

HERBAL DRUG TECHNOLOGY

UNIT - Ist

Chapter Ist

HERBS

AS RAW MATERIAL

Topics →

- Definition of herbs, herbal medicine, herbal drug prepⁿ, product, herbal drug prepⁿ.
- Sources of herbs
- Selection, identification and authentication of herbal material.
- Processing of herbal raw material.

HERBS → The word herb is derived from the Latin word 'herba', which means 'grass' or 'green stalk'. Herbs consist of entire plant or any part of plant such as leaves, flowers, fruit, fruiting bodies, seeds, stems, wood, bark, roots, rhizome or other parts which is used in various forms or preparations valued for their therapeutic benefits.

HERBAL MEDICINE → It is also known as 'Herbalism' or 'Phytomedicine'.

These consist of medicinal plants or any parts of plants usually in unprocessed or crude forms which have medicinal value. It include modern standards of testing and evaluation of herbs. The constituents and their therapeutic activity may be known or unknown.

→ Isolated phytoconstituents are not termed as herbal medicines.

HERBAL MEDICINAL PRODUCT →

The products which are produce from herbs and used in medicinal purpose are called as herbal medicinal product. These are defined as any medicinal product which contain one or more active ingredient of herbal origin.

→ They may contain excipients.

→ Natural remedies are medicinal products where active ingredient is of natural origin and consists of an animal part, a bacterial culture, a mineral or a salt.

→ Eg. of herbal medicinal product → Syrups, mixtures and tablets etc.
 दूध-कमिष्ठ

HERBAL DRUG PREPARATION →

Herbal drug prepⁿ are committed or powdered herbal substances, extracts, essential oils, tinctures, juices and fatty oils of herbal material. These are

obtained by subjecting herbal material to physical or biological processes such as extraction, infusion, decoction, maceration, distillation, purification, concentration and fermentation etc.

→ They also include that prepⁿ which are obtained by processing herbal material in alcohol beverages or by heating the herbal material.

→ Herbal drug prepⁿ contain mixture of various constituents.

SOURCES OF HERBS :: →

Herbs or medicinal plants can be

obtained from 3 sources ⇒

(A.) wild sources

(B.) cultivated sources

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(A) Wild sources \Rightarrow Herbs are obtained from the wild sources such as forests, plains, river banks etc. and they are in their wild forms. They grow themselves without any type of care. Wild plants also have active constituents and sometimes new variety is produced.

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

\rightarrow Wild plants grow under natural conditions.

\rightarrow Market demand from wild growing herb is increased greatly that can cause its extinction and such herb become threatened. So, there is need to cultivate wild plants so that increased demand of market can be fulfilled.

Adv \rightarrow

1. Less time consuming.
2. Less cost of laborer.
3. Economical.

Disadvantage \Rightarrow Quality of wild plants cannot be predicted due to various environmental changes.

Example given \Rightarrow Heartwood of sandalwood tree is collected from wild source and high demand of the species has resulted into its extinction. Now sandalwood is a threatened in South India.

(B) Cultivated sources \Rightarrow Herbs are obtained from cultivated sources, which use modern scientific techniques like tissue culture, hybridization and mutation to grow herbs. These herbs are grown with proper care by human. Care is taken towards soil, climate, rainfall, temp., fertilizers etc.

Advantages \rightarrow

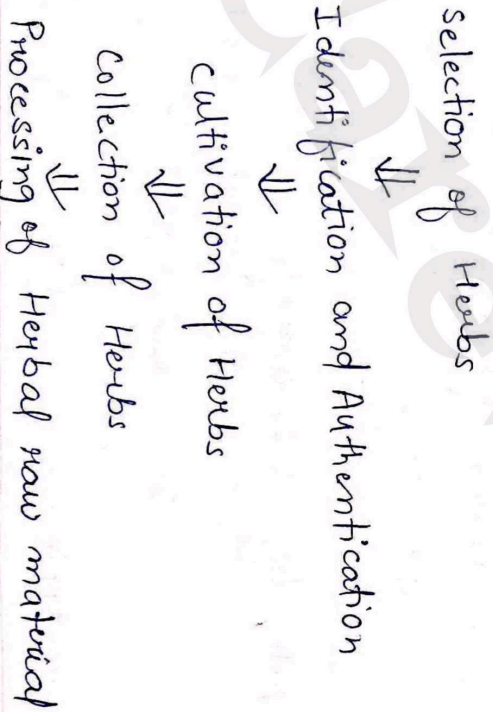
1. Quality and purity is ensured.
2. Better yield & more profit
3. Ensure regular supply of raw material.
4. Application of modern scientific techniques is possible.

Example given \Rightarrow cultivation of aromatic plants leads to industrialization.

STEPS INVOLVED IN SELECTION, IDENTIFICATION AND PROCESSING OF HERBAL RAW MATERIAL.

\rightarrow Herbs are subjected to various stages starting from their selection, identification, cultivating, collection, storage and processing until the final product is formed.

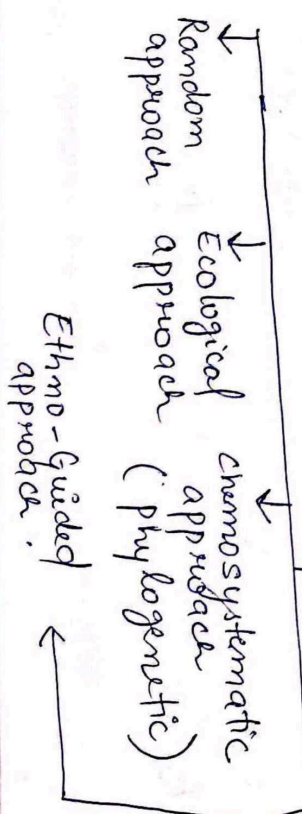
STEPS INVOLVED



SELECTION OF HERBS \Rightarrow The species or botanical variety selected for cultivation should be same as mentioned in official pharmacopoeia or national documents. In case of newly introduced plant, the variety selected for cultivation should be identified and documented.

Techniques & Methods for selecting Medicinal Plant

\rightarrow The criteria used for selection of plant for investigation depends upon the studies to be performed on plant species such as \rightarrow ecological, botanical taxonomic etc. So, there are four basic approaches for selection of plant.



1. Randomized Approach \Rightarrow It is a random selection and collection of plant species for study according to the plant availability. When randomized investigation carried out in regions with high diversity then probability of finding novel substances is higher.
 \rightarrow This type of selection provides an endless sources of new structures.

