

Classification of crude drug

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Crude drugs:

Products of plants and animal origin found in raw form and pharmaceutical products from natural origin & include subs from mineral origin like kaolin, bentonite, etc.

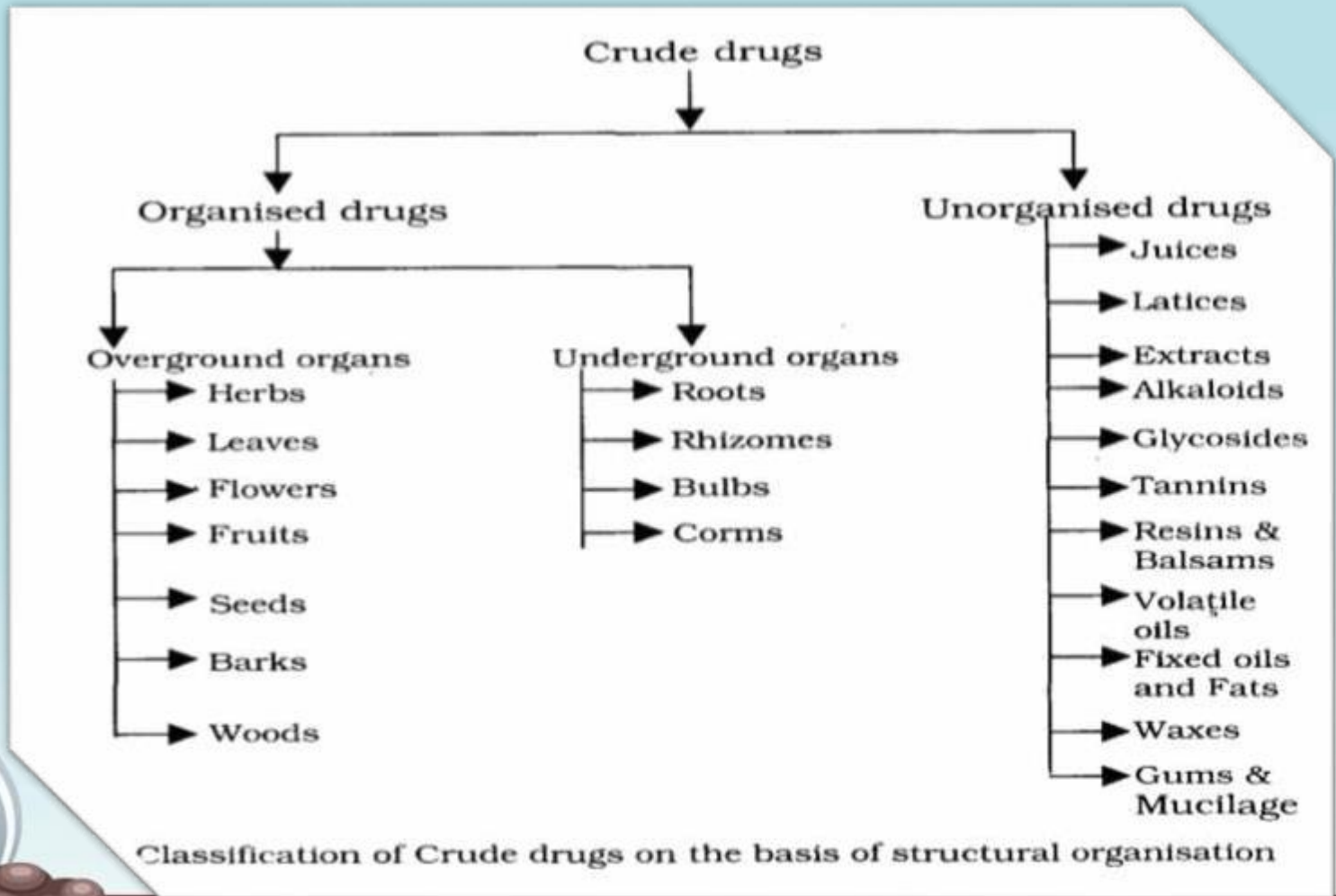
Crude drugs are further grouped as **organised** (cellular) or **unorganised** (non-cellular) according to whether contain a regularly organized cellular structure or not. Unorganised crude drug doesn't contain cells but cellular part either solid or liquid.

Organized drugs	Unorganized drugs
They are the sources from plants and animals.	They are the sources of plants, animals, and minerals.
They procured directly from the above sources.	They are products of plants and animals and obtained by extraction, distillation, incision methods.
They have proper cellular structures like, leaves, flowers, fruits, barks, roots, woods etc.	They do not have well defined cellular structure like gum, mucilage, resin etc.
They are identified by morphological characters.	They are identified by organoleptic properties.
They are solid in nature.	They are solid, semi-solid and liquid in nature.
To study their characters, transverse section is used for drugs under microscope.	To study their characters, physical parameters like density, optical rotation, viscosity, refractive index, chemical tests are important.
Examples: Woods: Quassia, sandal wood. Leaves: Digitalis, Eucalyptus, Mint, Senna,	Examples: Dried Latex: Opium, Papain. Dried Juice: Aloe, Kino.

