BALAJI COLLEGE OF PHARMACY

HERBAL DRUG TECHNOLOGY

UNIT-I

HERBS AS RAW MATERIAL

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Herb

- The word herb derived from the latine word herba which means green part of plant.
- It means any part which is obtained from the green part of plant they are called herbs.
- Herbs include crude plant materials such as leaves, flowers, fruits, seed, stem wood, bark, roots, rhizomes or other plant parts.
- All Herbs possess therapeutic activity, so herbs are used as a medicine for the prevention , curing, of diseases.
- It also used for flavouring, perfuming , and food

Herbal drugs:

- Usually these are unprocessed form of herbs except drying and size reduction.
- they are obtained from entire plant or any part of plant, such as leaves, flowers, fruits, seed, stem wood, bark, roots, rhizomes or other plant parts.
- The constituents and therapeutics activity may be known or unknown.

Herbal Drug Preparation

- They are processed form of herbs.
- They are derived from herbal drugs by the help of different processes like infusion, decoction, maceration, distillation, fermentation etc. and may include powders, extracts, tinctures, volatile oils, resins, gums and fatty oils of herbal materials.
- They contain a mixture of various constituents.
- However pure isolated compounds do not come under this category.

Herbal medicinal Product

- Herbal medicinal products are medicinal products which contain exclusively of herbal drugs or herbal drug preparations which are made from one or more herbs.
- They may contain excipients in addition to active ingredients.
- It may include various herbal formulations like tablets, syrups, capsules, creams, ointments etc.

SOURCE OF HERBS:

Herbs or medicinal plants can be obtained from two sources viz:

A. Wild source

B. Cultivated source

C. By using modern scientific technique like tissue culture, Hybridization. Mutation, polyploids

WILD SOURCE:

The plants are obtained from wild source and grow themselves without any type of care at unutilized land such as forests, plains, river banks, etc. The wild plants also have reasonable active constituents and sometimes new variety is produced. These plants grow under favorable conditions in natural habitat.

Advantages:

- Economical; No cost of land, caring, fertilizers, irrigation etc.
- Less time consuming.
- Decreased cost of labour.

CULTIVATED SOURCE

The plants are obtained from cultivated source. These plants are grown with proper care by human. Care is taken toward soil, climate, rainfall, irrigation, time of sowing and collection, altitude, temperature, fertilizers, manures, pesticides, weeds etc.

Advantages

- The quality and purity of medicinal plants can be ensured.
- Better yield and therapeutic quality, and give more profit.
- It ensures regular supply of raw materials due to planned cultivation.
- Application of modern scientific techniques like tissue culture, genetic engineering, hybridization, mutation, polyploidy etc. are possible.
- Cultivation of medicinal leads to industrialization and has given rise to several cottage and small scale industries.

Selection, identification and authentication of herbal materials

SELECTION OF HERBS:

Selection of medicinal plant is a very important parameter which influence the results of final product.

- The species or botanical variety selected and should be the same as specified in the official Pharmacopoeia or official document.
- In case of newly introduced medicinal plants, the variety selected and should be identified and documented.

IDENTIFICATION & AUTHENTICATION

Specimens: In case of a new plant with medicinal properties whose identity is not known, a specimen of the plant should be submitted to a national herbarium for identification and documented.

Authentication

Authentication of herbal raw material is the basic starting point in developing a botanical product.

Authentication of herbal raw material for preparation of a medicament should be authenticated on the basis of Botanical (Pharmacognistic) characters by qualified botanist.

❖ **Taxonomic method:**

❖ Botanical origin of the drug is identified and its scientific binomial, that is Phylum , Division , Class, Order , Family , genus, species is determined based on this method

❖ Information such as vernacular names, site of collection, detail of collector, season of collection, part collected etc are essential fundamentals even before authentacation.

Macroscopic method

Drugs can be identified with the aid of colour, odour, taste, size, shape, outer surface, inner surface etc. The size of the plant material may be used as an identification character. The colour of the material may be compared with an authentic material for genuineness.

