drying, total Ash value, Acid insoluble Ash value, Water soluble extractive, methanol soluble extractive. The prepared Ashwagandhadilehya was semisolid in appearance, brown blackish in color, sweetish pungent in taste, with characteristic odor. Obtained result of physicochemical parameters like pH value was 4.77, total Ash value 3.01% w/w, Acid insoluble Ash value 0.52% w/w, Water soluble extractives 38.11% w/w, methanol soluble extractives 23.91% w/w and loss on drying at 1050 C was 17.73% w/w. Major herbal ingredients of the prepared medicine have been identified through Thin Layer Chromatography. Lehya Kalpana means the pharmaceutical mode which is ingested in the body by the process of licking. Lehya Kalpana holds its speciality in many perspectives. The property of licking is very important regarding its mode of action which starts from the tongue itself. The ingredients like Ashwagandha, Pippali, and Masha etc. have a synergistic effect in disorders like emaciation, weakness, disability and various other ailments of the body. In pharmaceutical study a quick and easy preparatory procedure as compared to Avleha kalpana has been adopted, which

prove to be helpful for Ayurvedic scholars when they prepare this formulation of their own. This pharmaceutical standardization can help and encourage in better understanding of preparation. Standardization of any Ayurvedic formulation is utmost important now-a-days to prove its scientific validation. Hence this attempt was made to make better understanding with scientific approach for Ashwagandhadilehya.

Preparation and standardization of Bhasma

Bhasma

Bhasma is a calcined preparation in which the gem or metal is converted into ash. Gems or metals are purified to remove impurities and treated by triturating and macerating in herbal extracts. The dough so obtained is calcinated to obtain the ashes.Bhasma is a Sanskrit word that means “bone ash,” “cinder” or “disintegration.” It comes from the root bha, meaning “delusion,” “appearance” or “likeness,” and sma, meaning “ever” or “always.” In Hinduism and yoga, bhasma is sacred ash. In some traditions, it is thought to contain the energy of Shiva. In the traditional Indian medical system of Ayurveda, bhasma is a type of medicinal powder made through calcination of stones, gems, minerals or metals. There are a wide range of bhasmas used to treat many types of ailments. In the spiritual context, bhasma symbolizes burning the ego to ashes in order to unite with the higher Self or the divine. It represents liberation from the limitations of mortal life and freedom from the cycle of reincarnation. It is also a reminder of the temporary nature of the physical body, which will one day return to ashes. Also called vibhooti, bhasma is the sacred ash from the fire of a yogi or saint or from the sacrificial fire known as yajna in which special wood, herbs, grains, ghee and other items are offered as part of a worship ritual. Bhasma is thought to destroy sin and consume evil.

Preparation

The preparation of Lauha bhasma (iron ash) was carried out following the procedure described in the Ayurvedic Formulary of India. The raw material Lauha curna (Iron powder) was procured from the market in Trichy, India. The preparation involves the following major steps–samanya sodhana (normal purification), vishesha sodhana (special purification), bhanupaka (exposure to sunlight), sthali paka (roasting in an iron pan) and putapaka (calcination).

Samanya Sodhana (normal purification) the first step in the preparation of Lauha bhasma (iron ash) is sodhana (purification step), which involves sequential quenching in tila taila (sesame oil), takra (butter milk), kanjika (rice gruel), gomuthra (cow’s urine), and kulatha kasaya (horse gram decoction). As in a typical purification step, about 2 kg of the raw material (iron powder) was heated to red hot condition and immersed in 2 L of quenching medium (room temperature) for 2 hours. Each of the quenching processes was repeated thrice with each treating liquid by using fresh medium every time. These steps constitute samanya sodhana (normal purification) and the Lauha (iron) obtained at this stage is called Suddha Lauha (iron after normal 41 purification) Vishesha Sodhana (Special purification) Coarse powders of dried fruits, viz., Phyllanthus emblica (Indian gooseberry), Terminalia chebula (Chebulic myrobalans) and Terminalia bellerica (Belleric myrobalans) were taken in equal quantities (2 kg each) and mixed with 50 L of water. The resulting mixture was heated to reduce to one-fourth of the original volume to obtain triphala kasaya (decoction of three fruits). About 2 kg of Suddha Lauha (iron after normal purification) was heated to red-hot

condition and immersed in a mixture of 1 L each of triphala kasaya (decoction of three fruits) and cow's urine for 2 hours. This purification step was repeated seven times using freshly prepared mixture of triphala kasaya (decoction of three fruits) and cow's urine. The Lauha (iron) obtained at this stage is called Lauha after vishesha sodhana (iron after special purification)

