

CHAPTER 2.

Various systems of classification of drugs of natural origin.

Crude drugs means collection and drying of unprocessed natural substances obtained in crude form from nature's different sources like plant, animal, mineral, marine and biotechnology. These unprocessed crude drugs are further grouped as Organised (cellular) and Unorganised (acellular) drugs. Organized drugs are crude drugs represents part of a plant and are, therefore, made up of cells. Unorganized drugs are a diverse group of solid and liquid materials which do not consist of parts of plants and are obtained from natural sources by a variety of extraction procedures.

In pharmacognosy, crude drugs classified according to

- I. Alphabetical Classification
- II. Taxonomical Classification
- III. Morphological Classification
- IV. Chemical Classification
- V. Pharmacological Classification
- VI. Chemotaxonomical Classification

It is noted that, none of them give total profile of natural drugs and has its own limitations

I. Alphabetical Classification

Crude drugs arranged according to alphabetical order of their Latin and English names. Some of pharmacopoeia and reference books classify crude drugs according to this system are as follows eg. Indian pharmacopoeia, British pharmacopoeia, United States pharmacopoeia, National Formulary British Pharmaceutical Codex, European Pharmacopoeia used in Drugs and Cosmetics

Taxonomy: Practice of classifying plants and animals according to their presumed natural relationships

II. Taxonomical Classification

Drugs classified according to plants or animals from which they are obtained in phyla, orders, families, genera, species, subspecies, etc. This method of classification is based on considerations of natural relationship or phylogeny among plants or animals. Crude drugs of plant origin are classified on the basis of one of the accepted systems of botanical classification. A large number of plant families have certain distinguishing characteristics that permit crude drugs from these families to be studied at one time. Thus, drugs obtained from plants having alternate leaves, cymose flowers and fruits that are berries or capsules (hyoscyamus, datura, belladonna and stramonium) are considered with other members of Solanaceae.

Taxonomical classification of crude drugs derived from dicot plants as follows.

a. Phylum	...	Spermatophyta
b. Division	...	Angiospermae
c. Class	...	Dicotyledons
d. Order	...	Rosales
e. Family	...	Leguminosae
f. Sub-family	...	Papilionaceae
g. Genus	...	<i>Glycyrrhiza, Astragalus, Myroxylon.</i>
h. Species	...	<i>Glycyrrhiza glabra, Astragalus gummifer, Myroxylon balsamum</i>

III. Morphological Classification

Crude drugs grouped according to part of plant or animal represented into organised and unorganised drugs. organised drugs divided into parts of the plants like leaves, flowers, fruits, seeds, woods, barks, subterranean parts like roots and rhizomes. unorganised drugs are dried latex, gums, extracts, etc.

Some of the examples of crude drugs under this type of classification are as follows.

a. Seed	...	Nux vomica, Strophanthus, Areca, Castor
b. Leaf	...	Senna, Digitalis, Vasaka, Eucalyptus
c. Bark	...	Cinchona, Kurchi, Cinnamon, Quillaia
d. Wood	...	Quassia, Sandalwood, Sassafras, Red sanders
e. Root	...	Rauwolfia, Ipecacuanha, Aconite, Jalap
f. Rhizome	...	Turmeric, Ginger, Valerian, Podophyllum
g. Flower	...	Clove, Pyrethrum, Artemisia, Saffron
h. Fruit	...	Coriander, Colocynth, Fennel, Bael
i. Entire Organism	...	Ephedra, Ergot, Cantharides, Belladonna
j. Dried Latex	...	Opium, Gutta-percha, Papain
k. Resin combinations	...	Balsam of Tolu, Myrrh, Asofoetida, Benzoin
l. Dried Juice	...	Aloes, Kino, Red gum
m. Gum	...	Acacia, Tragacanth, Ghatti gum, Guar gum
n. Dried extract	...	Gelatin Catechu, Agar, Curare

This system of classification is more convenient for practical purposes, especially when chemical nature of drug is not clearly understood.