Physico chemical method:

Drugs can be identified with the aid of

- Moisture content
- Viscocity
- Melting point
- Solubility
- Optical rotation
- Refractive index
- Ash content
- Extractive value
- Volatile oil content

Spectroscopic method:

- Infrared spectroscopy
- Mass spectroscopy
- NMR spectroscopy
- Electron spectroscopy for chemical analysis
- Atomic absorption Spectroscopy
- X Ray diffraction analysis
- X-Ray fluorescence analysis

Chromatographic method:

- TLC
- HPLC
- Column Chromatography
- HPTLC

Processing of herbal materials

- Collection
- Harvesting
- Drying
- Garbling
- Packing
- Storage

COLLECTION

Drugs should be collected when they contain maximum amount of constituents

Leaves are collected just before the flowering stage e.g. vasaka, digitalis, etc.,

Flowers are collected before they expand fully, e.g. clove, saffron, etc.

Fruits are collected after their full maturity while the others are collected after the fruits are ripe.

Ex:- Cardamom fruits are collected just before their dehiscence.

Tamarind are collected after their fully maturity.

Caraway are collected when they are fully ripe

Barks are usually collected in spring season, as they are easy to separate from the wood during this season. Ex:- cinchona bark, cinnamon bark

Roots :- Roots are collected in spring season before the vegetative process stopsEx:- Liquorice, Ginseng.

Rhizomes:- Rhizomes are collected when they store sufficient food material. Ex:- Turmeric, Ginger

Unorganized drugs should be collected from plants as soon as they oozes out, e.g. resins, latex.

Ex:- Terpentine oleoresin are collected when the plant is about 8-10 years old.

Opium is collected aftere coagulation of latex.

Acacia is collected 2-3 week after making incision on the bark of the tree

HARVESTING

- Harvesting is an important operation in cultivation technology.
- Harvesting can be done efficiently in every respect by the skilled workers.
- The underground drugs like roots, rhizomes, tubers, etc. are harvested by mechanical devices, such as diggers or lifters.
- flowers, seeds and small fruits are harvested by a special device known as seed stripper.
- The technique of beating plant with bamboos is used in case of cloves.
- The cochineal insects are collected from branches of cacti by brushing.
- The seaweeds producing agar are harvested by long handled forks.
- Peppermint and spearmint are harvested by normal method with mowers,
- fennel, coriander and caraway plants are uprooted and dried. After drying, either they are beaten and the fruits are separated by winnowing.

DRYING

Drying consists of removal of sufficient moisture content of crude drug,

- to improve its quality
- it resistant to the growth of microorganisms.
- inhibits partially enzymatic reactions.
- facilitates pulverizing or grinding of a crude drug.

two types - (1) natural (sun drying) and (2) artificial.

Natural Drying

Shade drying :- If the natural colour of the drug and the volatile principles of the drug are to be retained. .ex- The flowers are dried in shade so as to retain their colour and volatile oil content.

sun-drying:- if the contents of the drugs are quite stable to the temperature and sunlight, the drugs can be dried directly in sunshine Ex- gum acacia, seeds and fruits

Artificial Drying

Drying by artificial means includes drying the drugs in an oven.

(a) Tray dryers:- The drugs which do not contain volatile oils and are quite stable to heat Examples - belladonna roots, cinchona bark, tea and raspberry leaves and gums

(b) Vacuum dryers:- The drugs which are sensitive to higher temperature are dried by this process

Examples - Tannic acid and digitalis leaves.

(c) Spray dryers:- drugs which are highly sensitive to atmospheric conditions and also to temperature of vacuum-drying are dried by spray-drying method

Examples:- papaya latex, pectin, tannins, etc.

GARBLING

This process is desired when sand, dirt and foreign organic parts of the same plant, not constituting drug are required to be removed.

- Drugs constituting rhizomes need to be separated carefully from roots and rootlets and also stem bases.
- Drugs constituting stems need to be separated carefully from Excessive stems.
- Drugs constituting cloves need to be separated carefully from stalks.
- Drugs constituting castor seeds need to be separated carefully from Pieces of iron.
- Drugs constituting bark need to be separated carefully from wood.
- Drugs constituting leaves need to be separated carefully from branches and sub branches

Packing

The morphological and chemical nature of drug, its ultimate use and effects of climatic conditions during transportation and storage should be taken into consideration while packing the drugs.