Vishesha Sodhana (Special purification) Coarse powders of dried fruits, viz., Phyllanthus emblica (Indian gooseberry), Terminalia chebula (Chebulic myrobalans) and Terminalia bellerica (Belleric myrobalans) were taken in equal quantities (2 kg each) and mixed with 50 L of water. The resulting mixture was heated to reduce to one-fourth of the original volume to obtain triphala kasaya (decoction of three fruits). About 2 kg of Suddha Lauha (iron after normal purification) was heated to red-hot condition and immersed in a mixture of 1 L each of triphala kasaya (decoction of three fruits) and cow's urine for 2 hours. This purification step was repeated seven times using freshly prepared mixture of triphala kasaya (decoction of three fruits) and cow's urine. The Lauha (iron) obtained at this stage is called Lauha after vishesha sodhana (iron after special purification.

Bhanupaka (exposure to sunlight) Triphala kasaya (decoction of three fruits) was added to Lauha obtained after vishesha sodhana (iron after special purification) and allowed to dry under sunlight for 5 days. This process was repeated seven times and the Lauha at this stage is called Lauha after bhanupaka. (Purified iron after exposure to sunlight).

Sthalipaka (frying in iron pan) Triphala kasaya (decoction of three fruits) was prepared by adding 2.3 kg each of Indian gooseberry, Chebulic myrobalans and Belleric myrobalans to about 110 L of water and reduced to one-eighth of its original volume. About 2.3 kg of Lauha after bhanupaka (purified iron after exposure to sunlight) was washed with water and placed in a sthali (iron pan), to which 13.5 L of Triphala kasaya (decoction of three fruits) was added and heated to dryness for about one hour at 95-100°C. The solid material obtained after this purification process is referred to as Lauha after sthalipaka (purified iron after frying in iron pan).

Puta paka (calcination) Triphala kasaya was prepared by adding 670 g each of Indian gooseberry, Chebulic myrobalans and Belleric myrobalans to 4 L of water and heated to reduce to one-fourth of its original volume. The prepared triphala kasaya was added to 2 kg of Lauha after sthalipaka (purified iron after frying in iron pan); triturated well for 3 hours and made into cakrikas (thin flat discs), which were dried under sunlight The cakrikas(thin flat discs) were placed in a hemi-spherical earthen container and covered with another hemi-spherical container, with the interface between the upper and lower containers covered with a clay-smeared cloth. This arrangement is normally referred to as Sarava Samputa (sealed earthern plates) a brick-walled calcination chamber measuring 90 cm each in all three directions was used for traditional calcination, in accordance with those proposed in ancient literature. This is referred to as traditional calcination chamber in the subsequent sections. About 150 cow dung cakes were stacked inside the pit over which the Sarava Samputa (sealed earthern 46 plates) was placed. This was followed by stack of another 150 cow dung cakes, ensuing uniform heat supply for the contents of Sarava Samputa (sealed earthern plates). This is referred to as traditional heating in the subsequent sections of this work. Calcination was initiated by igniting the cow dung cakes a Sarava Samputa (sealed earthern plates) was left undisturbed in the calcination chamber till all the cow dung cakes were burnt completely. The calcined intermediate was removed from Sarava Samputa, after the same was cooled naturally. This process of grinding with Triphala decoction to make thin flat discs and calcination in traditional chamber was repeated 60 times, as per the traditional procedure. The product obtained after sixty calcination is called Lauha bhasma. The temperature of

Sarava Samputa during traditional calcination was measured using a K-type thermocouple fitted indicator.

