BP 603 T. HERBAL DRUG TECHNOLOGY (Theory)

UNIT – ONE

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UNIT-I **11 Hours**

Herbs as raw materials

Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation

Source of Herbs

Selection, identification and authentication of herbal materials

Processing of herbal raw material

Biodynamic Agriculture

Good agricultural practices in cultivation of medicinal plants including Organic farming.

Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.

Indian Systems of Medicine

a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy

b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika,Churna, Lehya and Bhasma.

HERBS AS RAW MATERIALS

HERB

It consists of entire plant or any part of the plant like leaves, flowers, fruits, roots and rhizomes, bark, tubers, stems and branches

HERBAL DRUG

These consist of plants or any part of plants, usually in unprocessed or crude forms (crude drug) which have medicinal value.

They include different parts of plant like entire aerial part, flowers, fruits, seeds, bark, leaves, roots rhizomes etc The constituents and their therapeutic activity may be known or unknown.

HERBAL DRUG PREPARATION

They are processed form of herbs. They are derived from herbal drugs by various techniques like extraction, fractionalization, purification, concentration, fermentation and may be in the form of powders, extracts, tinctures, fixed oils, volatile oils, resins, gums, etc.

They contain a mixture of various constituents. However pure isolated compounds do not come under this category.

HERBAL MEDICINAL PRODUCTS (FINISHED HERBAL PRODUCTS)

These are the medicinal products which contain exclusive herbal drugs or herbal drug preparations which are made from one or more herbs.

It includes various herbal formulations like tablets, syrups, capsules, semisolid dosage forms, etc.

They may contain excipients in addition to active ingredients.

FIXED COMBINATION

It includes herbal medicinal products which contain more than one herbal drug preparations

SOURCE OF HERBS

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

a) Wild source b) Cultivated source

a) Wild source

The plants are obtained from the wild source such as forests, plains, river banks, etc, where they are found in their wild form.

Collection from wild sources is suitable for plants which are abundant in nature and are easily available.

Obtaining herbs from a wild source is easy, economical, less time consuming, and has a decreased cost of labour, however it also offers various disadvantages such as the quality of the plants cannot be predicted due to various environmental changes.

The plants will not be uniform in their growth and yielding characteristics.

Modern scientific techniques cannot be applied to increase the yield as well as quality.

If the plants are obtained continuously from wild sources for prolonged periods it may lead to depletion of raw materials from the wild.

b) Cultivated source

In recent times, medicinal plants have been systematically cultivated by applying modern scientific techniques.

Obtaining herbs from cultivated sources offer various advantages which are as follows.

- Quality and purity is ensured.
- Better yield and more profit
- Ensures regular supply of raw material
- Application of modern scientific techniques is possible.

STEPS INVOLVED IN THE SELECTION, IDENTIFICATION, AND PROCESSING OF HERBAL RAW MATERIALS

Herbs are subjected to various stages starting from their selection, identification, cultivation, collection, storage and processing until the final product is formed. The detailed steps involved in the processing of herbal drugs are discussed below.

Steps involved in processing of Herbal Drugs

Selection of Herbs

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Identification & Authentication

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Cultivation of Herbs

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Collection of Herbs

↓

Processing of Herbal Raw Material

a) Selection of herbs

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

b) Identification and authentication of herbal materials

- Botanical identity

The species, subspecies, genus, variety etc of the plant for cultivation should be verified from a qualified botanist/ institute and recorded.

- Specimens

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

- Seeds and other propagation materials

The suppliers of seeds and other propagation materials should specify all the necessary information relating to the identity, quality as well as their breeding history. The seeds and propagation material should be free from contamination and diseases in order to promote healthy plant growth

Cultivation of medicinal plants

Cultivation of medicinal plants requires intensive care and management as various factors such as environment, soil, irrigation pests, etc, play a vital role. These factors vary from one plant to another. Scientific documented methods should be followed, if no data available traditional methods should be adopted and a systematic method should be developed through research Good agricultural practices in cultivation (GACP) and conservation agriculture (CA) which aims to improve, conserve and make more efficient use of natural resources.

d) Collection of herbs

For the collection of medicinal plants, a proper time should be selected. Herbs are selected for collection at a stage when they yield the maximum amount of chemical constituents. Skilled labour should be employed as they are trained to identify and select the herbs at a proper stage. The age of the plant also plays a vital factor for their selection. Diseased plants should be rejected. Season of collection should also be given due consideration while selecting the plants for collection.

e) Processing of herbal raw materials

Processing of herbal raw materials involves various stages from which the crude drugs undergo after harvesting.It can be classified into primary and secondary processing which are further sub categorized as follows.

PROCESSING OF HERBAL RAW MATERIAL

Primary processing

1. Garbling
2. Washing
3. Parboiling
4. Leaching
5. Drying

Secondary Processing

1. Cutting/sectioning
2. Aging/sweating
3. Baking/roasting
4. Boiling/steaming
5. Stir frying
6. Fumigation
7. Extraction

❖ **Primary Processing**

It includes simple procedures by which the herbs are prepared like sorting of different parts, garbling, cleaning, drying, etc. The details of these processes are as follows:

1. Garbling (Sorting)

This process helps in ensuring the purity and cleanliness of the harvested material.

Dirt like soil, dust, impurities like insects, dead tissues and residual non medicinal plants are separated from the raw material.