2. Ecological Approach \Rightarrow It involves interaction between organisms in their ecological environment. This approach searches for secondary metabolites and biological activities. Ecological relationship is a useful tool for selection of plant species.

Example \rightarrow A plant or its secondary metabolites showing defence against pathogens can be selected for the development of antimicrobial drugs for humans.

3. Chemosystematics approach \rightarrow The selection of a species from a family or genus is based on phytochemical knowledge of at least one species of same family or genus. This approach is successful for selection of families, subfamilies and genera to be investigated.

4. Ethno - Guided Approach \rightarrow It consists of selecting plant species in accordance to the indication of specific population groups using traditional knowledge about medicinal use of natural resources and their impact on human health. This approach involves ethnobotany, ethnopharmacology, ethnomedicine and ethnopharmacy.

Identification and Authentication of herbal material ⇒

1. Morphological Identification ⇒ Plant material or herbal material is identified by its morphological characteristics such as its shape, size, colour, surface, texture, cross-section, odour, taste etc.
2. Organoleptic evaluation ⇒ Herbal material is identified by examine the herbal material with sense organs such as observed by naked eyes, touch by hands, smell by nose and taste by mouth.
3. Chemical tests OR Tests : → Some simple tests by water and fire can also be used for plant identification. The water test are used to measure the material's density, solubility, colour change, clarity, viscosity, PH etc.

• Under fire tests, colour of fire, smoke, expansion and melting are observed.

4. Microscopic identification ⇒ Qualitative and Quantitative microscopic identification are used to identify the structural features, tissues, cell components of herbal material in order to authenticate plant species by using a microscope.
 - Quantitative microscopic studies help not only in identification of plant species but also in differentiating →
 - 1. a very closely related different species of a genus.
 - 2. different varieties of same species.
5. Physical and chemical identification :
 - It is qualitative and Quantitative determination of major compound of herbal material by using physical and chemical methods.

→ The physical methods measure freezing point, melting point, bitterness, density, optical activity and swelling index of a herbal material.

→ The chemical methods measure the colour ~~and~~ formation, complex formation and precipitate formations of a herbal material.

6. Genetic identification ⇒ identification of herbal material can be done by using DNA molecular genetic markers (molecular biology technique). Genetic material are present in cell nucleus, in which chromosomes carry genetic information. DNA molecule genetic markers could be used to identify exact species, subspecies, population and individuals.

CULTIVATION OF MEDICINAL PLANT ⇒ ^{or herbal} cultivation of medicinal plants requires intensive care and management.

→ Various factors like environment, soil, irrigation, pests etc. play a vital role in the cultivation.

→ These factors vary from one plant to another plant.

→ scientific documented methods of should be followed in cultivation of ~~and~~ herbal material.

→ Good agricultural practices (~~and~~ GAP) and conservation agriculture (CA) in cultivation of herbal material, aims to improve, conserve and more effective use of natural resources.

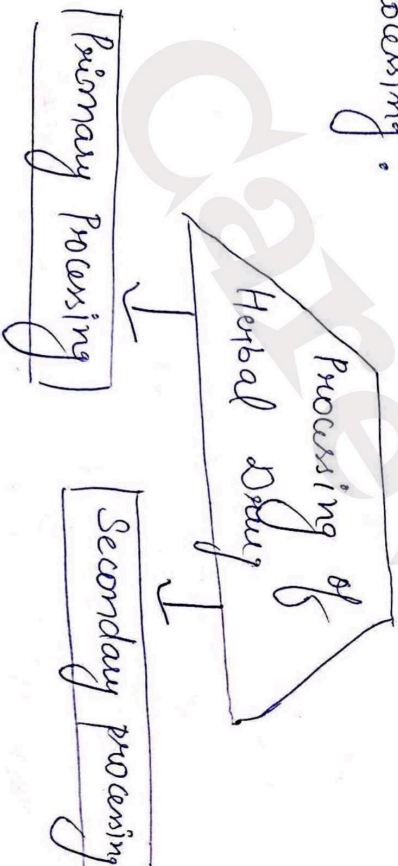
COLLECTION OF HERBS ⇒ For the collection of medicinal or herbal plant, a proper time should be selected.

→ When the herbal plant yield maximum amount of chemical constituent ~~in~~ in it, they are selected for collection.

→ skilled labour should be employed for collection of herbs as they are trained to identify and select the herbs at a proper time.
 → The age of plant also play a vital role for the selection of herbs. Diseased plants should be rejected.

PROCESSING OF HERBAL MATERIAL

Processing of herbal raw material involves various stages from which a crude drugs undergo after harvesting. It can be classified into primary & secondary processing.



Primary Processing	Secondary P.
<ol style="list-style-type: none"> ① Gorbuling (sorting) ② washing ③ Parboiling [Blanching] ④ Leaching ⑤ Drying 	<ol style="list-style-type: none"> ① cutting (sectioning) ② Aging [Sweating] ③ Baking/Roasting ④ Boiling/steaming ⑤ stir frying ⑥ Fumigation

Primary Processing ⇒ It includes simple procedures by which the herbs are prepared like sorting of different parts (gorbuling), washing, leaching drying etc.

1. Garbbling (Sorting) ⇒ In this process, dirt and impurities like soil, dust, insects, dead tissues, non-medicinal plants etc are removed or separated out from the raw material.

→ This process ensure the purity of cleanliness of harvested material.

→ Process is done by mechanically and sometimes done by manually.

2. Washing ⇒ After garbbling the herbal raw material should be cleaned well to remove the traces of remaining soil, dirt and other impurities from the surface.

→ In this, washed the herbal material with clean water. During washing process, scrubbing and brushing is necessary.

3. Parboiling (Blanching) ⇒ After washing, certain herbal raw material undergo parboiling process in which they are put in boiling water for a short period. This process also used for removing outer coats and covering material of herbs.

→ This process improve storage life of raw material and prevent contamination.

4. Leaching ⇒ It is the process of removal of impurities from raw material by subjecting the raw material under running water called as leaching.

→ Leaching for long duration may lead to excessive loss of other ingredients so time duration of leaching should be controlled.

5. Drying ⇒ After washing of raw material, they must be dried immediately to

remove moisture and reduce microbial contamination.

→ Plant material should be dried after washing in order to prevent the degradation and deterioration of active constituents. Boog drying prevent the activation of certain enzyme which may degrade the active ingredients.

• Drying under sunshine ⇒ Herbal material subject to open and direct sunlight in order to prevent microbial growth.