Standardization

Standardization is a measurement for ensuring the quality and is used to describe all measures, which are taken during the manufacturing process and quality control leading to a reproducible quality. For herbals formulations, it place major role from birth of a plant to its clinical application. It also means adjusting the herbal drug preparation to a defined content of a constituent or a group of substances with known therapeutic activity respectively by adding excipients or by mixing herbal drugs or herbal drug preparations. Standardization is not an easy task as numerous factors influence the bio efficacy and reproducible therapeutic effect. In order to obtain quality oriented herbal products, care should be taken right from the process of preparation.

For standard bhasma preparations, there is dearth of scientific analytical studies carried out, and even the existing ones suffer from incomplete analysis. Thus there is an imperative need for a scientific approach, which includes the following steps

- Physical standardization and elemental analysis of raw material and finished products.
- Determination of oxidation state of metals and association of these metals with acidic radicals in the finished product.
- Pharmacokinetics of the prominent metallic component of bhasma using tracer techniques or by metal extraction from tissues.
- Metal accumulation studies in different tissues and organs.
- Acute and chronic toxicity.
- Expression of heat shock proteins.
- Effect of bhasmas on normal physiological and antioxidant parameters.
- Therapeutic response of bhasmas on the recommended disease model at cellular and molecular level (based on claims written in ayurvedic texts).
- The role of bhasmas as drug carriers,
- The role of bhasmas in body immunomodulation and physiology of gastrointestinal tract (GI) (site of jataragani). These studies will provide evidence for the safety behind the use of bhasmas and also provide knowledge regarding their mechanism of action.

Standardization techniques

The standardization process include following methods-

Preliminary tests

I. **Floating test:** If a small quantity of bhasma is sprinkled on water surface it should float on the surface.

II. **Fineness test:** On rubbing a small quantity of the sample between the fingers it should enter into the lines on the fingers.

III. **Loss of metallic luster:** When visually examined preferably in presence of sun light no metallic luster should be observed.

IV. **Loss of metallic state:** This involves heating of a very thin silver sheet (600 nm thickness) along with a small quantity of bhasma to red hot for about 5 min. After cooling the sheet to room temperature, no traces of this sample should permanently stick to the silver sheet indicating no alloy formation takes place, thus confirming the metal has totally transformed into bhasma, its oxide form.

Physicochemical evaluation

The various physicochemical evaluation include colour, odour, pH, taste, fineness, loss on drying at 1050C, total ash, acid insoluble ash, water soluble ash and particle size mesh test . Tests for heavy/toxic metals should be carried out for standard formulation and their permissible limits.

Microbiological evaluation

The various microbiological evaluation includes total viable aerobic count, total Enterobacteriaceae and total fungal count, test for specific pathogen: E. coli, Salmonella spp., S. aureus, Pseudomonas aeruginosa.

Analytical evaluation

The various modern analytical evaluation include Atomic Absorption Spectroscopy (AAS), Atomic Force Microscopy (AFM), X-Ray Diffraction (XRD), X-Ray Fluorescence (XRF), X-Ray photo electron microscopy, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Energy Dispersive X-Ray Analysis (EDAX), Infrared spectroscopy (IR), Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES), FT-IR and Thermal Gravimetric Analysis (TGA) . The various analytical instrument used and their purpose of analysis.

Very Short Questions:

Q1.What is herbal Plant.

Q2. What are herbal materials?

Q3.What is the Indian system of medicine called?

Q4.What is ancient Indian medicine?

Short and Long Type of Questions:

Q1.Which Herb is used as medicines?

Q2.Why is herbal medicine important?

Q3.What is the Example of Herbal Plants?

Q4.What is the best natural supplement?

Q5.Which is the components of Indian systems of medicine?

Q6.What is traditional system of medicine?

Master Key Words:

- **Herbs are the usable parts of herbaceous plants.**
- **Herbal medicines are usually prepared as an extract, powder, tablet or a pill.**
- **The word Ayurveda is made up of two parts Ayu + Veda.**
- **India has a rich heritage of plant based healthcare systems.**
- **The Jaggery or sugar is dissolved in the required quantity of water.**
- **The most widely used microbial pesticides are Bacillus thuringiensis.**
- **Avaleha is a semisolid preparation of herbal.**
- **Drugs prepared in decoction or extracts of different.**
- **herbs by adding sweetening agents like jaggery,**