The process depends on the part of the plant to be prepared.

The process may involve procedures such as removing dirt and foreign substances, discarding damaged parts, peeling of barks, sieving, trimming, removal of hairs from roots, removal of seeds from fruits, stripping of leaves from stems.

This may be done by mechanical means but in some cases it is usually performed manually by hands.

2. Washing

After garbling the herbal raw material should be cleaned well to remove the traces remaining soil, dirt and other impurities from the surface.

The roots, rhizomes and tubers are washed with clean water.

During the washing process, scraping and brushing may be necessary.

3. Parboiling (Blanching)

After washing, certain herbal raw materials need to undergo a parboiling process in which they are put in boiling water for a short period.

This may help in improving the storage of the raw material and prevent insect/mould contamination.

It may also facilitate in further processing such as removal of stubborn impurities as well as outer coats/ covering of raw materials.

4. Leaching

Some impurities can be removed by subjecting the plant material under running water known as leaching.

However the duration of leaching should be controlled to prevent loss of chemical constituents present in the drug.

5. Drying

In some cases, the plant material should be thoroughly dried after washing in order to prevent the deterioration and degradation of active constituents.

They must be dried as soon as possible to remove moisture and reduce the damage due to microbial or mould infestation.

Drying also prevents the activation of certain enzymes which may otherwise degrade the active ingredients and also facilitate grinding and milling of the raw material Depending on the drug and nature of ingredients, different drying methods can be used which are as follows:

- Natural drying
- Sun drying

Most herbal raw material can be dried in open air under direct sunshine provided the climate is suitable. The duration of the drying process depends on the physical structure of the plant material and weather conditions.

The plant material should be spread out in thin layers, care should be taken to prevent contamination by dust impurities.

While drying the plant material should also be protected from insects, birds rodents, pests and other domestic animals.

Shade drying:

Some medicinal plants cannot be directly exposed to sunlight, hence one to be dried under shade.

This drying process is slow but helps in minimizing loss colour, volatile oils and aromatic components from being evaporated.

Artificial drying:

Drying by artificial heat is more rapid than open air drying and is necessary in rainy season and regions where there is high humidity.

The temperature and equipment used for drying depends on the physical and chemical nature of the drug and its constituents.

Various equipment such as tray dryers, spray dryers, vacuum dryers are used.

Overheating may lead to excessive loss of volatile components as well as decomposition of chemical constituents.

The temperature should be kept below 60°C wherever possible.

B) SECONDARY PROCESSING

It refers to the steps applied to herbs in addition to primary processing.

The secondary processing differs from one herb to another depending on the nature of active ingredients as well as therapeutic properties.

Secondary processing includes techniques such as removal of foreign substances, prevention of microbial/ infestation, enhancing the efficacy of drugs, reducing the toxicity, extraction using suitable solvents, concentration and drying of extracts.

These are further standardized by different methods

The following processes are carried out in the secondary processing of herbal raw materials.

Cutting Sectioning and Communition

After thoroughly drying, the herbal materials are processed by cutting and sectioning into smaller sizes which are convenient for storage as well as extraction.

Various sizes can be obtained depending on the part of herb and extraction methods used.

It may be small particles, coarse powder or fine powder.

Aging/ Sweating

Aging refers to storing the raw material for a specified time after harvesting It is generally done under sun or in shade for up to a year.

During the process of aging excessive water is evaporated and enzymatic reactions may occur to alter the chemical composition of herbal material.

Example: Cascara bark should be aged for at least one year prior to use in medicinal preparations to reduce its irritant effects.

Sweating is done by subjecting the herbal materials at a temperature between 45 to 656 with high humidity for a period ranging from one week to few months.

The herbal materials are stacked between woollen blankets or other kind of cloth. The sweating process is considered a hydrolytic and oxidative process in which some of the chemical ingredients of the herbs are hydrolysed or oxidised.

Example: Vanilla beans are subjected to sweating between woollen blankets for about 2 months during which they lose up to 80% of weight and develop a characteristic desirable colour and odour.

Baking/ Roasting

It is a process of drug heating where the herbal material is heated in ovens.

The temperature of heating and duration of baking/ roasting vary from one herbal material to another until the drug develops a specific colour.

Example: Nutmeg is roasted till they turn to a yellowish brown colour.

Boiling Steaming

In the boiling process the drug is cooked in water or any other liquid solvent such vinegar, wine, milk or animal urine.

Example: Acorus calamus rhizome is boiled in cows urine to enhance its anticonvulsant effects.

In the steaming process the herbal material is kept in contact with steam using a steamer resulting in development of moist texture.

Example: Roots of *Polygonum multiforum* are steamed in the presence of black bean decoction to enhance its tonic effects

Stir frying

It is a process in which the herbal materials are put in a pot of frying pan and continuously stirred or tossed for a specific period under heat until the external colour changes, charred or even carbonized.

To facilitate uniform heating the drug material can be admixed with sand, talc or clay.

Example: Liquorice roots and rhizomes are stir fried with honey.

Fumigation

Sometimes the harvested raw materials are subjected to fumes.

Fumigation with sulphur dioxide is commonly employed for some medicinal herbs for the purpose of preserving colour, improved appearance, bleaching and preventing the growth of insects and moulds.