• Drying under shade ⇒ Herbal material subject to shade with or without artificial air flow to avoid direct exposure to strong sunlight.
→ used in order to prevent colours of leaves and flowers.

→ preserve volatile and aromatic components from being evaporated.

• Drying by artificial heat ⇒ Drying the herbal material in an oven, vacuum and spray.

Secondary Processing ⇒ The secondary processing vary from one herb to another herbs depending on nature of chemical constituents and therapeutic properties.

→ secondary process include techniques such as extraction, infestation, removal of foreign substances, reducing the toxicity of herbal material etc.

1. Cutting / sectioning ⇒ After drying, the herbal material is cut & sectioned into smaller sizes because small sizes are convenient for storage as well as for extraction process.
→ varies sizes can be obtained depending on the extraction process to be used.

2. Ageing | sweating \Rightarrow Ageing 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 ageing, excessive water is evaporated and enzymatic reactions may occur to alter the chemical composition of the herbal material.

3. Baking | Roasting \Rightarrow It is a process of heating the herbal material in ovens.

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

4. Boiling | steaming \Rightarrow In boiling process, the drug is cooked in water or any other liquid solvent such as vinegar, wine, milk or animal urine.
 \rightarrow Boiling minimised the side effect

and enhances therapeutic effect of herbal material.

5. Stir frying \Rightarrow It is process in which the herbal material are put in a pot of frying pan and continuously stirred for a specific period under heat until the external colour changes.

6. Fumigation \Rightarrow Sometimes the harvested raw material are subjected to fumes.

\rightarrow 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 insect and moulds.

HERBAL DRUG

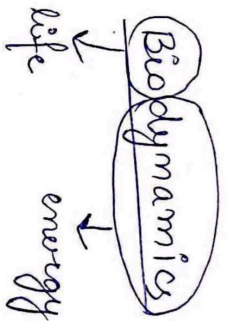
TECHNOLOGY

UNIT - 1

Chapter - 2ndBIO DYNAMIC AGRICULTURE

Topics ⇒ Good Agricultural Practices in cultivation of medicinal plants including organic farming.

- Pest and pest management in medicinal plants: Biopesticides / Bio-insecticides.



Biodynamics derived from two Greek words 'bios', which means 'life' and 'dynamis', which means 'energy'. So, Biodynamics refers to a 'working with the energies which create and maintain life'.

→ Biodynamics is a method of farming which main aim is to treat the farms as a living system that interact with environment and built a healthy living soil, in order to produce food that nourishes, vitalises and helps to develop humanity.

→ Bio dynamic farming totally replace the chemical fertilizers by microbial (biological) nutrients such as bacteria, algae, fungi and emphasizes the use of manures and composts. It also emphasizes the use of astronomical sowing and moon planting

calendars. Various herbs and minerals are used in manufacture of composts.

→ Bio dynamic farming treat animals, crops and soil as a single system and facilitates the use of traditional system.

→ Bio dynamic agriculture starts in 1924.

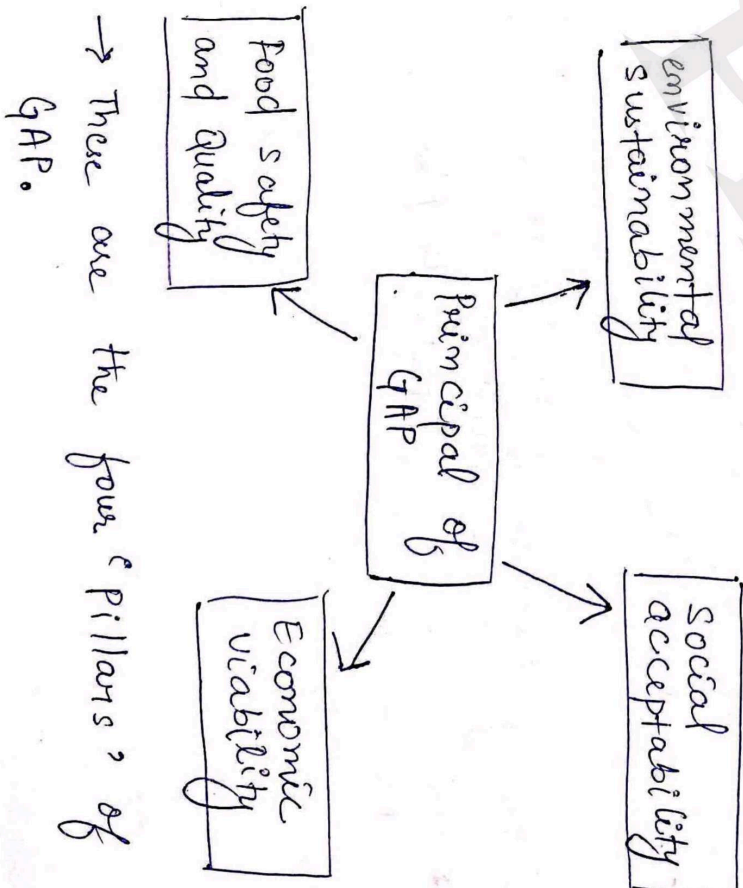
→ Rudolf steiner is the Father of bio dynamic agriculture.

Advantages of Bio dynamic Agriculture :-

1. Good for the environment.
2. Improvement in soil Quality.
3. Healthier for the consumer
4. Higher Annual yields.

PRINCIPLES AND GUIDLINES FOR GOOD AGRICULTURE PRACTICE (GAP) OF MEDICINAL PLANTS :-

→ GAP (Good Agriculture Practices) are defined as collection of specific and good methods applying to the agriculture for the production of safe, qualitative, healthy and useful crop, food and medicinal product.



→ The guideline described for GAP are :-

1. Seeds and propagation material :-
 - seeding materials are identified by botanically, plant variety, chemo-type and by its origin.
 - The material should be 100% traceable.
 - Morphological characteristics, organoleptic evaluation and tests are also used for material identification.
2. Cultivation :- cultivation requires intensive care and management.
 - various factors like environment, soil, pests etc. play a vital role
 - Principles of good crop husbandary must be followed in cultivation.
3. Soils and fertilizers :-
 - The soil which is used for cultivation should 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.

→ Medicinal and aromatic plants should not be grown in soil that is contaminated by sludge.

4. Irrigation :- Irrigation water should be free from contaminations such as faeces, heavy metals, pesticides, herbicides and other chemical substances.

→ Irrigation should be minimized as much as possible and only applied as per the needs of plant.

5. Crop Maintenance :-

- Tillage (prepn 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

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has to be documented.

