Pharmacognosy – I

(Unit – 3)

(Classification Of Drugs)

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CLASSIFICATION

Vegetable drugs can be arranged for study under the following headings:

- Alphabetical
- Morphological
- Taxonomical / Biological
- Pharmacological / Therapeutic
- Chemical

1. Alphabetical

- Either Latin or vernacular names may be used.
- This arrangement is employed for dictionaries,pharmacopoeias, etc.
- Although suitable for quick reference it gives noindication of inter-relationships between drugs.

In this classification drugs are classified in alphabetical order using either their Greek name or Latin name. Though pharmacopoeias, formulary, encyclopedias of various countries follow this classification, but due to lack of scientific value now-a-days this classification is not preferred.

Example: Acacia, Bael, Cinchona, Dill, Ergot, Fennel, Ginger, Henbane, Ipecac, Jalap, Kurchi, Licorice, Myrrh, Nux-Vomica, Opium, Podophyllum, Quassia, Rauwolfia, Senna, Tea, Urgenia, Vasaka, Wool Fat, Yam, Zedoary etc.

- Major Advantage of this method is that it provides quick reference.

2. Morphological

Drugs are arranged according to their morphological or external characters of the plantparts or animal parts, i.e. which part of the plant is used as drug.

This is most simple classification method where crude drugs are grouped into two major classes: organized (having specific parts of plant like root, rhizome, flower, leaf, fruit, bark, seed, wood etc.,) and unorganized drugs (dried lattice, juice, gum, wax, oil etc.). But many crude drugs are very similar morphologically and hence difficult to distinguish. Many times, crude drug available in powder form that time morphological classification is not so suitable and acceptable.

- Organized drugs:

obtained from the direct parts of the plants and containing cellular tissues.

e.g. leaves (digitalis, Senna, belladonna),

flowers (clove, saffron),

fruits (amla, cardamom, cumin),

seeds (ispaghula, linseed, Phyto stigma),

herbs (ergot, vinca),

barks (cinchona),

rhizomes and roots (aconite, ginseng, ipecac, rauwolfia),

hair &fibers (flax)

❖ Unorganized drugs:

prepared from plants by some intermediate physical processes such as incision, drying or extraction with a solvent and not containing any cellular plant tissues.

e.g. latex (opium),

dried juice (aloe),

extracts (agar, catechu, pectin),

waxes (beeswax),

gums (acacia, guar gum),

resins (benzoin, colophony, tolu balsam),

volatile oil (turpentine, cinnamon, peppermint, clove),

fixed oils & fat (arachis, castor, olive, cod liver),

➢ Advantage:

More convenient for practical study especially when the chemical nature of the drug is not clearly understood.

➢ Disadvantage:

there is no correlation of chemical constituents with the therapeutic actions.

Organised crude drugs		***Un-organised crude drugs***	
Obtained from parts of plants		Obtained from parts of plants& Animal	
Well defined structure		Not well-defined structures	
Solid in nature		Semisolid, solid, liquid in nature	
Microscopic studies are useful in quality control		Chemical tests are more useful in quality control	
Examples		***Examples***	
Parts	**Example**	**Class**	**Example**
Leaves	Senna, digitalis, vasaka, eucalyptus	Resins	Balsam of tolu, myrrh, asafoetida, benzoin
Barks	Cinchona, kurchi, cinnamom, quaillia	Gums and mucilages	Acacia, tragacanth, guar gum
Woods	Quassia, sandalwood	Dried latices	Opium
Roots	Rauwolfia, ipecacuanha, aconite	Dried juices	Aloes, kino
Rhizomes	Turmeric, ginger, valerian, podophyllum	Volatile oils	Cinnamon oil
Seeds	Nux-vomica, strophanthus	Fixed Oil	Castor oil and lard
Fruits	Coriander, colocynth, fennel, bael	Extracts	Catechu
Entire plant	Vinca, belladonna	Saccharine substances	Honey

3. Taxonomic / Biological

Drugs are arranged according to the plants from which they are obtained, in kingdom, subkingdom, division, class, order, family, genus and species.

In this classification crude drugs are arranged according to taxonomic order i.e., phylum, division, class, sub-class, orders, families, genus and species. Precise and orderly arrangement of drugs has no ambiguity in this classification. But again, this type of classification lacks scientific value and unorganized crude drugs are difficult to classify.

- Advantage:

It allows for a precise and ordered arrangement and accommodates any drug without

ambiguity; helpful for studying evolutionarydevelopments.

- Disadvantage:

does not correlate in between thechemical constituents and biological activity of thedrugs.

Example:

- Phylum - Spermatophyta
- Division - Angiospermae
- Class - Dicotyledons
- Sub-class - Sympetalae
- Order - Tubiflorae
- Family - Solanaceae
- Genus - Atropa
- Species – belladonna

❖ Class

— Angiospermae (Angiosperms): plants that produceflowers

Examples: Rose, Sunflower, Mustard Oil etc.

— Gymnospermae (Gymnosperms): Plants which do notproduce flowers

Examples: Pinus, Gnetum, Cycads etc.