Extraction of herbal materials

Extraction is a process of separation in which the chemical constituents present in plants and tissues are removed by using selective solvents which are called as menstruum.

Herbal extracts include infusions, decoctions, fluid extracts, tinctures and powdered extracts. The herbal preparation so obtained may be ready for use as a medicinal agent or it may be further processed to finished products as tablets, capsules and pills.

i. Infusion

It is a liquid preparation obtained by extracting herbal materials with either cold or hot water without boiling. Other solvents may also be used.

ii. Decoction

It is a liquid preparation obtained by boiling the herbal materials with water.

iii. Fluid extract

It is a liquid preparation obtained by maceration or percolation of herbal materials in alcohol. The ratio will be one part of liquid containing one part of herbs (1:1).

iv. Tinctures

It is a dilute alcoholic extract of herbal materials typically made up of 1 part of herbal material with 5 to 10 parts of the solvent

v. Powdered extract

It is a form of herbal preparation which is processed into dried, granulated or powdered materials

BIODYNAMIC AGRICULTURE

Biodynamic agriculture is a form of organic farming which includes various concepts introduced by Rudolf steiver in 1924.

Bio dynamics is a system of organic agriculture which recognises the biological and chemical values of soil and treats soil fertility, plant growth and livestock care as ecologically interrelated tasks.

Biodynamic farming is an alternative where the chemical fertilizers are totally replaced by microbial (biological) nutrients derived from bacteria, algae, fungi and it emphasizes the use of manures and composts.

Biodynamic farming treats animals, crops and soil as a single system and facilitates the use of traditional systems and development of new local breeds and varieties.

It uses various herbal and mineral additives in the manufacture of composts and field sprays. Biodynamic farming also emphasizes on the use of astronomical sowing and moon planting calendar. Bio dynamic farming promotes composting, green manuring crop rotations, inter cropping, mixed cropping, etc, as well as employing predators, parasites, which are natural enemies of pests.

PRINCIPLES AND GUIDELINES FOR GOOD AGRICULTURE PRACTICE (GAP) OF MEDICINAL PLANTS

The guidelines described for GAP are intended to streamline the cultivation of medicinal plants as per the well regulated methods and follow a systematic way in the cultivation process as it is important for the production of good quality plant material.

The various stages of processing which are included in good agricultural practice (GAP) are described as follows.

1) Seeds and propagation material

- The seeding materials are to be identified botanically, indicating plant variety, cultivar, chemo type and its origin.
- The material used should be I00% traceable.
- The above same rule applies to vegetative material as well
- The parent material of vegetative part used in organic production should be certified and authentically organic.

2) Cultivation

- Depending on the method of cultivation conventional or organic growers should be allowed to follow different standards operating procedures (SOP) for cultivation
- Care should be taken to avoid environmental disturbances
- The principles of good crop husbandry must be followed including appropriate rotation of crops

3) Soil and fertilization

- Medicinal and aromatic plants should not be grown in soils that are contaminated by sludge
- The soil should also not be contaminated by heavy metals, pesticidal residues and other unnatural chemicals.
- The use of fertilizers and other chemical products should be as minimum as possible and in accordance with the demands of the plant.

4) Irrigation

- Irrigation should be minimized as much as possible and only applied as per the needs of the plant
- Irrigation water should be free from contaminants such as faeces, heavy metals, pesticides, herbicides and other hazardous substances.

5) Crop maintenance

- Tillage (preparation of land for growing crops) should be adapted to enable good plant growth and must be carried out whenever required.
- Pesticides and herbicides should be avoided as far as possible.
- The use of pesticides and herbicides has to be documented.

6) Harvesting

- Harvesting should be done when the plants are in their best quality and quantity.
- Harvesting should be done in optimum conditions as wet soil, dew, rain, high humidity can produce unfavorable effects.

7) Primary processing

- It includes steps such as washing, drying, freezing etc,
- Buildings used for processing should be clean, aerated and provide protection for the harvested crop from birds, insects, rodents and animals.
- Processing equipment must be cleaned and regularly serviced.
- All the processed material should be inspected and substandard products must be discarded.

8) Packaging

- The product should be packed in clean, dry preferably new sacs, bags or cases
- The label must be clear, permanently fixed and made from non toxic material.
- Reusable packaging materials should be well cleaned and dried before use, care should be taken that they do not cause contamination.

9) Storage and transport

- Packaged dried materials and essential oils should be stored in a dry, well aerated building in which temperature fluctuations are controlled and good aeration is provided.
- Fresh products should be stored between 1 to 5°C, while frozen products should be stored below -18°C or below -20°C for long term storage.
- Essential oils should be stored as per the chemical storage standards.
- During transportation, sufficiently aerated vehicles should be used.
- National regulations on transport have to be followed

10) Staff requirements

Personnel involved in the good agricultural practice (GAP) should receive adequate training and education related to the nature of the work being carried out.

- The staffs who works with the plant material must have a high degree of personal hygiene.

- Staff with infectious diseases should not be allowed into the rooms in which they can come into contact with plant material

11) Documentation

- All the propagation material and steps in the production process must be documented.
- All the starting materials, processing steps including location of cultivation have to be documented
- All agreements between producer and buyer should be fixed in a written form.

