

AYURVEDA AS A COMPLEMENTARY DRUG DELIVERY SYSTEM:**REVIEW****Shinde P.P^{1*}, Kanwade V.A¹, Sayyad S.F¹, K.S. Salunkhe¹**

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ABSTRACT

Ayurveda is ancient medical science which was developed in India thousands of years ago (Ayur = Life, Veda = Science). Different Herbal formulations are available in the market, vary in quality and therapeutic efficacy due to the differences in the composition of the product. These formulations are safe, less side effect, less cost and easily available in the market. This reveals the fact that traditional medicines are amazingly significant even today and have the capabilities to take the global care of diseases such as formulations used for different diseases, Antianginal treatment, Antiarrhythmics, Antihypertensive. But a major drawback is lack of standardization, and improper patient treatment, to avoid this problem use integrating modern scientific principles with traditional Ayurvedic concepts, to convert formulation

into modern medicine means an attempt complementary alternative medicine (CAM).

KEY WORDS: Integration, Ayurveda, Traditional Ayurvedic, complementary alternative medicine.

1. INTRODUCTION**1.1 Drug Delivery System^[1]**

Drug delivery refers to approaches, formulations, technologies, and systems for transporting a pharmaceutical compound in the body as needed to safely achieve its desired therapeutic effect. It may involve scientific site-targeting within the body, or it might involve facilitating systemic pharmacokinetics; in any case, it is typically concerned with both quantity and duration of drug presence. Drug delivery is often approached via a drug's chemical formulation, but it may also involve medical devices or drug-device combination products.

Drug delivery is a concept heavily integrated with dosage form and route of administration, the latter sometimes even being considered part of the definition.