❖ Subclass

– Dicotyledonae (Dicotyledons, Dicots): plants with twoseed leaves

Examples: Peanut, Marigold, Sunflower etc.

– Monotyledonae (Monotyledons, Monocots): plantswith one seed leaf

Examples: Palm tree, Grasses, Bananas, Orchids etc.

❖ Suborder

A group of related plant families,classified in the order in which they arethought to have developed their differencesfrom a common ancestorEach superorder is further divided into severalorders; the names of the orders end in -ales

❖ **Family**

- Each order is divided into families
- These are plants with many botanical features incommon, and are the highest classification normallyused.
- The names of the families end in —aceae

Examples: Apocynaceae

Lamiaceae

Liliaceae

Solanaceae

Papaveraceae

Roseaaceae

❖ **Subfamily**

The family may be further divided into a number ofsubfamilies, which group together plants within the family that have some significant botanicaldifferences.

— Subfamilies end in -oideae

❖ **Genus**

Part of the plant name that ismostfamiliar; the normal name that you give a plant

- Papaver (Poppy)
- Arachis (Peanut)

❖ **Species**

- Level that defines an individual's plant.
- The name describes some aspects of the plant.
- The color of the flowers, size and shape of the leaves, and it may be named after the place where it was found.
- Should be written after genus name, in small latter.

4. Pharmacological/ Therapeutic

Drugs acting on G.I.T.

- Carminative - Fennel, Cardamom, Mentha
- Emetic - Ipecac
- Antiamoebic - Kurchi, Ipecac
- Laxative Agar, Isabgol, Banana
- Purgative - Senna, Castor oil

Cathartic - Senna

Drugs acting on Respiratory System

- Antitussive - Opium (codeine)
- Bronchodilators - Ephedra, Tea
- Expectorant - Vasaka, Liquorice, Ipecac

Drugs acting on Autonomic Nervous System

- Adrenergic- Ephedra
- Cholinergic - Physostigma, Pilocarpus
- Anticholinergic- Datura, Belladonna

Drugs acting on Cardiovascular System

- Cardiotonic - Digitalis, Strophantus, Squill
- Cardiac depressant - Cinchona, Veratrum
- Vasoconstrictor - Ergot
- Antihypertensive – Rauwolfia

Drugs acting on Central Nervous System

- Central analgesic - Opium (morphine)
- CNS depressant- Belladonna, Opium,Hyoscyamus
- CNS stimulant - Tea, Coffee
- Analeptic - Nux vomica, Camphor, Lobelia

Miscellaneous

- Antispasmodic- Datura, Hyoscyamus, Opium, Curare
- Anticancer -Vinca, Podophyllum, Taxus
- Antirrheumatic - Aconite, Colchicum, Guggal
- Anthelminthic-Quassia, Vidang
- Astringent- Catechu, Myrobalans
- Antimalarial - Cinchona, Artemesia
- Immunomodulatory- Ginseng, Ashwagandha, Tulsi
- Immunizing agent- Vaccines, Sera, Antitoxin
- Drugs acting Skin Membrane - Beeswax, Wool fat, Balsamof Tolu, Balsam of Peru
- Local anesthetic – Coca

5. Chemical

- Crude drugs are classified depending upon theactive constituents
- Irrespective of the morphological or taxonomicalcharacters, the drugs with similar chemicalconstituents are grouped together

This classification is purely based on chemistry of constituents. Different crude drugs are classified according to the presence of major active constituents. This is most preferred method of classification.

- Advantage:

it is a popular approach forphytochemical studies

- Disadvantage:

ambiguities arise when particulardrugs possess a number of compounds belongingto different groups of compounds.

Chemical Constituent Group

- Alkaloids- Cinchona, Datura, Vinca, Ipecac, Nux vomica
- Glycosides - Senna, Aloe, ginseng, Digitalis
- Carbohydrates & its derivatives - Acacia, Starch, Isabgol
- Volatile oil - Clove, Coriander, Fennel, Cinnamon,Cumin
- Resin and Resin Combination - Benzoin, Tolu Balsam,Balsam of Peru
- Tannins- Catechu, Tea
- Enzymes- Papain, Casein, Trypsin
- Lipids - Beeswax, Kokum butter, Lanolin

Parameters involved in pharmacognostic study of crude drug

Parameters	***Description***
Chemical constituents	major and minor chemical constituents present
Chemical tests	To Identify crude drug and its chemistry
Uses and pharmacological	actions Various therapeutic applications
Adulterants and Commercial varieties	Useful for quality control
Formulations available in Market	To understand market potential
Quality control and standardization	To establish qualitative and quantitative standards with the help of sophisticated instruments.
Common names	Names in various languages
Biological source	Genus, species and family
Geographical source	Location
History	Discovery of crude drug
Cultivation, collection and preparation for market	Time and method of cultivation, irrigation, climate, fertilizers, collection time, processing etc.
Morphological description	Color, odor, taste, size, shape, extra features
Microscopical description	Cell, tissue type and arrangement, cell inclusions, special characters etc