12) Quality assurance

- In order to ensure a good quality of the produced crude drug, it is extremely advisable to educate all personnel dealing with the crop at various stages.
- Consultation and feedback should be taken from buyers of medicinal and aromatic plants regarding the quality and other properties of plant material and an agreement have to be made.

PEST AND PEST MANAGEMENT IN MEDICINAL PLANTS

Pest is an undesired animal or plant which causes loss of cultivated plants. The different types of pests infecting medicinal plants are as follows.

Types of pests

1) WEEDS
2) INSECTS
3) FUNGI/ VIRUSES
4) NON INSECT PESTS

a) Fungi and viruses

Examples: *Ascochyta atropae* causes necrosis of leaf. Cercospora atropae produces leaf spot disease.

b) Insects

Insects such as flea beetles, flies, moths, cutworms, grasshoppers, spiders, termites, etc, also produce significant loss of cultivated plants.

c) Weeds

A weed is an undesired plant, it can produce losses more than any other pests or diseases. They cause depletion and shortage of nutrients, water, light, and space to the cultivated plants. They also increase the cost of labour and equipment and reduce the quality of cultivated plants.

Examples of weeds are Parthenium, Ragweed, Medican tea, Varnish tree, etc.

E) Non insect pests

They are further sub classified as follows.

- Vertebrates: Animals like monkeys, rats, rabbits, squirrels, birds, pigs etc.
- Invertebrates: Animals like crabs, snails, mites, nematodes, etc.

METHODS OF PEST CONTROL

Different techniques are followed to achieve pest control effectively. These methods are discussed as follows.

1) Agricultural method
2) Biological method
3) Mechanical method
4) Chemical method

Mechanical method

It includes simple techniques like hand picking, pruming burning, using of pest traps, collection and destruction of eggs, larvae and insects. Construction of concrete warehouses to protect from rodents and animals. Rats and mouse traps are also used.

Agricultural method

It includes various methods such as crop rotation, inter cropping, integrated weed management methods, solarisation etc. Production of pest and insect resistant plants through genetic engineering technique is another approach.

Biological method

This method involves combating pests with other living organisms such as employment of cats to combat rats and squirrels, employment of birds to combat insects. Some chemical substances produced by female insects such as sex attractants, which can be used to lure male insects and prevent reproduction.

Chemical control

Pests are controlled using chemical pesticides which include insecticides, fungicides, herbicides, rodenticides. However these chemical substances are highly toxic to human beings. Improper use of these chemical pesticides may lead to toxic effects on humanand animals. Examples:

- Rodenticides: Arsenic trioxide
- Insecticides: Malathion, Parathion, Methoxychlor.
- Miticides: Tetradifon, Chlorobenzolate
- Fungicides: Chlorophenols, Quaternary ammonium compounds, etc.

- Herbicides: 24 dichloro phenoxy acetic acid, Calcium arsenate, etc.

BIOPESTICIDES/BIOINSECTICIDES FOR PEST MANAGEMENT

These are pesticides obtained from natural sources like microorganisms, plants, animals, insects and certain minerals. They offer enormous advantages over chemical pesticides which are as follows.

Advantages of bio pesticides over chemical pesticides

- ✓ They are non-toxic to plants as well as humans.
- ✓ They are biodegradable and do not leave any toxic residues.
- ✓ They are less expensive and can be grown along with the cultivated medicinal plants. >They are eco friendly and do not affect soil fertility.
- ✓ They are safe to handle and use.

TYPES OF BIOPESTICIDES

They can be categorized depending on their source as follows.

- BIOCHEMICAL
- MICROBIAL
- PLANT PESTICIDES

Microbial pesticides:

They consist of microorganisms, microbial pesticides can control different kinds of pest:and are relatively specific for its target pests. It is reported that some fungi are used to control weeds and insects.

Biochemical pesticides

These are naturally occurring chemical substances which are obtained from insects and animals which have the ability to control the pests by non toxic mechanisms. These include substances like insect sex pheromones.

Plant pesticides

Various plants are reported to possess pesticidal and insecticidal properties. They can be grown along with cultivated plants to combat insects and can be used in powdered form or the constituents can be extracted from them and used to spray on the crops.

Example: Neem, Tobacco, Pyrethrum, Sabadilla, Derris, Ryania.

INDIAN SYSTEMS OF MEDICINE

TRADITIONAL SYSTEMS OF MEDICINE

Traditional system of medicine also known as indigenous/ folk medicine/ alternative medicine comprises of medical aspects of knowledge, skills, and practices based on different cultures and different people which are used to treat the diseases. It includes various systems being practiced throughout the world such as Ayurveda, Siddha, Unani, Homeopathy, Chinese systems etc. These systems of medicine are based on theories, beliefs and experiences of different practitioners from the ancient periods.

AYURVEDA SYSTEM OF MEDICINE

Ayurveda is one of the oldest system of medicine which came into existence in about 900 BC. The word "Ayur" means Life and "Veda" means Science. Literally Ayurveda means science of life. Charaka and Sushruta made significant contributions to Ayurveda. The book "Charak Samhita" was written by Charaka and he was known as father of Ayurveda.

BASIC PRINCIPLES OF AYURVEDA

PRINCIPLES OF AYURVEDA		
PANCHAMAHABHUTA	**TRIDOSHA**	**GUNA-RASA SIDDHANTHA**

• PRITHVI • JALA • VAYU • AGNI • AKASHA	• VATA • PITTA • KAPHA	• RASA • GUNA • VIRYA • VIPAKA • PRABHAVA

Ayurveda is based on the following principles

a) Panchabhuta Siddhanta

b) Tridosha theory

c) Guna-Rasa-Virya-Vipaka-Prabhava Siddhanta.