Crude Drugs

Classification of crude drugs :

Based on structural organisation



Classification of crude drugs

- 1. Alphabetical**
- 2. Taxonomical**
- 3. Morphological**
- 4. Chemical**
- 5. Pharmacological**
- 6. Chemo-taxonomical**

1. ALPHABETICAL CLASSIFICATION:

Crude drugs are arranged according to their Latin or English names alphabetically: Some of the **Pharmacopoeias and reference books** which classify crude drugs according to this system are as follows

1. Indian Pharmacopoeia.
2. British Pharmacopoeia.
3. United States Pharmacopoeia & National Formulary.
4. British Herbal Pharmacopoeia.
5. British Pharmaceutical Codex.
6. European Pharmacopoeia (Latin titles).
7. Encyclopaedia of common Natural ingredients used in drugs and cosmetics.

e.g.: Acacia, benzoin, cinchona, dill, ergot, fennel, gentian, hyoscyamus, ipecacuanha, jalap, kurchi, liquorice, myrrh, Nux vomica, opium, podophyllum, quassia, rauwolfia, senna, uncaria gambier, vasaka, wool fat, yellow bees wax, zedoary.

- **Advantages:**

It is simple method, in this system location, tracing and addition of the drug is easy, No technical person is required for handling the system.

- **Disadvantages:**

- Scientific nature of the drug cannot be identified by this method, whether they are organised or unorganised drug
- This system does not help in distinguishing the drugs of plant, animal and mineral source. (Original source is not clear)

Examples:

Acacia, Agar, Benzoin, Beeswax, Cinchona, Cinnamon, Digitalis, Datura, Ephedra, Fennel, Ginger, Isapagol, Jalap, Kino, Linseed, Mustard, Nutmeg, etc

2. TAXONOMICAL CLASSIFICATION:

- The drugs are classified according to plants or animals from which they are obtained in Phylum, Orders, Families, Genera, Species, Sub-species, etc.
- This system of classification is criticized for its failure to recognize the organized and unorganized nature of crude drugs and chemical nature of active constituents and therapeutic significance of crude drugs
 - Phylum - Spermatophyta
 - Division - Angiospermae
 - Class - Dicotyledons
 - Order - Rosales
 - Family - Leguminosae
 - Sub-family - Papilionaceae
 - Genus - Glycyrrhiza, Astragalus, Myroxylon
 - Species - Glycyrrhiza glabra, Astragalus gummifer, Myroxylon balsamum.

- **Phylum - Spermatophyta**
- **Division - Angiospermae**
- **Class - Dicotyledons**
- **Sub-class - Sympetalae**
- **Order - Tubiflorae**
- **Family - Solanaceae**
- **Genus - Atropa, Hyoscyamus, Datura**
- **Species - Atropa belladonna, Hyoscyamus niger, Datura stramonium**

In this system the drug are arranged according to taxonomical studies.

The drugs are arranged according to their phylum, order, family, genus and species. It is purely a type of botanical classification or biological classification and restricted mainly to crude drugs from plant source

3. MORPHOLOGICAL CLASSIFICATION:

- Here the crude drugs are arranged (Grouped according to the part of the plant or animal represented into organised (Cellular) drugs and unorganised (Acellular) drugs.
- **Organised (Cellular):**
- Drugs are the direct parts of the plant and are divided into leaves, barks wood, root, rhizome, seed, fruit, flower, stem, hair and fibers.
- **Unorganised (Acellular):**
- Drugs are the products of plant, animal and mineral source and they are divided into dried latex, dried juice, dried extracts, gums, resins, fixed oils and fats, waxes, volatile oil, animal products, minerals (Solids, liquids, semi solids etc).
- **Advantages:**
- This system of classification is more convenient for practical study especially when the chemical nature of the drug is not clearly understood.
- This type of classification is very useful in identifying the adulterants used.

Disadvantages:

- It does not give an idea about biological source, chemical constituents and uses.
- When different parts of the plant contain different chemical constituents, it is difficult to classify them.

3. MORPHOLOGICAL CLASSIFICATION:

- The crude drugs are grouped according to the parts of the plants or animal represented into organised and unorganised drugs.
- Seeds - nux-vomica, strophanthus, isabghol, castor
- Leaves - senna, digitalis, vasaka, eucalyptus
- Barks - cinchona, kurchi, cinnamom, quailia
- Woods - quassia, sandalwood, red-sanders
- Roots - rauwolfia, ipecacuanha, aconite, jalap
- Rhizomes - turmeric, ginger, valerian, podophyllum
- Flowers - clove, pyrethrum, saffron, artemisia
- Fruits - coriander, colocynth, fennel, bael
- Entire drugs- ephedra, ergot, cantharides, belladonna
- Dried latices- opium, gutta-percha, papain
- Resins & resin combinations - balsam of tolu, myrrh, asafoetida, benzoin
- Dried juices - aloes, kino, red gum
- Gums - acacia, tragacanth, ghatti gum, guar gum
- Dried extracts- gelatin, catechu, agar & curare