1.2 Drug Delivery Technologies^[2]

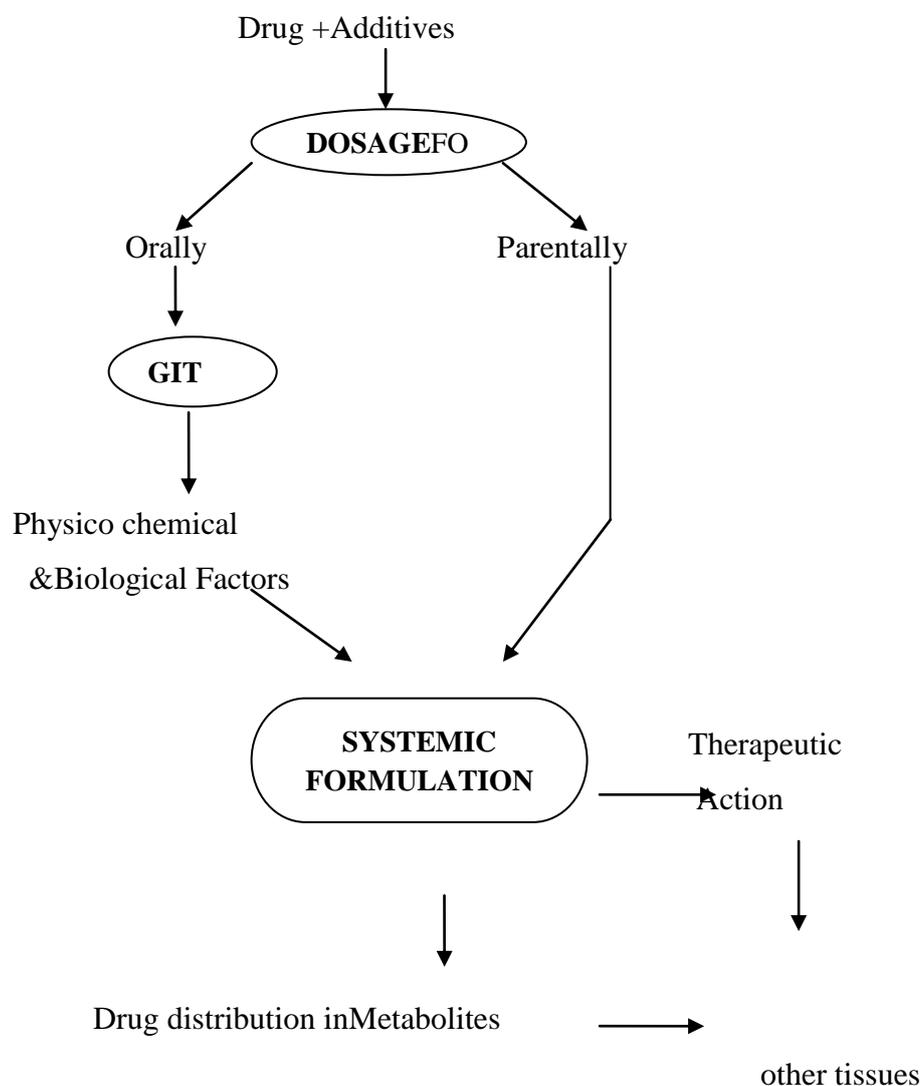


Figure 1: Drug Delivery Process

Drug delivery technologies modify drug release profile, absorption, distribution and elimination for the benefit of improving product efficacy and safety, as well as patient convenience and compliance. Drug release is from: diffusion, degradation, swelling, and affinity-based mechanisms.

Drug may or may not be absorbed after administration as its absorption depends on number of physico-chemical and biological factors. The drug having different brands may differ in the drug response. The availability of drug at absorption site is its bioavailability. However, it

is the concentration of drug available in absorbable form and not the drug available at biological site, governs the absorption rate.

1.3 Routes Of Administration

Most common routes of administration include the preferred non-invasive per oral (through the mouth), topical (skin), transmucosal (nasal, buccal/sublingual, vaginal, ocular and rectal) and inhalation routes. Targeted delivery in which the drug is only active in the target area of the body (for example, in cancerous tissues) and sustained release formulations in which the drug is released over a period of time in a controlled manner from a formulation. Whenever drug is administered orally or by any other route, it gets absorbed into the circulatory system and then excreted through the kidney or may be excreted as metabolite.

1.3.1 Drug delivery approaches^[3,4]

1.3.1.1 Oral drug delivery system

Oral drug delivery is the most widely utilized route of administration among all the routes (nasal, ophthalmic, rectal, transdermal and parenteral routes) that have been explored for systemic delivery of drugs via pharmaceutical products of different dosage form. Oral route is considered most natural, uncomplicated, convenient and safe (in respect to Parenteral route) due to its ease of administration, patient acceptance, and cost effective manufacturing process. Pharmaceutical products designed for oral delivery are mainly immediate release type or conventional drug delivery systems, which are designed for immediate release of drug for rapid absorption. It is estimated that 90% of all medicine usages is in oral forms

1. Advantages

1. Avoid patient compliance problems.
2. Employ less total drug
3. Minimize or eliminate local side effects
4. Minimize or eliminate systemic side effects
5. Obtain less potentiating or reduction in drug activity with chronic use.
6. Minimize drug accumulation with chronic dosing.
7. Improve efficiency in treatment
8. Cures or controls condition more promptly.
9. Improves control of condition i.e., reduced fluctuation in drug level.
10. Improves bioavailability of some drugs.

11. Make use of special effects, E.g. Sustained-release aspirin for morning relief of arthritis by dosing before bed time.
12. Economy i.e. reduction in health care costs. The average cost of treatment over an extended time period may be less, with less frequency of dosing, enhanced therapeutic benefits and reduced sideeffects.

1 Disadvantages

- ✓ Decreased systemic availability in comparison to immediate release conventional dosage forms, which may be due to incomplete release, increased first pass metabolism, increased instability, insufficient residence time for complete release, site specific absorption, pH dependent stability etc.
- ✓ Poor in vitro – in vivo correlation.
- ✓ Possibility of dose dumping due to food, physiologic or formulation variables or chewing or grinding of oral formulations by the patient and thus, increased risk of toxicity.
- ✓ Retrieval of drug is difficult in case of toxicity, poisoning or hypersensitivity reactions.
- ✓ Reduced potential for dosage adjustment of drugs normally administered in varying strengths.
- ✓ Stability problems.
- ✓ Increased cost.
- ✓ More rapid development of tolerance and counseling.
- ✓ Need for additional patient education and counseling

1.3.2 Other technologies ^[5]

1. Buccal drug delivery system

Drug administration through the mucosal membranes lining the cheeks and the area between the gum and upper and lower lips to the systemic circulation.

2. Sublingual Delivery

Systemic delivery of drugs through the mucosal membranes lining the floor of the mouth to the systemic circulation.