Pancha Bhoota Siddhanta

According to this theory, It believes that the whole universe is made up of five basic elements known as "Mahabhutas" and they are present in the human body. They are Prithvi (Earth) Jala (Water), Vayu (Air), Agni (Fire), Akasha (Void/Sky). Combinations of these five elements form seven basic tissues of the body which are referred as "Sapta Dahu" which are as follows:

1. Rasa (Lymph/ Plasma), 2 Rakta (Blood), 3. Mamsa (Flesh), 4. Meda (Fat), 5. Asti(Bones), Moja (Marrow), 7. Shukra (Reproductive organs).These Sapta dahu undergo wear and tear to form "Mala" (Excretory products).

Tridosha theory

According to this theory, the five basic elements (Pancha Mahabhuta) exist in human body in three different forms, together known as "Tridosha", they are

- Vata (Space + Air).
- Pitta (Fire + Liquid).
- kapha (Liquid + Solid).

These tridoshas when present in balanced form in the body is considered as healthy condition, any imbalance in tridosha is considered as disease condition. Ayurveda tries to maintain the balance in these elements.

Vata: It regulates the psychic and nervous system. Imbalance of this leads to disease of ENT heart, urinary tract, skin, etc.

Pitta: It regulates energy production, digestion, tissue building, etc. Imbalance of this lead to disease like acidity, indigestion, liver and skin disease.

Kapha: It regulates heat, formation of fluids, mucous, etc. Imbalance of this results in join pain, brain disease, drowsiness, etc.

Guna-Rasa-Virya-Vipaka-Prabhava Siddhanta

These are considered as five pharmacological principles / properties of "Dravya" (dru substance), they are Rasa (Taste), Guna (Quality), Virya (Active principle), Vipaka (Digestive products), Prabhava (Pharmaco therapeutic action).

DIAGNOSIS IN AYURVEDA

Diseases are diagnosed by-

- Observation of Doshas (vata, pitta, kapha).
- Observation of skin, eyes, hair, nails and tongue.
- Recording the pulse.
- Investigation of Mala (urine, stools and sweat).

TREATMENT

The different treatments in Ayurveda are as follows

- Elimination therapy
- Alleviation therapy
- Psychic therapy
- Surgery therapy

In addition to single drugs, compound formulations are generally used to treat disease in the form of tablets, pills, powders and syrups. Following are the examples of few Ayurvedic drugs along with their uses.

List of some Ayurvedic drugs and their uses

Drug	Uses
Arjunaristha	Heart disease
Khadirarishta	Skin disease
Kumaryasava	Tonic, liver diseases
Triphala churna	General diseases, stomachic

Ashwagandha churna	Adaptogenic diseases
Parad bhasma	Diarrhoea, dysentery
Chirayanta arka	Fever
Kasturi gutika	Aphrodisiac
Dashmula quath	Ailments of kapha and vata

BRANCHES OF TREATMENT IN AYURVEDA

i. Kayachikitsa (General medicine).

ii. Salya chikitsa (Surgery).

iii. Salakya chikitsa (ENT).

iv. Bala chikitsa (Pediatrics)

v. Jara chikitsa Treatment related to genetics).

vi. Rasayana chikitsa (Treatment with chemicals).

vii. Vajikarana chikitsa (Treatment related to reproductive organs and aphrodisiacs).

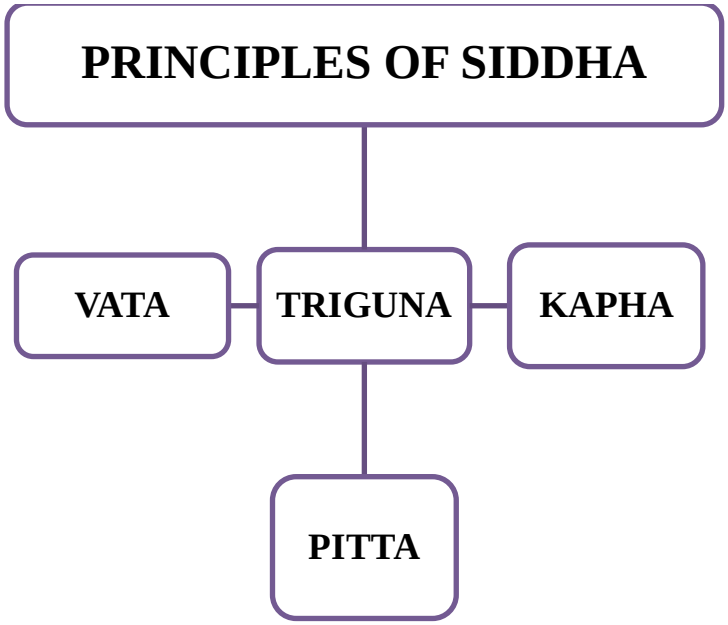
viii. Graham chikitsa (Planetory effects).

ix. Visha chikitsa (Toxicology).