6. Harvesting : → Harvesting should be done when plant are in their best quantity and quality.

→ Harvesting should be done in optimum condition as wet soil, rain, high humidity.

7. Primary processing : → It includes

steps such as washing, drying, freezing etc. Buildings or area used for processing should be clean, aerated and provided protection for the harvested crop from birds, insects and animals.

→ Processing material or equipment must be cleaned.

→ All processed material should be inspected in order to maintain standard.

8. Packaging : → The product should be packed in clean and dry bags and cases.

→ The label must be clear, permanently fixed and made from non toxic material.

→ Proper care should be taken in reusable packing so, that they don't cause contamination.

9. Storage and Transport : → Packaged material should be stored in dry and good aeration provided areas.

→ Packed materials stored in well closed containers at specific temp.

Temp. for Fresh product → 1-5°C

" " Frozen " → -18-20°C

→ During transportation, aerated vehicles should be used.

10. Staff requirements → Personnel working in GAP should be educated and trained.

→ Personnel have knowledge of personal hygiene.

→ Personnel should be free from infectious disease.

11. Documentation :-> All the steps involve in manufacturing and production must be documented.
 -> All the agreements b/w producer and buyer should be fixed in written form.

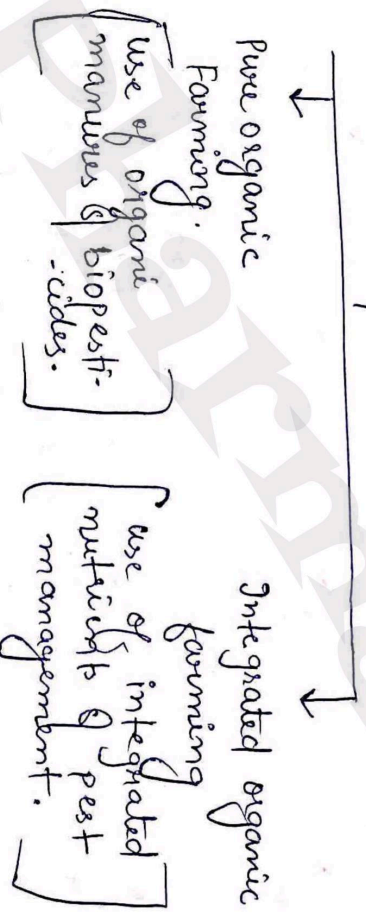
12) Quality assurance :-> The quality of product must be standardized to monograph.
 -> The properties must as per Pharmacopoeia ~~set~~ section.
 -> consultation and feedback should be taken from buyers regarding the quality and properties of product.

ORGANIC FARMING

- organic farming is the production of crops without the use of any synthetic chemical or inorganic fertilizers. It only use biofertilizers for the production.
 -> The aim of organic farming is human welfare without any harm

to environment.

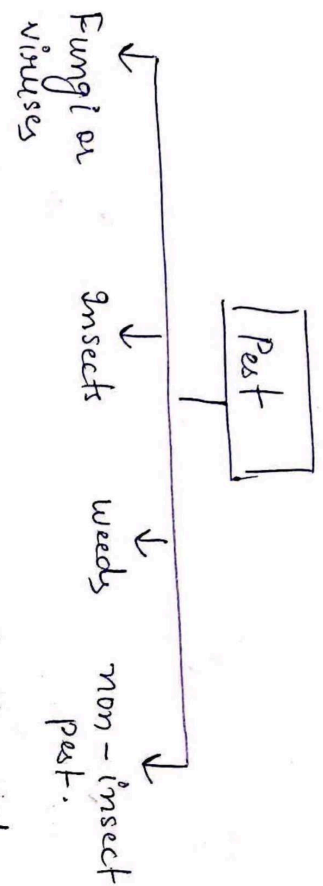
Types of organic farming



- Principles :->
1. Production of high quality nutritious food.
 2. Maintain ecological balance in nature.
 3. Good quality of life and reduce poverty.
 4. Enhance productivity & efficiency.

PEST AND PEST MANAGEMENT IN MEDICINAL PLANTS

Pest => Pest is a undesired plant or animal body which causes loss of cultivated plants.



• Fungi → Fungi grows on plants and produces many diseases such as wheat rust, asparagus rust and rose rust etc
 eg → Ascochyta trapez causes formation of greyish white irregular spots which further causes meiosis of leaves ग्रहण, cell death

• viruses → viruses are also responsible for diseases occurring on plant.
 → virus causes twisting in young leaves, stunts growth of the entire plant and causes poor fruit and leaf production.
 eg → TMV (Tobacco mosaic virus) affects digitalis, nightshade or solanaceae family.

• Insects ⇒ Insects such as flies, moth, cutworms, grass hoppers, spiders etc causes the loss of cultivation.

• Weeds ⇒ Any undesirable plant that grow along with crop is called weed. weed interfere in the growth of cultivated plant by consuming most of water and minerals ^{from the soil}.

→ The growth of weed at cultivated plant area will soon acquire whole the space at area and lead to destroy the cultivated plant.

→ Weed attacks the other pest and insects which may destroy our cultivated plant.
 → Quality of weed become poor due to presence of weeds.

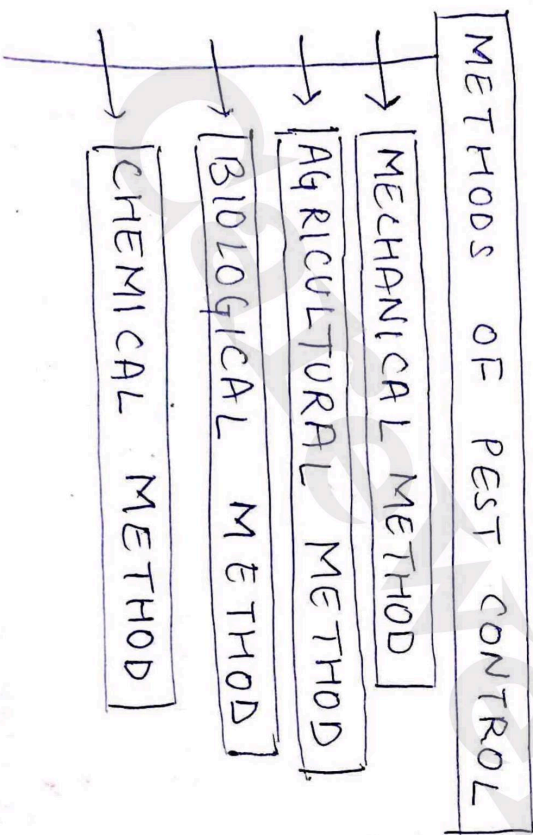
Eg → Corn Cocker seeds causes death of wheat flour when they are present in excessive quantities.