- Aloe is packed in goat skin.
- Colophony and balsam of tolu are packed in kerosene tins,
- asafoetida is stored in well closed containers to prevent loss of volatile oil.
- Cod liver oil, being sensitive to sun- light, should be stored in such containers, which will not have effect of sunlight,
- leaf drugs like senna, vinca and others are pressed and baled.
- Cinnamon bark, which is available in the form of quills, is packed one inside the other quill.
- The crude drugs like roots, seeds and others do not need special attention and are packed in gunny bags, while in some cases bags are coated with polythene internally.

ORGANIC FARMING

- Organic farming is a method of crop production with an objective not to use pesticides, fertilizers, genetically modified organisms, antibiotics and growth hormones
- The principal goal of organic production is to develop enterprises that are sustainable and in agreement with the environment
- organic farming system depend upon crop rotations, use of crop residues, animal manures, legumes, green manures, off farm organic wastes, bio fertilizers, mineral bearing rocks, biological control to maintain soil productivity and to supply plant nutrients and to control insect, weeds and other pests
- Use of excessive chemical fertilizers and toxic pesticides polluted the land and water deeply. This leads to severe environmental penalty like loss of topsoil, decrease in soil fertility, surface and ground water contamination and loss of genetic diversity
- Organic farming is a production management system that promotes and improves agro-ecosystem health like biodiversity, biological cycles, and soil biological activity. Organic farming methods produce even higher yields than conventional methods

Lower prices: organic foods are cheaper as they don't use application of expensive pesticides, insecticides, and weedicides

Improved taste: organic food tastes better than other food. The sugar content in organically grown fruits and vegetables provide them extra taste

Organic farming methods are eco-friendly: organic farming does not utilize harsh chemicals so; the environment including plant life, animals, and humans remain protected

Longer shelf-life: organic plants have greater metabolic and structural reliability in their cellular structure than conventional crops. This enables storage of organic food for a longer time

Virus:-

they are mosaic causing necrosis of leaves, petiole and stem on different solanaceous plants.

Tobacco mosaic virus and Tobacco ring spot virus- are detected on digitalis.

Cucumber mosaic virus is detected on hyoscyamus

Insects:- various insect pest attack on medicinal plants.

- Mentha is attacked by Phytomyza atricornst
- Rauwolfia is attacked by Diaphania nilgirica.
- Dill is attacked by Papilio machon

Non insect pests:-

They are divided in to vertebrates and invertebrates.

Vertebrates that disrupt the plants are monkeys, rats, birds, squirrels, etc.

Non vertebrates – Mites,Nematodes ,crabs, snails

Weeds: - Weed is undesired plant. It reduce growth and yields of plants

Methods of pest management:.

Mechanical control:

It employs manual labour as well as mechanical devices for collection or destruction of pest. Techniques, such as handpicking, pruning, trapping and burning are employed for the destruction of eggs, larvae, pupae and adult insects.

Better way for Protection from the rats

- ❖ Contraction of concrete ware house
- ❖ Rat traps are also used

Agricultural control:

Nowadays advanced plant breeding techniques like hybridization, mutation, polyploidy and biotechnological manipulations are greatly used for the production of pest resistant species.

It has achieved much success in producing hybrid varietes which are resistance to fungal and bacterial attach. Deep plugging for the eradication of weeds and early stages of insects, alternate crop rotation or changing environmental conditions are some methods that leads to obstruction of the life cycle of pests

Chemical controls:

Chemical agents are the major pesticides agents used for the control of pest throughout the world. These are the materials used for the purpose of killing pests or for protecting crops, animals.