SIDDHA SYSTEM OF MEDICINE

This system was practised in south India especially Tamil nadu. This system is believed to be older than Ayurveda and the latter was derived from Siddha system. “Agastya" believed to be the father of Siddha medicine and he wrote a book known as Charkku "Agattiya

BASIC PRINCIPLES OF SIDDHA SYSTEM



It is based on three principles vata, pitta and kapha, which are known as "**Trigunas**".

- **Vata**: People with predominant vata are characterized by stout, black, cold and inactive personalities. Increased vata develops flatulence, acidity, obesity, heart attacks, etc.
- **Pitta**: People with predominant pitta are characterized by lean, whitish complexioned ha personalities. Increased pitta shows early greying of hair, reddish eyes, burning chest,mental derangement, anaemia.
- **Kapha**: People with predominant kapha are characterized by well built, good complexioned well behaved personalities. Increased kapha leads to jaundice, heart attack, high fever anaemia, etc.

A particular guna in the body increases according to the time.

- Vata is predominant at 6.00am to 10.00am and 6.00pm to 10.00pm.
- Pitta is predominant at 10.00am to 200pm and 10.00pm to 2.00am.
- Kapha is predominant at 2.00pm to 6.00pm and 2.00am to 6.00am.

DIAGNOSIS IN SIDDHA SYSTEM

During the diagnosis the physician studies eight things, they are Nadi (Pulse), Dhwani (Speech), Twaka (Tongue), Deham (Body), Neeram (Colour), Malam (Faeces), Mutram (Urine) and Vizhi (Eyes).

Treatment

Siddha physicians give knowledge of one thousand herbs and their effectiveness in specific composition and formulation. Commonly medicines are prepared freshly for specific diseases.

The formulations are prepared using plants animals, minerals, metals like mercury, gold, silver, sulphur, zinc, copper, aluminum, borax and arsenic are used in small quantities.

The following formulations are commonly used in Siddha system.

- Kashayam (Decoction).
- Churna (Powder).
- Tailam (Medicated oils).
- Kuligai (Pills & Tablets).
- Chenduram (Metal complexes).
- Bhasma (Calcinated drugs).

DIET IN SIDDHA

Siddha system also gives importance to "Pathya" (restriction on diet), following are the examples of restricted and non-restricted diets.

Non restricted foods: wheat, milk, ghee, pulses, tender vegetables, goat meat, sugar, etc.

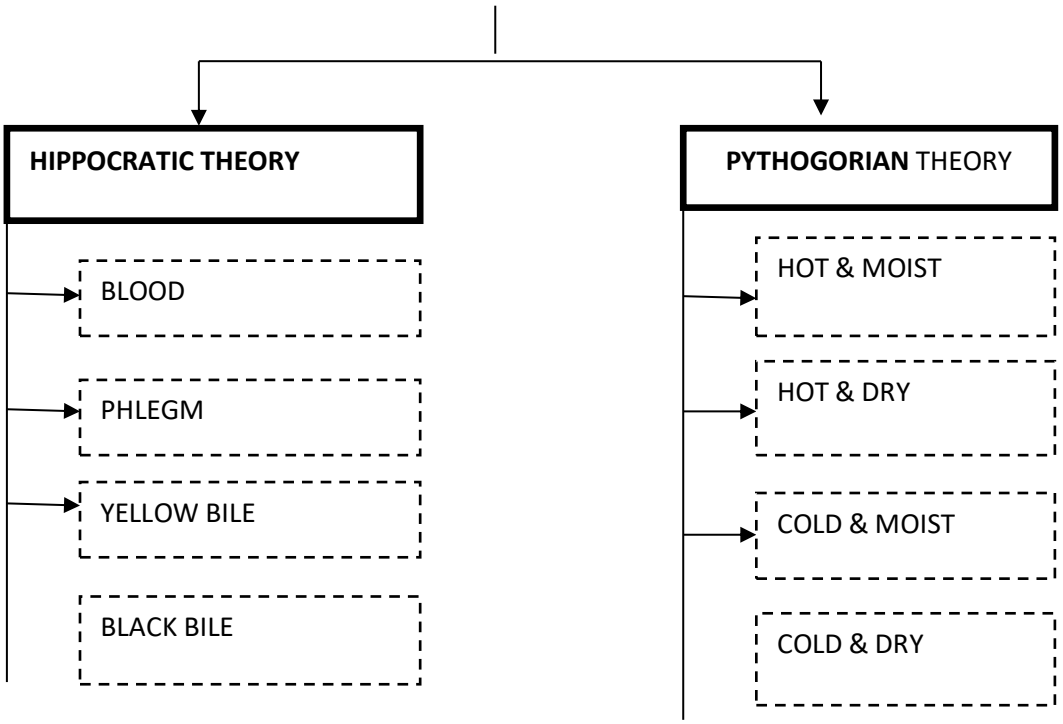
Restricted foods : chicken, mangoes, coconut, fenugreek, mustard, sesame, almonds, etc.

UNANI SYSTEM OF MEDICINE

Unani system originated in Greece. It was started by a Greek philosopher Hippocrates. He was the first physician to introduce documentation of medical history which gave rise to development of "Humoral theory". Unani system was later developed by Arabs and became popular as Arab system of medicine.

BASIC PRINCIPLES OF UNANI SYSTEM

PRINCIPLES OF UNANI



Unani system considers that the entire universe is made of four basic elements viz:- fire, air, earth, water. These elements are present in human body that represent various qualities. Unani system is based on two theories.