• non-insect pest : → Mammals like rat, mouse, rabbit and monkey causes the loss of cultivation. Caud drugs are

often contaminated due to faecal content and hair from rat and mice.
 → Rodents are responsible for transmitting disease (in cultivated plant) from which they are suffering.

PEST MANAGEMENT AND METHODS OF PEST CONTROL

Different techniques and methods are followed to control pests.



1. Mechanical Method ⇒ It includes simple techniques like hand picking, burning, using of pest traps (rats and mouse traps).
 → Destroy the eggs and larvae of insects and mammals.
 → Kill the insect and animal.
 → Construct & ware houses in order to protect crop from animals.
 2. Agricultural Method ⇒ It involves various methods such as crop rotation, inter cropping, solarisation, using use of organic pesticides, using pest to fight against pests, maintaining crop diversity etc. all these methods are used in order to manage pest so, that the crop must be safe.
- Crop rotation → Crop rotation is growing of different crops in field year after year, avoid exhausting of soil fertility and control weeds, pests and diseases.

3. Biological Method ⇒ This method involves, introducing a new enemy against pest in order to control the pests.

eg → introducing cats to combat (fight) against rat and squirrels.

• introducing birds to combat (fight) against insects.

4. Chemical control ⇒ chemical methods involve the use of synthetic chemicals that target specific pests. These chemicals are highly toxic to human. If improper use of these chemicals may lead to toxic effects on human and animals.

eg → Fungicides → chlorophenols and colloidal sulphur etc.

Herbicides → urea derivatives, calcium arsenate etc.

Insecticides → Malathion, Parathion etc.

Rodenticides → Zinc phosphate, warfarin.

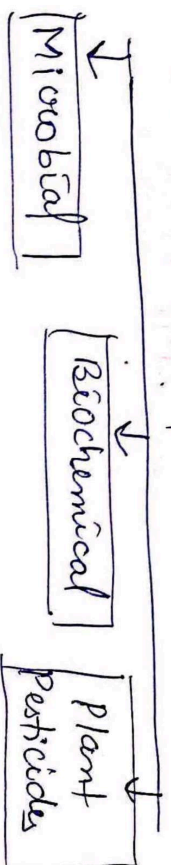
BIOPESTICIDES / BIOINSECTICIDES FOR PEST MANAGEMENT

Biopesticides or bioinsecticides are obtained from natural sources like micro-organism, plants, animals, insects and certain minerals.

→ They offer enormous advantages over chemical pesticides ⇒

1. safe to handle and use.
2. Non-toxic to plants and humans.
3. less expensive
4. Eco-friendly and don't affect soil fertility.
5. Biodegradable.

TYPES OF BIOPESTICIDES



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1. Biochemical Pesticides ⇒ These are naturally occurring chemical substances which are obtained from insects and animals which have ability to control the pests by non-toxic mechanism. These include substances like insect sex pheromones
 - Biochemical pesticides contain biomolecules that directly kill the pest.
 - Different functional classes:
 - Pheromones, semiochemicals, plant extract, natural insect growth regulators etc.
 - Even biopesticides need to be approved & registered before they can be used, sold or supplied.
2. Microbial Pesticides ⇒ Pesticides that contain micro-organism like bacteria, fungi or virus, which attack specific pest and species.

There are some fungi that act as bio herbicides (control weeds)

eg → Biofungicides → Trichoderma
 Bioherbicides → Phytophthora
 Bioinsecticides → B. thuringiensis.

Plant Pesticides ⇒ Plant pesticides are those plants which have pesticidal and insecticidal properties. They can be grown along with cultivated plants to control insects and can be used in powdered form or spray form. (after extracting constituents from them).

Example → Neem, Tobacco, Ryania etc.

HERBAL DRUG TECHNOLOGY

UNIT - 1

Chapter-3rd INDIAN SYSTEM OF MEDICINE

Topics → • Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy.

- Preparation and standardization of Ayurvedic formulations viz Arishtas and Asawas, Ghritika, churna, Lehya and Bhasma.

TRADITIONAL SYSTEM OF MEDICINE

→ Also known as Indigenous system of medicine, 'folk system and Indian system of ASU [Ayurveda, Siddha, Unani].

→ The system of medicine which is Indian in origin and the system of medicines which are come from other outside and got assimilated in Indian culture, both are known as Indian System of Medicine.

→ The system include knowledge, approaches and benefits of plants and minerals which are used in medicines and therapies in order to treat and cure the illness.

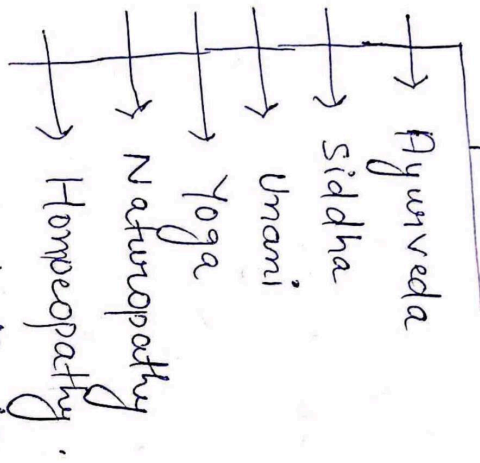
→ Traditional system of medicine meets the health care needs of large population in most of developing countries.

→ In Japan, allopathic physicians prescribe traditional medicine to the patients.

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→ India has five recognized systems of medicine.



Homeopathy came to India in 18th century and completely assimilated in Indian culture, hence it is considered as a part of Indian system of Medicine.

Ayurveda System of Medicine

- Oldest system of medicine
- Came into existence in about 900 B.C.

life → Ayurveda → science or to gain knowledge

→ The word Ayurved consist of two Sanskrit word 'Ayur' means 'life' and 'veda' means 'science' or 'to gain knowledge'. It is a science of life.

→ Charaka and Sushruta made significant contributions to Ayurveda.

→ The book "Charak samhita" was written by Charaka and also known as Father of Ayurveda.

Principle involved in Ayurveda

1. → Panchamahabhuta
2. → Tridosha
3. → Guna - Rasa Siddhanta

1. Panchabhuta Siddhanta or Panchamahabhuta

→ Elements.

According to this theory, the whole universe is made up of five basic elements known as "Mahabhutas". and these elements are present in human body.