3. Nasal Drug Delivery System

The use of the nasal cavity as a route for drug delivery has been an area of great interest to the pharmaceutical industry, especially for systemically acting drugs that are difficult to deliver via routes other than injection. The nasal route could be important for drugs that are

used in crisis treatments, such as for pain, and for centrally acting drugs where the putative pathway from nose to brain might provide a faster and more specific therapeutic effect

4. Transdermal Drug Delivery

A transdermal drug delivery system is a device that is made of one or more types of polymers embedded with drug(s) to deliver the embedded drug through the skin over a controlled period of time.

5. Parenteral Drug Delivery System

(intravenous, intramuscular, subcutaneous) are very important. Because of rapid onset of action, parenteral route preferred in emergency situation.

6. Rectal Drug Delivery System

Drugs are often administered into rectum in the form of solution, suppositories and ointments for both local and systemic effects.

1.4 Novel Drug Delivery Systems ^[6]

These are also referred to as “Non immediate Drug Delivery System” or “Sustained Release Dosage Forms”. The aim of formulating and designing such dosage form is to prolong the action of drug for longer period than that achieved by conventional dosage form such as tablet, capsule or ointments. These dosage form release the drug to biological system (i.e Human body) over a prolonged period of time thus reducing toxic manifestations due to overdosing, reduce the frequency of dosing and maintaining therapeutic concentration of drug in the body for better efficacy and bioavailability.

Novel drug delivery system can be classified broadly as follows:

1. Parenteral Controlled Release Drug Delivery System.
2. Ocular Controlled release drug delivery system (for eyes).
3. Intravaginal Oral Sustained or Controlled Release Drug Delivery System.
4. Controlled Release Drug Delivery System
5. Intrauterine Controlled Release Drug Delivery System.
6. Magnetically Release Drug Delivery System.
7. Transdermal Drug Delivery System.
8. Implantable Therapeutic System.
9. Transdermal Therapeutic System (for skin).
10. Microparticulate Drug carriers such as Nanoparticles, Liposomes.

11. Pumps and implantable infusion system.

12. Inotophoretic Devices.

Administration of drug in conventional dosage forms expect intravenous infusion at constant rate result see-saw fluctuation (peak and valley patterns) of drug concentration in systematic circulation and body tissues .The magnitude of these fluctuations depends on the rates of absorption ,distribution and elimination of drug and the dosing interval or dosing frequency .This “ peak and valley” pattern is more striking for drug with a biological half –life of less than four hours ,since prescribed dosing intervals are rarely less than four hours .On the other hand ,a drug with a long half life has the drawback that rapid termination of therapy is very difficult .A well designed controlled release drug delivery system can significantly reduce the frequency of drug dosing and also maintain a more steady concentration in blood circulation and target tissues.

1.5 Medicine Systems Used For Treatment^[7]

1.5.1 Allopathic medicine

The term ‘Allopathy’ was coined in 1842 by C.F.S. Hahnemann to designate the usual practice of medicine (Allopathy) as opposed to homeopathy, the system of therapy that he founded based on the concept that disease can be treated with drugs (in minute doses) thought capable of producing the same symptoms in healthy people as the disease itself originated in western countries a few hundred years ago. Allopathy is known as “Conventional Medicine” allopathy is popularly known as “Modern System of Medicine”. In this system the diseases are treated with drugs which are having opposite effects to the existing symptoms.

1.5.2 Types of formulations^[8]

Allopathic Dosage form are all the medicines intended for internal or external use, for or in the diagnosis treatment, mitigation or prevention of disease or disorder in human beings or animal. Dosage form can be classified in various ways depending upon nature of formulation ,route of administration ,site of application ,release pattern , release site ,designing of formulation ,sterility etc. allopathic Dosages forms are classified in to four groups depending upon their physical nature:

1. Solid Dosage Forms

Tablet, capsule,implants, pills, powders ,granules, lozenges .

2. Liquid Dosage Forms

Mixture, Lotion, Liniments, Emulsion, Suspension, Injection, Eye drops, Ear drops, Elixirs, Solution, Spirits, Syrups, Tincture, Nasal drops, etc.

3. Semi-solid Dosage Forms

Ointments, Creams, Pastes, Nasal-bogies, Ear-Cones, Pessaries, Suppositories, Gellies, Plasters etc.