- Hippocratic theory of four humors.
- Pythagorean theory of four proximate qualities.

Hippocratic theory of four humours mentions the first products of digestion, they are

- Blood (Dum).
- Phlegm (Balgham).
- Yellow bile (Safra).
- Black bile (Souda).

Pythogorian theory of four proximate qualities includes hot, cold, moist and dry. These four qualities are present in the human body in combinations and represent the four basic elements of the universe. They are.

- Hot & moist (Air).
- Hot & dry (Fire).
- Cold & moist (Water).
- Cold & dry (Earth).

These four qualities are present in different proportions in the body and vary from one person to another. These 4 qualities represent the nature or temperament/ humor of individual known as "Mizaj".

Mizaj/ Temperament/ Humors of a person

- Mizaj-e-har (Hot).
- Mizaj e-barid (Cold).
- Mizaj-e-yabis (Dry).
- Mizaj-e-rath (Moist).

Balance form of these 4 humors is called as healthy condition and imbalance form is known as pathological condition

DIAGNOSIS

It is done by recording the parameters such as psychology, age, gender, habits, working condition, history, etc. The following things are analysed during diagnosis

- Pulse reading.
- Examination of sputum, urine, and stools.
- Patient counselling.

TREATMENT IN UNANI SYSTEM

Two things are attempted during the treatment they are:

- To remove the cause of ailment, also known as cleansing or detoxification. It is done by purging, diuresis, vomiting and bleeding.
- To strengthen the natural defence mechanism and prevention of relapse.

Treatment in Unani system involves various therapies which are as follows:

a. Regimental therapy: It includes emesis, purging, diaphoresis, diuresis, massaging, Turkish bath, etc

b. Diet therapy: It is done by using a special diet. The quality and quantity of foods is regulated

c. Pharmacotherapy: It deals with the use of medicine, most commonly natural drugs are used.

UNANI MEDICINE

The Materia Medica describes drugs obtained from herbs, animals and mineral sources. Herbal drugs include various parts of plants and their products. Animal drugs include organs, flesh, hair, bones, etc. Mineral drugs include metals like gold, silver, lead, zinc arsenic, etc. Precious stones like emerald, sapphire are also used.

HOMEOPATHY SYSTEM OF MEDICINE

Homeo means similar and pathos means suffering hence homeopathy means similar suffering. It means, the cause of the disease itself can be used for its treatment or the substance producing similar symptoms of disease in healthy individuals can be used to treat that disease. Homeopathy was introduced by a German physician "Dr. Samue Hahnemann". Basic principle of Homeopathy is "Similia Similibus Curantur" meaning let like be treated by likes.

BASIC PRINCIPLES OF HOMEOPATHY

It is based on seven principles which are as follows

- **PRINCIPLES OF HOMEOPATHY**
  - INDIVIDUALISATION

- PRINCIPLE OF SIMILIA
- PRINCIPLE OF SIMPLEX
- PRINCIPLE OF MINIMUM DOSE
- LAW OF PROVIDING
- LAW OF DYNAMISATION
- VITAL FORCE

Individualization

This concept maintains that no two individuals in the world are same, hence disease affecting the individuals and their response to it cannot be similar. The individual response to the same disease would be different from person to person. Thus medicines used to cure the same disease in different individuals are different.

Principle of similia

Substances which are the cause of disease or produce similar symptoms in healthy individuals can be used to cure the disease in patients (Vaccines)

Principle of minimum dose

This rule states that dose of the drug is inversely proportional to its potency (lower the dose, more potent the drug is).

Law of proving

The testing of drugs is done on healthy volunteers. If the drug produces similar symptoms in a healthy person as that of the diseased person, the drug is considered as suitable for treating that disease

Examples:

Cinchona (anti malarial drug produced symptoms of malaria in healthy persons, hence it can be used to treat malaria. ii. Ipecac (antiemetic drug) produced emesis in healthy persons, hence it can be used to treat vomiting

DIAGNOSIS IN HOMEOPATHY

- Collection of detailed case history and medical history.
- Investigation of symptoms, location, sensation, etc.

- Build up a symptoms picture of the patient.

TREATMENT

Homeopathy system used drugs in the form of mother tincture, small pills and powders. Preparation of doses involved three processes, they are trituration, succession and serial dilution. Potentiation is a physical process denoted by 'C. Three scales are used; they are decimal, centesimal and millesimal.

Sources of Homeopathy medicine

Plants: various plants, fungi, etc.

Animals: secretions, saliva, etc. Minerals and chemicals: toxic metals, inorganic salts, etc.

Serum: protoplasm of animals, hormones, etc.

Vaccines bacterial and viral products, etc

Disadvantages of Homeopathy

- ✓ Selection of correct drug is difficult.
- ✓ It takes long periods of time to cure in chronic cases.

PREPARATION AND STANDARDIZATION OF AYURVEDIC FORMULATIONS

Ayurvedic formulations can be categorized into four types based on their physical nature of dosage forms.