1.Insecticides: to control insect (DDT, gammaxine, parathione, malathione)

2.Fungicides: to control fungus diseases (Bordeaux mixture, chlorophenols, antibiotics)

3.Herbicides: to control weeds (2,4-di chlorophenoxy acetic acid, Sulphuric acid)

4.Rodenticides: to control rodents (Warfarin, Strychnine, Red squill)

AYURVEDIC SYSTEM OF MEDICINE

- **Ayurveda** – Oldest system of traditional medicine
- Ayurveda – Two Sanskrit words
- **Ayur** – Life, **Veda** – Knowledge / Science
- **Ayurveda is knowledge of life or science of life**
- Ayurveda – Incorporates Science and religion
- Ayurveda is a classical system of healthcare originating from the Vedas documented around 5000 years ago

There are four Vedas. They are –

- Rigveda
- Yajurveda
- Samaveda
- Atharvaveda

Principle:

- Based on concept of five basic elements (Pancha mahabhuthas), tri doshas and sapta dathus
- Whole universe is made up of five basic elements
- Whole universe – Material world, plant kingdom an other living beings
- All the five elements – Basis of all matter

English Name	Sanskrit Name
Space	Akasha
Air	Vayu
Fire	Agni
Water	Jala
Earth	Prithvi

Tri Doshas

Dosha	Combination of
Vata (Air principle)	Space and air
Pitta (Fire principle)	Fire and water
Kapha (Water principle)	Earth and water

Vata is the dynamic principle which governs the utilisation of energy by the various cells and organs for their anabolic (energy producing) and catabolic (energy destroying) activities. It also controls the movements of *pitta* and *kapha*, thus regulating all the functions and activities of the body. The mood states, breathing (inspiration and expiration), voluntary actions such as talking and walking, circulations of fluids in the body, excretion of waste products from the body are attributed to *vata*

Pitta represents *tejas* (fire) and produces physical and mental processes that are *satvik* in nature. In its ambit come the functions of vision, digestion, heat production, hunger, thirst, softness and suppleness of the body, cheerfulness and intelligence.

Kapha constitutes the cellular and intracellular structure of the body and maintains the internal environment. Maintenance of smooth working joints, integration of structure of the body along with mental processes of courage, vitality, knowledge, etc.

Sapta Dhatu (basic tissues).

The seven bodily constituents are rasa (thicker pale yellow fluid,), rakta (blood), mamsa (flesh), medas (fat), asthi (bone), majja (bone marrow) and shukra (sperm).

There are three main methods mentioned in Ayurveda for diagnosing the Dosha imbalance and disease process in a person. They are –

1. **Darsana Pareeksha** – By observing the patient 's physical signs and symptoms, Example – colour of skin, hair, eyes, behavior, body condition etc.

2. **Prasna Pareeksha** – By asking minute questions regarding the imbalance of each Doshas.

3. **Sparsana Pareeksha** – By touching the patient . The pulse diagnosis, palpation, are included in this method.

Nadi Pareeksha (Pulse diagnosis) is a very important tool for diagnosis. The physician feels the radial artery pulsations on the wrist of the patient and through his experience he can get a clear picture of the milieu interior.

Branches Of Ayurveda

The concept of panchakarma is believed to eliminate the toxic elements from the body. Eight disiplines of ayurveda treatment called asthanga are given below.

1. Kayachikitsa (general Medicine),
2. Shalya Tantra (Surgery),
3. Shalakya (Eye and ENT),
4. Kaumar Bhritya (Pediatrics),
5. Graha Chikitsa (Psychiatry),
6. Agad Tantra (Toxicology),
7. Rasayana (Gerontology- promotional healt
8. Vajikarana (Science of virility- diseases of genital organs),

Ayurvedic dosage forms

On the basis of physical form Ayurvedic dosage form are classified in to four groups

1. **Solid dosage form :** Gutika, vatika
2. **Liquid dosage form :** Asava, Arista, Taila,
3. **Semi solid dosage form :** Avleha, paka, Lepa, ghrita
4. **Powder dosage form** : Bhasma, satva, pisti, lavana, churna

Arista and **Asava**

Arista and **Asava** – Medicinal preparations prepared by soaking the drugs either in the powder/decoction (kasaya) form in a solution of sugar or jaggery for a specific period of time, during which fermentation generating alcohol, thus facilitating the extraction of active principles present in the drug, it also serves as a preservative