4. Gaseous Dosage Forms

Aerosols, Inhalants

1.5.3 Advantages & Disadvantages

1. Allopathy medicine cures the diseases within a short span of time.
2. Allopathy medicine may cause side effects like hair loss, weak health, allergies and many more.
3. Allopathy treatment tries to nullify the symptoms of an ailment.
4. Allopathy is based on major three steps: hypothesis, experimentation and observation and finally the theory or the conclusion.

1.5.4 Alternative and traditional medicine^[9]

Alternative medicine is any practice that is put forward as having the healing effects of medicine but is not based on evidence gathered using the scientific method. It consists of a wide range of health care practices, products and therapies, using alternative medical diagnoses and treatments which typically have not been included in the degree courses of established medical schools or used in conventional medicine. Examples of alternative medicine include homeopathy, naturopathy, chiropractic, energy medicine and acupuncture.

Complementary medicine is alternative medicine used together with conventional medical treatment in a belief, not proven by using scientific methods, that it "complements" the treatment. CAM is the abbreviation for Complementary and alternative medicine. Integrative medicine (or integrative health) is the combination of the practices and methods of alternative medicine with conventional medicine.

Ayurvedic system of medicine^[10,11]

Ayurveda (Sanskrit: आयुर्वेद; Āyurveda, the "the complete knowledge for long life") or ayurvedic medicine is a system of traditional medicine native to India and practiced in other

parts of the world as a form of alternative medicine. In Sanskrit, the word ayurveda consists of the words āyus, meaning "longevity", andveda, meaning "related to knowledge" or "science". Evolving throughout its history, ayurveda remains an influential system of medicine in South Asia. The earliest literature on Indian medical practice appeared during the Vedic period in India. The SuśrutaSamhitā and the CharakaSamhitā were influential works on traditional medicine during this era. Over the following centuries, ayurvedic practitioners developed a number of medicinal preparations and surgical procedures for the treatment of various ailments.

History^[12]

Around 1500 BC, ayurveda's fundamental and applied principles got organised and enunciated. Ayurveda traces its origins to the Vedas, Atharvaveda in particular, and is connected to Hindu religion. Atharvaveda (one of the four most ancient books of Indian knowledge, wisdom and culture) contains 114 hymns or formulations for the treatment of diseases. Ayurveda originated in and developed from these hymns. In this sense, ayurveda is considered by some to have divine origin. Indian medicine has a long history, and is one of the oldest organised systems of medicine. Its earliest concepts are set out in the sacred writings called the Vedas, especially in the metrical passages of the Atharvaveda, which may possibly date as far back as the 2nd millennium BC. According to a later writer, the system of medicine was received by Dhanvantari from Brahma, and Dhanvantari was deified as the god of medicine. In later times his status was gradually reduced, until he was credited with having been an earthly king. The SushrutaSamhita of Sushruta appeared during the 1st millennium BC. Dwivedi & Dwivedi (2007) – on the work of the surgeon Sushruta – write: The main vehicle of the transmission of knowledge during that period was by oral method. The language used was Sanskrit — the vedic language of that period (2000–500 BC). The most authentic compilation of his teachings and work is presently available in a treatise called SushrutaSamhita. This contains 184 chapters and description of 1,120 illnesses, 700 medicinal plants, 64 preparations from mineral sources and 57 preparations based on animal sources.

Underwood & Rhodes (2008) hold that this early phase of traditional Indian medicine identified 'fever (takman), cough, consumption, diarrhea, dropsy, abscesses, seizures, tumours, and skin diseases (including leprosy)'. Treatment of complex ailments, including angina pectoris, diabetes, hypertension, and stones, also ensued during this period. Plastic

surgery, cataract surgery, puncturing to release fluids in the abdomen, extraction of foreign elements, treatment of anal fistulas, treating fractures, amputations, cesarean sections, and stitching of wounds were known. The use of herbs and surgical instruments became widespread. The CharakaSamhita text is arguably the principal classic reference.