1. Solid dosage forms: Eg Vati, Ghutika.

2. Semi Solid dosage forms Eg Leha, Kalka

3. Liquid dosage forms Eg: Aristas. Asavas

4. Powder dosage forms. Eg Bhasmas Churras

ARISTAS AND ASAVAS

They are also known as preparations containing self generated alcohol (alcoholic preparations). They are prepared by adding powdered drug or its decoction into a solution of sugar or jaggery, It is then fermented for a specified time during which alcohol is generated which facilitates the extraction of active principles present in the drugs. The self generated alcohol also acts as a preservative.

Both Aristas and Asavas are self generating alcoholic preparations, but they differ in the methods of preparation. Aristas are prepared by extracting the powdered drug in the form of decoction and then added to the solution of sugar or jaggery.

Asavas are prepared by directly adding the powdered drugs into the solution of sugar or jaggery, the remaining process of preparation remains the same.

Method of preparation of Aristas

The crude drugs are coarsely powdered and decoction (Kashaya) is prepared and filtered. Other ingredients are mixed with the decoction and these contents are added to a solution sugar or jaggery or honey. It is then boiled, cooled and transferred to wooden barrels or pot.

The mouth of the container is covered with an earthen lid and the edges are sealed with clay smeared cloth which is wound in seven consecutive layers. The container is kept in an underground cellar or a heap of paddy in order to ensure a constant temperature maintained during the process of fermentation.

After the specified period, the lid is removed and the contents are examined to ensure that the process of fermentation (Sandhana) has been completed.The fluid is filtered and stored.

Method of preparation of Asavas

The drug is finely powdered and mixed with other ingredients and these contents are added to a solution of sugar or jaggery or honey, mixed well. It is then boiled, cooled and transferred to wooden barrels or pots. The mouth of the container is covered with an earthen lid and the edges are sealed with clay smeared cloth which is wound in seven consecutive layers. The container is kept in an underground cellar or a heap of paddy in order to ensure a constant temperature is maintained during the process of fermentation. After the specified period, the lid is removed and the contents are examined to ensure that the process of fermentation (Sandhana) has been completed. The fluid is filtered and stored

Standardization parameters for Aristas and Asavas

- Aristas and Asavas should be clear without any froth or foam at the top.
- It should not become sour upon standing
- It should have a characteristic aromatic and alcoholic odour.
- There should be no effervescence produced.

Examples:

Aristas: Ashokarista, Dasmularista, Ashwagandhaarista

Asavas: Arvindasava, Kumaryasava, Vasakasava.

VATI & GHUTIKA (TABLETS & PILLS)

These are medicines in the form of tablets (vati) and pills (ghutika). They contain single or combinations of herbal, mineral or animal drugs.

Method of preparation

The drugs are dried and finely powdered, mineral drugs are converted into calcinated products (bhasmas) or any other form as specified. As per the mentioned formula, the drugs and other ingredients are mixed together and made into a soft paste with specified liquids. It is then properly ground and made into vati (tablets) or ghutikas (Pills).

Standardization parameters for Vati & Ghutikas

- Vati & Ghutikas should be stable up to 2 years after preparation.
- If they contain only mineral ingredients, they can be used indefinitely
- They should not lose their original colour, odour, taste and form upon storage.
- If they contain sugar/ salt, they should be protected from moisture.

Eg: Vati: Gandhaka vati, Sankha vati.

Ghutika: Pranda gutika, Lasunadi gutika.

CHURNA

They contain single or combination of drugs along with other ingredients in a powdered form.

Method of preparation

Drugs and other ingredients mentioned in the formula are separately dried, finely powdered and sieved to get uniform sized particles, they are mixed to get a uniform powder.

Standardization parameters for Churna

- Churnas should be free flowing powder and should not adhere or become moist
- Churnas are able up to one year if they are stored properly
- Finer the powder, better is its potency and therapeutic value.

Eg. Triphala churna, Drakshadi chuma, Sudarshan churna

LEHA AVALEHA

These are semisolid preparations made by boiling the powdered drug/ extract with solution of sugar or jaggery

Method of preparation

Sugar / jaggery is dissolved in a liquid, it is boiled and filtered. The powdered drugs extract along with other ingredients are added with continuous stirring to form a homogenous semisolid mass. If necessary ghee or oil is also added while the preparation is hot.

Standardization parameters for Leha

- It should neither become hard nor liquify.
- There should be no growth of fungus over it.
- It should not change its colour odour and taste.
- They can be used up to one year it properly stored.

Eg: Draksavaleha, Vasavaleha Bilvadileha

BHASMA

These are the powdered forms of drugs prepared by calcination (heating the solids in air to change is original form) of metals, minerals or animal products by a special process in closed crucible or in pits covered with cow dung

Method of preparation

They are prepared in two stages viz:

i. Sodhana: It is a process of purification of metals, minerals by heating them and immersing in a specific liquid. This is done to remove its toxicity.

ii. Marana: This is the second stage of preparing bhasmas, in which the purified drugs obtained from shodhana process are ground and mixed with plants/ extracts as specified. After specified time, small cakes are made and dried in sunlight. The dried cakes are kept in earthen vessels, sealed with clay smeared cloth and kept in a pit covered with cow dung and the fire is put on all the sides. After heating for a specified period, the contents are removed and ground into a fine powder and stored.

Standardization parameters for Bhasmas

- Bhasmas are grey, whitish, yellowish or black coloured powders. They should not change their colour on storage.
- They are highly stable for long periods and should not lose their potency.

Eg: Suvarna bhasma, Shankha bhasma, Taura bhasma.