→ The 5 - elements are ⇒ ① Pritivi (Earth)

② Jala (water)

③ Vayu (Air)

④ Agni (Fire)

⑤ Akash (Sky)

→ All these elements are in perfect balance in the body and when balance disturbed, the healthy ~~and~~ or illness condition developed.

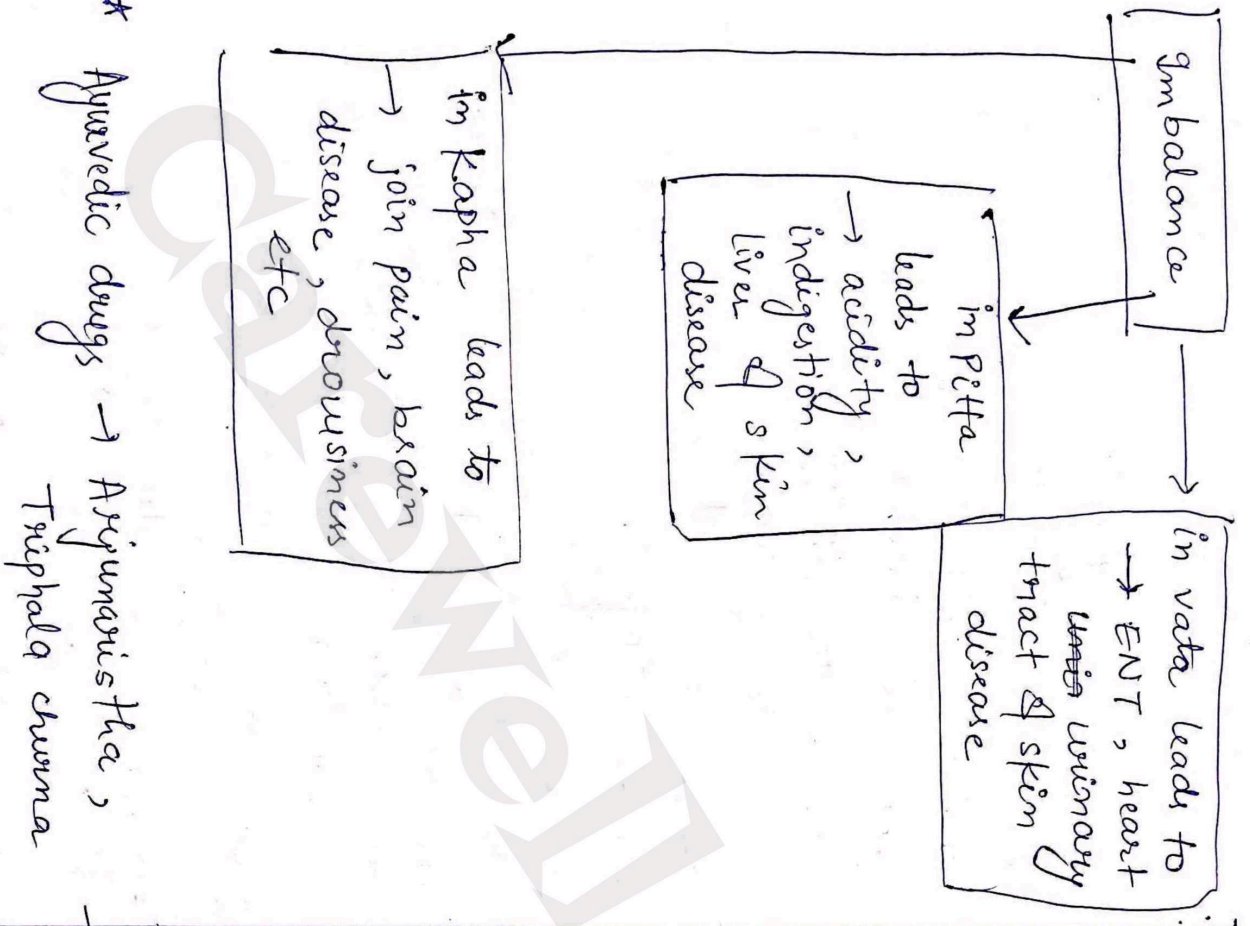
2. Tridosha Theory ⇒ According to this theory, the 5 basic elements (earth, water, air, fire and sky) exist in human body in combined form like Kapha (earth + water), Vata (air and sky) and Pitta (fire and water). Kapha, vata and Pitta collectively called as Tridosha (three pillars of life).

→ when Tridosha is balanced in body then body considered as healthy. If any imbalance in Tridosha, body is considered as disease condition. Ayurveda tries to maintain balance in these elements.

Vata → regulate psychic & nervous system

Pitta → regulator digestion, tissue building metabolism & energy production

Kapha → regulates mucous, formation of fluids and heat.



* Ayurvedic drugs → Arjuna, Triphala, Churna

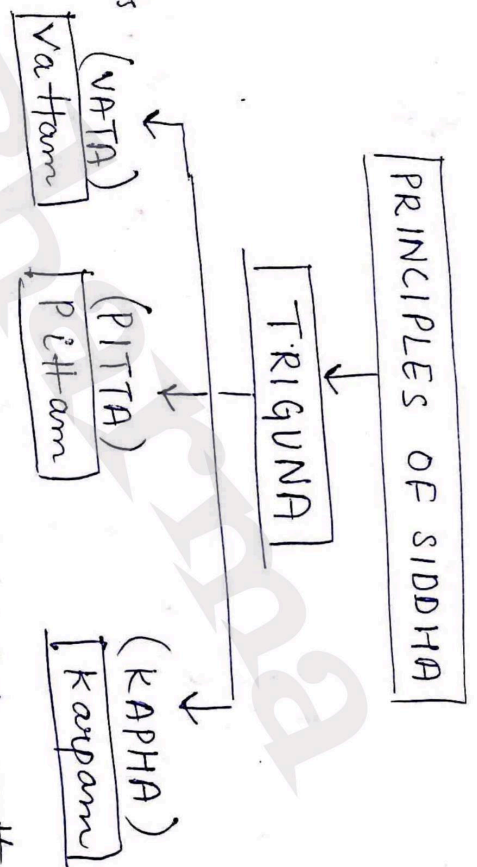
3. Guna - Rasa - Virya - Vipaka - Prabhava Siddhamta

These are considered as five Pharmacological properties of Drug substance i.e. Taste (Rasa) Taste (Guna) Active principle (Virya) Digestive product (Vipaka) Pharmacotherapeutic action (Prabhava)

SIDDHA SYSTEM OF MEDICINE

→ Siddha is one of the oldest systems of medicine in India originated from Tamil Nadu.