1.6 Basic Principal Of Ayurveda^[13]

Ayurveda is the science of positive health and fulfillment in life. The aim of Ayurveda is threefold:

1. To achieve positive health for the individual
2. Protection of the masses
3. Ultimate liberation

The last goal can be achieved by following regulations of daily conduct and by following strict seasonal regimens, so that one can be constantly healthy. Being continuously healthy is comparable to achieving ultimate liberation, as it involves the eradication of the factors that bring about suffering. To understand Ayurveda, it is very essential to know its basic concepts. These are the backbone of Ayurvedic philosophy. Ayurvedic approach to health care is based on their applications

1. PanchaMahabhuta (The five basic elements)
2. Doshas (Biological elements)
3. Dhatus (Basic tissues)
4. Malas (Waste products)
5. Agni (Biological fire)

1.7 Ayurvedic Dosage Forms^[14,15, 16,]

1.7.1 Classification And Definitions

Ayurvedic medicines are all the medicines intended for internal or external use, for or in the diagnosis treatment, mitigation or prevention of disease or disorder in human beings or animal and manufactured exclusively in accordance with the formulae described in the authorities books of Ayurvedic Systems of medicine specified in the first schedule of the Drug and Cosmetic act 1940. Ayurvedic Drugs are obtained from the natural source that is from animal, plants and minerals. Ayurvedic Dosages forms are classified in to four groups depending upon their physical forms:

1. Solid Dosage Forms: Pills, Gutika, Vatika.
2. Semi-solid Dosage Forms: Avleha, Paka, Lepa, Ghrta.

3. Liquid Dosage Forms: Asava, Arista, Arista, Arka, Taila, Dravaka.
4. Powder Dosage Forms: Bhasma, Sativa, Madura, Pistil, Parfait, Lavaca, Share, Churn. Pharmaceutical aids like Binding agent, Flavoring agent, sweetening agents, Coloring agents, Preservatives are commonly used in Ayurvedic Formulae.

Asava and Arista

Asava and Arista are the medicinal preparations prepared by soaking the drugs in the powdered forms or in the form of their decoction, in a solution of sugar or jiggery as may have intended for a specific period of time.

Arka

It is the liquid preparation obtained by distillation of certain liquids or cured – drugs soaked in water using the distillation unit, (Arkayantra)

Avleha or Leha and Paka

Avleha or Leha is a Semi-solid preparations of drugs prepared by addition of sugar, jiggery or sugar candy and boiled with prescribed drug juice or decoction.

KvathaCurna

The coarse powder of crude drugs or the combination of drugs in powder form, kept ready for preparation of decoction (Masaya) are known as KathCurna.

e.g.: DamselKathCurna, ArsenideKathCurna.

Curna (Churn)

Fine powder of drug or drugs is known as Curna, Drugs mentioned in yoga are cleaned, properly, dried thoroughly, Pulverized and then sieved.

Dravaka

The liquid preparations obtained from lianas or shares are known as Drivakis. They are prepared by distillation process with or without addition of any fluids.e.g.:SanctaDravaka.

Kara's

Alkaline substances obtained from the ash of drugs are known as Kara's. Drugs are cut in to small pieces and burnt to get ash. Ash is dissolved in water, stained again evaporated to get rid of water while salty solid obtained is known as Knar. e.g.: YakKara, PalsKara.

Lepa

The preparations in the form of paste meant for external applications on the body are known as Lepa. e.g.: SinduradiLepa, PathyadiLepa.

Vati or Gutika

Medicaments in the form of Tablets or pills are known as vati or Gutika.

e.g.: MuktadiMahanjana and ChandrodayVartti.

Netrabindu and Anjan

Netrabindu is made by dissolving the specified drugs in water or kasaya or honey and used as eye drops. Anjans are very fine powders of medicaments to be applied with netrasalaka.

e.g.: MuktadiMahanjana and ChandrodayVartti.

Sattva

Water extractable solid substances obtained from drugs are known as Sattva.

e.g.: GulvelSattva.

Pistil

These are obtained by triturating the drug with the specified liquids and exposing to sun or moon light. e.g.: PravalPistil, MuktaPistil.

Ghrta (Snehalapa)

These are preparations in which ghee is boiled with the prescribed quantity of the decoction and fine paste of the drug as specified in the formula.

Taila (Oils)

Tailas are the preparations in which tailas (Fixed Oils) is boiled with specified decoction and fine paste of the drug as mentioned in the prescribed formula.

e.g.: BhrangarajaTaila, Maha Narayan Taila.

Bhasma

The powdered form of the substances, obtained by calcination of metals minerals or animal products by a special process in closed crucibles in pits covered with cow dung cake (Putra) is known as Bhasma. e.g.: GodantiBhasma, LauhaBhasma.

Rasa-Yoga

The Medicinal Preparations containing mineral drugs as their main ingredients in the form of powder or pills are known as Rasa Yoga. e.g.: Kapura Rasa, LaghuMaliniVasant Rasa.