4. CHEMICAL CLASSIFICATION:

• Here, the crude drugs are divided into different groups according to the chemical nature of their most important constituent present in the drug to which the pharmacological/therapeutic activity of drug is attributed

- **Glycosides** - Digitalis, senna, cascara, liquorice
- **Alkaloids** - Nux vomica, ergot, cinchona, datura
- **Tannins** - Myrobalan, pale catechu, ashoka
- **Volatile oils** - Peppermint, clove, eucalyptus, garlic
- **Lipids** - Castor oil, bees wax, lanolin, cod liver oil, kokum butter
- **Carbohydrates** - Acacia, agar, guar gum, pectin, honey, isapghula
- **Resins & resin** - Colophony, jalap, Balsam of Tolu
- **Vitamins** - Yeast, Shark liver oil, Oxytocin, Hormones insulin
- **Proteins** - casein, gelatine, papain, trypsin

Preferred method of classification, since therapeutic and pharmacological significance is based on the chemical composition of crude drugs.

- **Advantages :**

- Chemical constituents are known,
- Medicinal uses are known

- **Disadvantages :**

- Drugs of different origin are grouped under similar chemical titles.
- This type of classification makes no proper placement of drugs containing two different types of chemicals.

Eg: Certain drugs are found to contain alkaloids and glycosides (Cinchona), Fixed oil and volatile oil (Nutmeg) of equal importance together and hence it is difficult to categorize them properly

5. PHARMACOLOGICAL (THERAPEUTIC) CLASSIFICATION:

This involves the grouping of crude drugs according to the **pharmacological action of their active constituents** or their therapeutic uses, regardless of their morphology, taxonomical status, or chemical relationships.

The drugs differing in MOA but having same pharmacological effects are also grouped together, e.g. bulk purgatives, irritant purgatives,
emollient purgatives

- **Drugs acting on GIT:**

Bitters - Gentian, Quassia, Cinchona

Carminatives - Dill, Mentha, Cardamom

Emetics - Ipecacuanha

Anti-amoebiasis - Kurchi, Ipecacuanha

Bulk laxatives - Agar, Isapghula, Banana

Purgatives - Senna, Castor oil

Peptic ulcer - Derivatives of Glycyrrhithinic acid treatment
(Licorice and Raw banana)

Drugs acting on respiratory system

- Expectorant - Licorice, Ipecacuanha, Vasaka
- Anti-tussives - Opium (Codeine, Noscapine)
- Bronchodilators - Ephedra, Tea (Theophylline)

Drugs acting on CVS:

- Cardiotonics - Digitalis, Squill, Strophanthus
- Cardiac depressants - Cinchona (quinidine), Veratrum
- Vaso-constrictors - Ergot (ergotamine), Ephedra
- Anti-hypertensives - Rauwolfia

Drugs acting on autonomic nervous systems:

- Adrenergics - Ephedra
- Cholinergics - Physostigma, Pilocarpus
- Anticholinergics - Belladonna, Datura

Drugs acting on CNS:

- Central analgesics - Opium (morphine)
- CNS Stimulants - Coffee (caffeine)
- Analeptics - Nux-vomica, Lobelia, Camphor
- CNS depressants - Hyoscyamus, Belladonna, opium,
- Hallucinogenics - Cannabis, Poppy Latex

- **Anti-spasmodics:**

- Smooth Muscle Relaxants - Opium, Datura, Hyoscyamus
- Skeletal Muscle Relaxants - Curare
- **Anti-cancer:** Vinca, Podophyllum, Taxus, Camptotheca
- **Anti-rheumatics:** Aconite, Colchicum, Guggul
- **Astringents:** Myrobalan, Black Catechu

6. CHEMOTAXONOMIC CLASSIFICATION:

In this system of classification, the equal importance is given for **taxonomical status** and chemical constituents. There are certain types of chemical constituents which are characteristics of certain classes of plants.

Eg: Tropane alkaloids generally occur in most of the members of Solanaceae

Eg: Volatile oils occur in the members of Umbelliferae and Rutaceae.

Thank you

Primary Metabolites	Secondary Metabolites
<ol style="list-style-type: none">1. These are biomolecules required for basic metabolic processes.2. These are produced in generous quantities and can easily be extracted from the plant.3. These are found throughout the plant kingdom.4. These are part of the basic molecular structure of the cell.5. They are highly useful to plant.6. They are found from the start of plant life.	<ol style="list-style-type: none">1. These are derivatives of primary metabolites which are not involved in basic.2. These are produced in small quantities and their extraction from the plant is difficult.3. Particular secondary metabolites are found in one plant species or families and not all.4. These are not part of the basic molecular structure of the cell.5. They have limited role in plant.6. They are found at particular stages of development.