- siddha system is older than Ayurveda.
- 'Agastya' was believed to be Father of siddha system.
- Agastya wrote a ~~book~~ book known as 'Agasthya charakya'.
- The term siddha refers to achievements.
- Acc. to siddha system, human body and all objects in the universe is made up of five basic elements (earth, water, fire, air and sky). The maintenance of this determine health and imbalance leads to diseases.
- Cause of disease is identified in siddha system through observing colours of body, reading pulses, study of voice, checking of digestive system and examination of tongue and urine.



It is based on three principles vattam (vata), Pittam (Pitta) and Ka rppam (Kapha). Collectively known as

Triguna

1. Va ttam (vata) [sky + air] ⇒ vata esse characterized in people by black, cold and inactive personalities. • Increased vata develops flatulence, acidity, Obesity, heart attacks etc.

- Vata is predominant at 6.00 am to 10.00 am and 6.00 pm to 10.00 pm.

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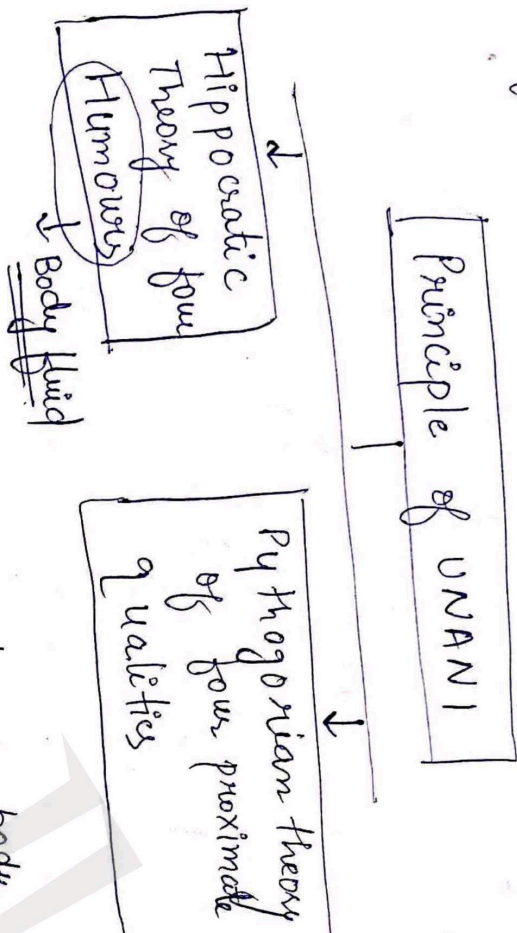
2. Pittam (Pitta) [Fire & water] ⇒
 - Pittam is characterized in people by whitish complexioned hot personality.
 - Increased Pitta shows early greying of hair, reddish eyes, burning chest, an aemia.
 - Pitta is predominant at 10.00 am to 2.00 pm and 10.00 pm to 2.00 am.
3. Karpam [Kapha] (earth + water) ⇒
 - Karpam is characterized in people by good complexioned personalities.
 - Increased Kapha leads to jaundices, heart attack, high fever, anaemia.
 - Karpam / Kapha predominant at 2.00 pm to 6.00 pm and 2.00 am to 6.00 am.

- The medicines are prepared in sidha by using plank, animals, minerals, metals (mercury, gold, silver, sulphur, zinc, copper, aluminium, borax and arsenic).
- Drugs of sidha system.
 - Churna (Powder)
 - Bhasma (calcinated drugs)
 - Cailigai (Pills & Tablets).

UNANI SYSTEM OF MEDICINE

- Originated in Greece.
- Start by a Greek Philosopher 'Hippocrates'.
- System is based on two principles / theory → Hippocratic theory of four humours and Pithagorian theory of four proximate qualities.
- System was later developed by Arabs

and become popular as 'Arab system of medicine'.



→ According to this system, human body is composed of four basic element i.e earth, air, water and fire having cold, hot, wet and dry temp. respectively.

→ The body fluids are made up of four humours, i.e blood, phlegm, yellow bile and black bile and temp. of these humours are →

(i) Blood : hot & wet
(ii) Phlegm : cold and hot

(iii) yellow bile : hot & dry
(iv) Black bile : cold & dry.

→ Quality and quantity of four humours affect the state of health and disease in body.

- If humours in body are in equilibrium then healthy body
- If imbalance of humours in body leads to disease condition.

Hippocratic Theory of four Humours

- (i) Blood
- (ii) Phlegm
- (iii) yellow bile
- (iv) Black bile

→ There are four humours in body and regulate the function of body and provide nourishment. Abnormality and imbalance of humours leads to disease.

2. Pythagorean Theory of four proximate qualities :→ include hot, cold, moist and dry. These four qualities are present in human body in combinations and represent four basic elements of universe.

<u>4 humors</u>	<u>4 Qualities</u>	<u>4 elements</u>
Blood →	Hot & moist →	Air
Phlegm →	cold & moist →	Water
Yellow bile →	Hot & dry →	Fire
Black bile →	cold & dry →	Earth

→ Imbalance leads to disease condition.

→ Unani drugs → Habb, Quers, Safoof, majoon, Arq etc

HOMOEOPATHIC SYSTEM OF MEDICINE

- It is new system of medicine & developed in eighteenth century.
- Homeopathy comprises of two words → 'Homo' means similar and 'Pathos' means 'suffering', so, homeopathy is a system of similar suffering.
- system introduced by Dr. Samuel Hahnemann → physician of Chemist in Germany.
- Homeopathy works on principle of law of similar, i.e. [lets likes cure likes]. Means if a drug substance that cause symptoms in healthy person, that drug can also cure those same symptoms in sick person.

PRINCIPLE OF HOMOEOPATHY

1. → Individualization
2. → Law of similars.
3. → Principle of simplex
4. → Minimum dose
5. → Law of proving
6. → Law of dynamisation
7. → vital force

1. Individualization ⇒ Concept is that, No two individuals in the world are ~~the~~ same, hence disease affecting individuals and their response cannot be similar.
2. Law of similars ⇒ A drug can cure a disease if it produces similar

Symptoms of disease in a healthy individual. (vaccines)

3. Principle of simplex ⇒ At one time, only a single simple medicine is given to a patient. • The combination of medicine is not allowed.

4. Minimum dose ⇒ This rule state that, lowers the dose of medicine, the greater is effectiveness.

5. Law of proving ⇒ The testing of drug is done by healthy volunteers. To prove a drug, dose of healthy person daily to a group of healthy and symptom experienced are carefully recorded.