Kupipakva-Rasayana

These are the drugs prepared as: The minerals and drugs of metallic origin in the powdered form are mixed together and placed in glass flask occupying about one third of volume. The glass flask is closed with clay smeared pieces of cloth around the bottle in seven consecutive layers. The flask is dried and buried in sand (Valukayantra) up to neck. The flask in Valukayantra is then heated gradually in three that is Mrdu-agni, Madyamgni and tiksagni for specified period of time as mentioned in process. Then the red hot iron rod about 5cm in diameter is inserted in glass flask through the opening and stirred properly, do that opening of flask is not chocked due to the coating formed by sublimed Sulphur. When the process is over, the glass flask is cooled and broken to collect the content carefully without the contamination of any glass pieces therein. e.g.: Makaradhvaja, Swarnasindura

1.7.2 The advantages and disadvantages of ayurveda**Advantages**

Ayurveda has an advantage of being a holistic approach that works on the whole body. It doesn't just rely on traditional medicine which only masks the problems we face in life for the most part. We need harmony with nature and health in our soul, body, senses, and mind. Ayurveda looks at all these areas through therapies. We can heal ourselves of many ailments when we understand our body and how it is out of balance. Pills and medication only mask the issues they don't treat that imbalance we face.

Medications in Ayurveda only come from pure natural sources and don't use the chemicals we are so used to with traditional medicines. We eat vegetables, fruit, plants, and get the minerals we need from Ayurveda medicine which helps us heal. With this type of medicine we don't have the side effects that normally occur with traditional medicine which is often worse than the condition. We moderate our lifestyle and work on a whole body healing when we use Ayurveda. It has been in practice for thousands of years and has shown to work for people over that time. Many traditional medications have only been around for a short period and they may have far reaching long-term negative effects on the body. Ayurveda is an alternative to harsh chemicals and other medications that we use to treat conditions today.

Disadvantages

Despite the advantages Ayurveda does have some drawbacks to it. The first disadvantage is there's no scientific evidence that many of the medications and healing techniques actually work for patients who are using Ayurveda. This means that a patient may be given a medicine that does absolutely nothing for them or their condition. In today's world we also have many complex medical problems that need proper medical care to treat. This type of holistic healing practice might not work for complex medical problems where medication and advanced therapies or surgeries are required to keep the individual alive. Ayurveda might not work for these individuals and could even make the condition they suffer from worse.

1.8 Formulation Types^[17]

1.8.1 Unani system of medicine

This system was developed during the Arab civilization .it is known as “ UnaniTibb” system of medicine .The system is based on the concept of four humors put forth by Hippocrates .According to this concept the cause of sickness is the harmony or disharmony of the four humors. The four humors present in body are blood, phlegm, yellow bile, and black bile.According to Galens concept the temperament of individual may be sanguine, phlegmatic, choleric,or melancholic any changein temperament causes change in health state of individual .The humor are assigned temperament thus the ,blood is hot and moist ,phlegm is cold and moist, yellow bile is hot and dry and black bile is cold and dry.Thus the UnaniTibb system temperament of individual is considered as the basis of pathology ,diagnosis and treatment of disease.

1.8.2 Siddha

The term Siddha means achievement .The saintly personalities known as“Siddhars” inprevedic period have attained proficiency in medicine through practice of Bhakti and Yoga. Siddha system of medicine owes its origin to the Dravidian culture .It is mainly therapeutic in nature .the principle and doctrines of this system .both fundamental and applied have a close similarity to Ayurveda, hence like Ayurveda this system also believes that all objects in universe are made up of five basic elements viz.earth, water, sky, fire and air. The diagnosis is made through pulse reading, body colour, voice, examination of urine and tongue. The medicines mentioned in pharmacopeia of siddha include mainly the mercury, sulphur, iron, copper, bitumen, arsenic and vegetable poisons

1.8.3 Traditionalchinese^[18,19]

The Chinese medicine is still prevalent .This ancient system finds its references in the Yellow Emperors classic of Internal medicine which is believed to be prepared between 200 BC and 100 AD. This herbal is based on the idea that all life is subject to natural laws .the hypothesis includes two quite different system the yin and yang theory and five elements (i.e water ,metal, earth, fire, wood) The phases are symbols for the qualities and activities associated with them.**Wood** symbolizes the substance wood as well as the living wood, i.e., trees and in general (the Chinese character mùis a pictorial representation of a tree). Wood stretches upward and outward as it grows; hence the wood phase signifies flexibility and expansive movement. Note that “wood” means not only the substance wood, but also trees and plant life in general. The Chinese character mùis a pictorial representation of a tree. **Fire**flames upward as it consumes its fuel. It symbolizes intense heat. **Earth** is the producer of all things, notably food. **Metal** is used to make cutting tools and weapons and is associated with creative and destructive qualities.**Water** moistens the earth and flows downward to the lowest places where it finally becomes still.