Morphology: The branch of geology that studies the characteristics and configuration and evolution of rocks and land forms

IV. Chemical Classification

Crude drugs are divided into groups according to chemical nature of their constituent. Since pharmacological activity and therapeutic significance of crude drugs based on nature of their chemical constituents, chemical classification of crude drugs is preferred method of study. The crude drugs containing alkaloids are grouped together, regardless of their morphology and taxonomical behaviour.

Few examples of drugs under chemical classification are as follows.

- a. Glycosides ... Digitalis, Senna, Cascara, Liquorice
- b. Alkaloids ... Nuxvomica, Ergot, Cinchona, Datura
- c. Tannins ... Myrobalan, Pale Catechu, Ashoka
- d. Volatile oils ... Peppermint, Clove, Eucalyptus, Garlic
- e. Lipids ... Castor oil, Bees wax, Lanolin, Cod liver oil
- f. Carbohydrates & Derived products ... Acacia, Agar, Honey, Ispaghula
- g. Resins and Resin Combinations. ... Colophony, Jalap, Balsam of Tolu.
- h. Vitamins and Hormones ... Yeast, Shark liver oil, Oxytocin, Insulin
- i. Proteins and Enzymes. ... Gelatin, Papain, Trypsin

Chemical method of classification is preferred for systematic study of crude drugs, inspite of fact that crude drugs belonging to different morphological or taxonomical categories may be brought together, provided there is some similarity in the chemical nature of principles.

V. Pharmacological Classification

This system of classification involves grouping of crude drugs according to pharmacological actions regardless of constituent, morphology, taxonomical status or chemical relationship, drugs are grouped together,

- (a) Laxatives: Aloes, Rhuburb. Castor oil, Ispaghula, Senna.
- (b) Cardiotonics-Digitalis, Arjuna.
- (c) Carminatives & G.I regulators – Umbelliferous: Coriander, Fennel, Ajowan, Cardamom Ginger, Black pepper, Asafoetida. Nutmeg. Cinnamon, Clove
- (d) Astringents-Catechu.
- (e) Drugs acting on nervous system - Hyoscyamus, Belladonna. Aconite, Ashwagandha. Ephedra, Opium, Cannabis, Nux vomica and Datura.
- (f) Antihypertensives - Rauwolfia.
- (g) Antitussives - Vasaka, Tolu balsam, Tulsi.
- (h) Antirheumatics - Guggul, Colchicum.
- (i) Antitumour - Vinca.
- (j) Antileprotics - Chaulmoogra Oil.
- (k) Antidiabetics - Pterocarpus, Gymnema, Sylvestro.

- (l) Diuretics - Gokhru, Punarnava.
- (m) Antidysentrics - Ipecacuanha.
- (n) Antiseptics and disinfectants Benzoin, Myrrh. Nim, curcuma.
- (o) Antimalarials - Cinchona.
- (p) Oxytocics - Ergot.
- (q) Vitamines - Shark liver Oil and Amla.
- (r) Enzymes - Papaya, Diastase, Yeast.
- (s) Perfumes and flavouring agents - Peppermint Oil, Lemon Oil, Orange Oil, Lemon grass Oil, Sandalwood.
- (t) Pharmaceutical aids - Honey, Arachis Oil, Starch, Kaolin, Pectin, Olive oil, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatin.
- (u) Miscellaneous - Liquorice, Garlic, Picrorhiza, Dioscorea, Linseed, Shatavari, Shankhapushpi, Pyrethrum, Tobacco.

VI. Chemotaxonomical Classification

The expanding knowledge of the phytochemical screening has revealed the existence of close relationship between chemical constituents of plants and their taxonomical status. The concept of 'chemotaxonomy' has brought the plant chemist back to the systematic botany in view of the fact that certain chemical compounds have been found to characterize certain botanical groupings. Chemotaxonomy establishes a relationship between the position of the plant and attempts to utilise chemical facts to obtain more exact understanding of biological evolution and natural relationships. The knowledge of chemotaxonomy could serve the basis for the classification of crude drugs. The location of berberine alkaloid in *Hydrastis*, *Berberis* and *Argemone*, distribution of rutin, ranunculaceous alkaloids and flavonoids in species of higher plants are of chemotaxonomical significance.