Asava : It is prepared by fermenting fine powder of drugs along with sugar or jaggery

Method of Preparation:

- Weighed quantity of sugar/jaggery according to the formula is dissolved in water, boiled and added to fermentation pot
- Weighed quantity of drug/s as per the formula in fine powder form are added
- Prakshepaka dravyas are added, if mentioned in the formula
- Contents are stirred with a wooden rod, which encourages the growth of yeast and play an imp role in fermentation

- Mouth of the vessel covered with an earthen lid
- Edges are sealed with clay smeared cloth wounded in seven layers
- Closed vessel is kept in a special room in an underground cellar or heap of paddy (To ensure constant temperature)
- Variation in temperature may accelerate or impede fermentation
- After specified period of time the contents are examined to ensure the fermentation is complete

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Method of preparation:

- Either jaggery or sugar is dissolved in the liquid
- Strained to remove the foreign particles
- Resultant solution is boiled over a moderate flame till the paka becomes the ready
- It can be confirmed when the paka is pressed between fingers or sinks in water without getting dissolved easily
- Subsequently fine powder of drugs are added in small quantities and stirred continuously to get a homogenous mixture
- Finally ghee/oil if mentioned is added and mixed well while the preparation is still hot
- Honey may be added when the preparation is cool and mixed well if mentioned

Conditions

- Drugs like asafoetida are roasted, powdered and mixed at the end
- Drugs which are to be taken in the fresh conditions like satavari, guduchi etc are made in to paste, dried and then added

Characters:

- Should be a very fine powder of at least 80# sieve
- Should not be sticky

Storage:

- Should be stored in airtight containers

Types of Sodhana:

Samanya sodhana : Heating of thin sheets of metals by immersing in taila / gomutra

Visesa sodhana : Four types

Bhavana – Grinding with special decoctions

Svedana – Convert drug into a poultice

Nirvapana – Incinerating to red hot and dipping into taila

Mardana – Triturating /rubbing with some dravyas

GUTIKA OR PILL

Gutika or pill is defined as the medicine prepared in the form of tablets or pills.

These are made up of one or more drugs of plant and mineral origin

Composition :

Plant, mineral drugs

Suganda dravya

Jaggery/ sugar

Method of preparation:

- Herbal drugs are dried and powdered separately
- In case of minerals drugs made in to bhasmas
- if the formula contains gandhaka, then kijjali is prepared first and later remaining drugs are added one by one according to the formula
- Drugs are made into paste in kalva with prescribed liquids, in case more than one liquid add in succession
- Sugandha dravyas like kasturi, karpura are added when tha mass attains the suitable state for molding into pills, then it is ground again

- Final stage is the one where the mass is non sticky to the fingers when rolled and punch the tablets
- Finally the pills are dried in shade or sun
- If sugar/Jaggery is prescribed, paka is prepared on mild fire, powdered drugs are added to this paka and mixed briskly

Characters:

- Should not loose colour, taste, odour and form

Storage:

- Pills of plant origin in air tight containers can be used for 2-3 years
- Those of mineral origin can be used indefinately
- Pills with salt /Ksara should be kept away from moisture

HOMEOPATHY SYSTEM OF MEDICINE

Homeopathy is relatively a recent system of medicine. The word "**Homeopathy**" is derived from two **Greek words Homois** meaning **similar** and **pathos** meaning **suffering.**

Homeopathy simply means treating diseases with remedies, prescribed in minute doses, which are capable of producing symptoms similar to the disease when they taken by the healthy people. It is based on the natural law of healing. "Similia Similibus Curantur" which means "Likes are cured by likes"

FUNDAMENTAL PRINCIPLES OF HOMOEOPATHY

1. Law of Similia
2. Law of Simplex
3. Law of Minimum
4. Doctrine of Drug proving
5. Theory of Chronic disease
6. Theory of Vital force
7. Doctrine of Drug-dynamization

1. **Principle of similia-** suggest that, treatment of a disease by a medicine which produce similar symptoms in a healthy individual by providing the drug.