1.9 STATUS OF HERBAL MEDICINE IN INDIA ^[20]

India has a rich tradition of herbal medicine as evident from Ayurveda, which could not have flourished for two years without any scientific basis. Ayurveda which literally means knowledge (Veda) of life (Ayur) had its beginning in Atharvaveda (Circa 1500-1000 BC). CharakSamhita and SushrutaSamhita are the two most famous treatises of Ayurveda several other were compiled over the centuries such as BelaSamhita, KashyapSamhita, AgniveshTantra, Vagbhata’sAshtanghridaya (600), MadhavaNidan (700 AD) . Vegetable products dominated IndianMeteriaMedicawhich made extensive use of bark, leaves, flower, fruit, root, tubers and juices.

The theory of rasa,vipaka, viryaand prabhavaformed the basis of Ayurvedapharmacology, which made no clear distinction between diet and drug, as both were vital component of treatment. Charak, Sushruta and Vagbhata described 700 herbal drugs with their properties and clinical effects. Based on clinical effects 50 categories of drug have been described – such as appetizers, digestive stimulant, laxatives, anti-diarrhea, anti-haemorrhoid, anti-emetic, anti-pyretic, anti-inflammatory, anti-purity, anti-asthmatic, antiepileptic, anti-helminthes, haemoptietic, haemostatic, analgesis, sedative, promoter of life (Rasyana),

promoter of strength, complexion, voice, semen and sperm, breast milk secretion, fracture and wound healing, destroyer of kidney stones etc .

The advent of western medicine in the eighteen century was a setback to the practice of Ayurveda, which suffered considerable neglect at the hands of the colonial administration. After the first success of reserpine, an enormous amount of characterization of medicinal plants was done in many laboratories and University Departments, but the outcome was discouraging because the effort was disorganized, thin spread and nonfocused. Molecular pharmacology now provides a new interface between Ayurveda and modern medicine. Using modern techniques, various categories of Ayurvedic drug could provide novel molecular probes. It is now possible to explore the mechanism of action of Ayurvedic drugs in terms of current concept of molecular pharmacology. Some striking example, of Ayurvedic drugs which are understood in terms of today's molecular pharmacology:

Sarpagangha (Rauwolfiaserpentina)

Reserpine uniquely prevent pre-synaptic neuronal vesicular uptake of biogenic amines (dopamine, serotonin and nor-epinephrine).

Mainmool (Coleus forskoliBriq)

Forskolin directly stimulates adenylatecyclase and cyclic AMP, with inotropic and Lusitropic effect on heart muscle.

Sallaki (Boswelliaserrata)

Boswellic acid inhibits 5-lipoxygenase and leukotriene B4 resulting in anti-inflammatory and anti-complement effect.

Shirish (Albizzialebek)

prevents mast cell degranulation, similar to sodium cromoglycate.

Aturagupta (Muconapruriens)

contains L-DOPA Ashwagandha (Withaniasomnifera) GABA-A receptor agonist.

Katuka (Picrorhizakurua)

is anti-oxidant action equal to a tocopherol, effect on glutathion metabolism in liver and brain. Listed 15 crude Ayurvedic drugs, which have received support for their therapeutic claims.

Rasyanadravyas

have been shown to increase phagocytosis, activate macrophages and enhance resistance to microbial invasion. Drugs like *Asparagus racemosus*, *Tinosporacodifolia* and *Ocimum sanctum* antagonise the effect of stress.

1.10 Integration Of Traditional Ayurvedic Medicine In To Modern Formulation^[21]

In current accepted modern medicine or allopathy has gradually developed over the years by scientific and observational efforts of scientist. However, the basis of its development remains rooted in traditional medicine and therapies. The R & D thrust in the pharmaceutical sector is focused on development of new drug, innovative indigenous process for known drugs and development of plant-based drugs through investigation of leads from the traditional system of medicine. Recapitulation and adaptation of the older science to modern drug discovery process can bring renewed interest to the pharmaceutical world and offer unique therapeutic solution for a wide range of human disorder. Even though time-tested evidences vouch immense therapeutic benefits for ayurvedic herbs and formulations.