6. Law of dynamisation ⇒ Medicine should preserve the normal state of healthy body.

7. Vital Force ⇒ Medicine should ~~have~~ have the capacity to develop sufficient energy to maintain a healthy body.

* Homeopathic drugs ⇒ Fungi, saliva, hormones, toxic metals etc.

PREPARATION AND STANDARDIZATION OF AYURVEDIC FORMULATIONS

Ayurvedic formulations are categorized into 4 types

- **Solid dosage forms**: Vati, Ghritika
- **Semisolid dosage form**: Leha, Kalka
- **Liquid dosage form**: Arishta, Asava
- **Powder dosage form**: Bhasmas, churnas.

ARISTAS AND ASAVAS

→ Arishta is prepared from medicinal herbs

decoction extraction process

→ Asavas is prepared from fresh herbs.

Prepn of Arishta

Take a crude drug or herb.

Crude drug or herb is coarsely powdered

Then, decoction is prepared from that crude drug powder.

Now transfer ~~the~~ to fermentation vessel/pot. (earthen vessel/pot)

Add soln of sugar, Jaggery or honey

Any other additive added along with Dhataki pushpa (used as preservative) in vessel.

close the ^{vessel with} earthen lid, sealed edges with

Clay ~~and~~ smeared cloth in seven consecutive layers.

पानी से रोज़ा हुआ गाँड़ा

Container is placed in heap of paddy एपिग फीर
for specific period of time.
→ Heap of paddy is used to maintain
constant temp. during fermentation

↓
After a specified time earthen lid is removed carefully and content of container are examined out [is process of fermentation is complete or not?].

↓
Decant the fluid and filter and kept for 2-3 days

↓
~~The~~ Boiled the decanted fluid to avoid further fermentation

↓
Fill in bottle and seal
(Aushtha)

↓
Decant Decantation meaning → Pouring a liquid in another container while leaving a solid behind.

Prepn of Asava

★ [only decoction process is missed here, ~~and~~ rest process is same]

Take a crude drug or fresh herbs

↓
Crude drug or herb is coarsely powdered

↓
Transfer to fermentation vessel / pot
[earthen vessel / pot]

↓
Add soln of sugar, Jaggery or honey.

↓
Any other additive added along with Dhataki pushpa (which is used as preservative) in vessel.

↓
Close the vessel with an earthen lid and seal its edges with cloth smeared in clay in seven layers

Container is placed in heap of paddy for specific period of time. [heap of paddy is used to maintain constant temp. during fermentation]

After a specified time earth lid is removed carefully and content of the container is examined out [is process of fermentation is complete or not?]

Decant the fluid and filter and kept for 2-3 day
↓
Boiled the decanted fluid to avoid further fermentation

↓
Asava is obtain. Fill in bottle & seal

Standardization parameters for Arishta and Asava

1. Arishta & Asava both are clear liquid prepⁿ without any foam at top.
2. Both have aromatic & alcoholic odour
3. Both do not become sour upon standing
4. Taste is flavonoid.
5. Colour → Black or dark brown
6. Odour → Aromatic
7. PH → 3 ± 1.50
8. specific gravity at 25°C
9. Boiling point
10. Viscosity → 3.53 cps
11. Alcohol content → $15\% \text{ v/v}$

* Don't need to write values of standardization parameter bcoz it vary from drug to drug. So, only names of standard parameter are sufficient

VATI & GHUTIKA (Tablets and pills)

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

Prepⁿ of VATI and Ghutika ⇒

The drugs of plant origin are dried

↓
dried drug made into fine powder,

↓
Drugs and other ingredients are mixed.
(As per mentioned formula)

↓
Then put into mortar and ground to make a soft past with the prescribed fluid / liquid.

Tablets (vati) and pills (ghutika) are made / prepare from soft paste

↓
And then dried in sunlight.

Standardization of vati & Ghutika

For standardization Ghutika & vati should be evaluated on following parameter →

1. Hardness
2. Friability
3. Dissolution
4. Disintegration
5. Colour
6. Odour
7. PH

8. → Both should be stable upto 3 years after prepⁿ.

9. → Both should not lose their original colour, odour, taste.

10. → If they contain sugar/salt, they should be protected from moisture.

Eg → vati → Gandhaka vati and
sankha vati

Ghritika → Pranda ghritika and
Lasunadi ghritika.

CHURNA ⇒ It is powdered

dosage form which contain single
or combination of drugs along with
other ingredients

Prepn of churna

The drug and other ingredient (mentioned
in formula) which are used for
Prepn of churna are dried separately

Then made fine powdered of each
↓

Then passed through sieved (mesh no. 80)
to get uniform particle size.

↓
Then these drug powdered are mixed
with each other accurately to
get a

Uniform Powder i.e churna

Standardization of churna ⇒

1. PH → 7 to 11
2. Total ash value → 4.76
3. Alcohol soluble → 7.07 ± 0.09
4. Moisture content → .
5. Density → 0.1 - 0.7 g/ml
6. Finer the powder, better is its
potency of therapeutic value.
7. Churnas are stable upto 1 year
8. Churnas must be free flowing
powder and should not
become moist.

Eg → Sudarshan churna, Drakshadi
churna.

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BHASKMA :-> Bhaskma are powdered dosage form of drugs prepared by calcination (heating the solid in air to change its original form) of metals, minerals or animal products.

Prepⁿ of Bhaskma => 2 stages of Prepⁿ

sodha
↓
Mashana

1. **sodhana** -> It is a process of purification of metals, minerals by heating them from immersing in specific liquid.
It is done to remove its toxicity.

Mashana -> Take the purified drug which we made from sodha process

then ground the drug & mixed other ingredient into it and make small cakes.

↓
Dry the cakes in sunlight

↓
then dried cakes are placed in earthen vessel and sealed the vessel with clay smeared cloth.

↓
Now place the vessel in pit (STB) which is covered with cow dung.

↓
put the ~~the~~ fire in pit.

↓
After heating and ~~the~~ cooling, the vessel is taken out and remove the contents from vessel and ground into fine powder & then store it.

Standardization of Bhasma →

- 1 → Bhasma are grey, whitish, yellow or black colour powders.
- 2 → should not change their original colour
- 3 → Stable for long period of time
- 4 → colour
- 5 → odour
- 6 → Taste
- 7 → Total ash
- 8 → PH

Eg → Sivarvama Bhasma
Shankha Bhasma