2. Principle of simplex- this emphasizes only single, simple medicine at one time & combination is not allowed. Though patients have a number of complaints, only a single, simple medicine is selected from the Materia Medica.

3.Principle of minimum dose- it means minimum medicine at a time which is just sufficient to arouse the vital force of an individual.

4.Law of proving- if a medicine has a capacity to produce the diseased state in healthy individuals, are used as curative agent against that disease, is known as law of proving.

5. Law of dynamisation- it is the methodology of serial dilution by which all the energy of drug is librated & transfered to the medium used as base sugar or alcohol

6. Vital force- Dr. Hanhemann described vital force as a dynamic power which preserves life force & its normal state indicates good health

7. Acute and chronic diseases

The diseases are classified into these types depending upon their onset, nature of progress and termination of diseases

UNANI SYSTEM OF MEDICINE

Introduction:

Unani system of medicine may be traced to that system of Greek medicine that was developed during the Arab civilization. It was the Greek philosopher-physician Hippocrates on whose teachings the theoretical framework of medicine is based

Principles

According to the principles and philosophy of Unani Medicine, disease is natural process. Its symptoms are the reactions of the body to the disease and the chief function of the physician is to aid the natural forces of the body.

Unani Medicine is based on the Hippocrates Theory of four Humors and pythagorian theory of four proximate qualities

Hippocrates Theory of four Humors

The basic framework consists of theory of Hippocrates, include four humours in the body namely blood, phlegm, yellow bile and black bile. These are also known as KHOO N, BELGHAM , SAFRA , SAUDA which regulate the functions of the body.

KHOON - (Blood)
BELGHAM - (Phelgm)
SAFRA - (Yellow Bile)
SAUDA- (Black Bile)

Pythagorian theory

Pythagorian theory of four proximate qualities include Hot, Cold, Moist , Dry which are in relation to the human body.

Four qualities namely Hot, Cold, Moist , Dry associate with one another to give four combinations.

Air- Hot and Moist

Earth- Cold and Dry

Fire -Hot and Dry

Water - Cold and Moist

Earth and water develop organs and air and fire produces energy.

TREATMENT

In the Unani system of **medicine various types of treatment** employed are:

1. Regimental therapy (*Ilaj bid-Tadber*)
2. Dietotherapy (*Ilaj bil-Ghiza*)
3. Pharmacotherapy (*Ilaj bid-Dawa*)
4. Surgery (*Jarahat*)

SIDDHA SYSTEM OF MEDICINE

The term siddha comes from siddhi means attinment of perfection.This system is a almost akin to Ayurvedha. Siddha system of traditional medicine originating in Tamilnadu in India

HISTORY

The siddha science is a traditional treatment system generated from dravidian culture.The siddha flourished in the period of Indus valley civilization. Palm leaf manuscripts say that the siddha system was first described by lord shiva to his wife parvathi. Parvathi explained all this knowledge to her son lord murga. He taught all these knowledge to his disciple sage Agasthya.

Agasthya taught 18 siddhars and they spread this knowledge to human beings

PRINCIPLE

the siddha system of medicine is based three principle of the body. namely vata,pitta and kapha.which are known as triguna.

- **Vata-**stout black cold and inactive Personalities, increase vata shows partial paralysis,heart attacks neck and chest pain.
- **pitha-**whitish complexoind.increase pittha shows early greying of hair,reddish eyes and anaemia etc.
- **kapha-**body peronality well built. Kapha increases jaundice,heart attacks,high fever, anaemia

DIAGNOSIS

IN DIAGNOSIS OF EIGHT TERMS

- TOUNGE
- VOICE
- COLOUR
- EYES
- TOUCH
- STOOL
- URINE
- PULSE

DRUG IS USED IN THE TREATMENT OF 8 TERMS

TREATMENT

- Siddha is used in the treatment of pcos-poly cystic ovarian syndrome, ayurvedic diet, hairloss etc.
- Siddha is used in the treatment of infertility.
- siddha is used in the treatment of hiv/aids.
- Siddha is used in treatment of hypothyroidism, knee pain, dengue fever, sinus etc.
- Siddha is mainly used in cancer treatment.