There has been an upsurge in demand for the phyto-pharmaceutical products of ayurveda in western nation because of the fact that the synthetic drugs are considered to be unsafe. Due to this many national and multinational pharmaceutical companies are now concentrating on manufacturing of Ayurveda phyto-pharmaceutical products.

Traditional use of ayurvedic formulation is the very basis and internal part of various cultures, which was developed within an ethnic group before the development and spread of modern pharmaceutical formulation. This, requires a highly integrated approach that combines the best of the traditional wisdom and modern scientific knowledge and expertise. Evaluation of medicine prescribed in ayurvedic classics utilizing modern scientific tools and techniques, reveals the fact that they are amazingly relevant even today and have the capabilities to take global care of the disease. Allopathic medicine commonly practiced currently is only 100 years old. Although traditional medicine has been around for thousands of years, no integration exists between it and allopathic medicine. Ayurveda is the indigenous system of medicine. This plant based system of medicine gained worldwide attention due to quality, safety, and efficacy. These parameters are paramount – important to rationalize the use of therapeutic based on traditional medicine in health care globally. Knowledge about active principal of herbal preparation are not well defined, information regarding

pharmacokinetics and bioavailability is not available. Quality is the paramount issue because it can affect the efficacy and /or safety of the products being used.

Globally, there have been concerted efforts to monitor quality and regulate the growing business of herbal drug and traditional medicine. Health authorities and governments of various nation have taken an active interest in providing standardizes botanical medication ,several important issue are required to be resolved for successful implementation of ayurvedic principal to present drug discovery methodologies. Although many novel leads and drug molecules have already been discovered from ayurvedic medicinal herbs ,further scientific exploration in this arena along with customization of present technologies to Ayurvedic drug manufacturing principal would greatly facilities a standardized drug discovery.

Ayurveda is ancient medical science which was developed in india thousands of years ago (Ayur =Life,Veda=Science).Differant Herbal formulation are available in market vary in quality and therapeutic efficacy due to the differences in composition of product.These formulations are safe, less side effect, less cost and easily available in market. This reveals the fact that traditional medicines are amazingly significant even today and have the capabilities to take the global care of diseases such formulation are use for different diseases,antianginal treatment, antiarrythmics, antihypertensive, but major drawback is lack of standardization ,and improper patient treatment, to avoid this problem use integrating modern scientific principles with traditional ayurvedic concepts, means an attempt to convert formulation in to modern medicine.

To manufacturing ofarjunatablet not getting proper results thus integration of traditional method with modern scientific technology, isessential.

Scope

1. Integration of ayurvedic formulation into modern medicine using scientific principles will facilitates standardization and quality control of formulation
2. There will improvement in quality, safety, and efficacy of theproduct.
3. Such formulation will meet regulatory requirements of the countries. Resulting in increases in use of products and hence global market.
4. This will make possible large scale preparation of formulation plants with reproducibility in result

5. This might help for development and globalization of Indian traditional medicine in current evidence based medicine.

CONCLUSION

Herbal medicines have been widely used all over the world since ancient times and have been recognized by physicians and patients for their better therapeutic value as they have fewer adverse effects as compared with modern medicines. The drugs of ayurvedic origin can be utilized in a better form with enhanced efficacy by incorporating in modern dosage forms. However, phototherapeutics need a scientific approach to deliver the components in a novel manner to increase patient compliance and avoid repeated administration. This can be achieved by designing novel drug delivery systems for herbal constituents. Novel drug delivery systems not only reduce the repeated administration to overcome non-compliance, but also help to increase the therapeutic value by reducing toxicity and increasing the bioavailability and so on. Recently, pharmaceutical scientists have shifted their focus to designing a drug delivery system for herbal medicines using a scientific approach. The novel research can also aid in capturing as well as to remain in the market. But there are many challenges with herbal drugs which need to be overcome like difficulty of conducting clinical research in herbal drugs, development of simple bioassays for biological standardization, pharmacological and toxicological evaluation methods' development, investigation of their sites of absorption, toxic herbal drugs in use, discovering various animal models for toxicity and safety evaluation, legal and regulatory aspects of herbal drugs and so on.

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