Subject :Medicinal plants

Level: Second

Lecturer: Najat hameed jasim

Natural products:

Definition

Natural products: are chemical compounds produced by living organisms such as plants, animals, or microorganisms.

In pharmacognosy, the term usually refers to bioactive compounds obtained from plants that are used in medicine and therapy.

Classification of Natural Products :

The most important natural sources of drugs are (higher plants , microbes & animals and marine organisms) . Some useful products are obtained from minerals that are both organic and inorganic in nature . **drugs are classified in the following different ways :**

1- Alphabetical classification .
2- Morphological classification
3- Taxonomic classification
4- Pharmacological classification

5- Chemical classification
6- Chemo - taxonomical classification

1- Alphabetical Classification : حسب الترتيب الابجدي

Crude drugs are arranged in alphabetical order either in Latin or English names (Common names) or sometimes local .

Some of the pharmacopoeias , dictionaries and reference books which classify crude drugs according to this system are as follows :

1- Indian Pharmacopoeia (IP).
2- British Pharmacopoeia(BP)
3- British Herbal Pharmacopoeia(BHP)
4- United States Pharmacopoeia & National Formulary(USP,(NP)
5- British pharmaceutical Codex (BPI)

Examples:

Amla	Ipecac	Rauwolfia
Bael	Jalap	Scilla
Catechu	Kalmegh	Senna
Datura	Lemon peel	Tobacco
Eucalyptus	Methi	Urgenia
Ergot	Nutmeg	Vasaka
Fennel	Orange peel	Withania
Gokhru	Picrorrhiza	Yeast
Honey	Quassia wood	

6- European Pharmacopoeia(UP)

2- Morphological Classification: اعتمادا على الشكل المستخدم

In this type of classification of crude drugs are arranged according to the part of plant used as drug (for example leaves, fruits, flowers, bark لحاء الشجر, etc.). When a drug represents a part of the plant, it is known as organized drug but when a drug does not represents part of plant, it is known as an unorganized drug.

a. Classification of organized drugs: have a specific part used: fruit, seed, root

b. Classification of unorganized drugs: have a nonspecific part used: juice, extract, wax

a. Classification of organized drugs.

S. No.	Part of plant	Drugs
1	Bark	Cinchona, cinnamon, cassia, cascara, kurchi, Quillaia.
2	Rhizomes	Rhubarb, valerian, podophyllum, liquorices, turmeric, ginger, acorus,
3	Root	Ipecac, Rauwolfia, senega, gentian, aconite.
4	Leaves	Senna, Datura, Belladonna, digitalis, eucalyptus, scilla, coca, Vasaka
5	Flowers	Rose, clove, saffron
6	Fruits	Bael, fennel, Gokhru, capsicum, cardamom, dill
7	Seeds	Almond, nux-vomica, nutmeg, castor, Plantago, Bavchi, mustard
8	Entire plants	Ergot, Ephedra, chirata, Shankhpuspi, lobelia, benafsha
9	Hairs and fibres	Cotton, hemp, jute, wool

b. Classification of unorganized drugs

S. No.	Category	Drugs
1	Extracts	Agar, Gelatin
2	Fixed oils	Castor oil, Arachis oil, olive oil,
3	Fat	Lard
4	Gums	Acacia, Tragacanth
5	Gum resin	Myrrh, asafetida
6	Juice	Aloe
7	Latex	Opium
8	Resins	Benzoin, colophony , Asafoetida,
9	Waxes	Beeswax, wool fat
10	Oleoresins	Balsam of tolu, balsam of peru

3- Taxonomical Classification :

Taxonomical classification is a botanical نباتي classification , It is based on class of **drug or phylogenetic** النشوء و التطورsimilarities of plants. In this system crude drugs are arranged in a group according to their **division, class, order, family, genus and species.** This system gives in detail an ideal about the whole plant but it is not significant because in most of the cases only one part of plant is used as drug. The whole plant is rarely used as drug.

Taxonomical classifications of crude drugs

S. N.	Drug	Division	Class	Order	Family	Genus	Species
1	Senna	Angiosperm	Dicotyledone	Rosales	Leguminosae	Cassia	Angustifolia
2	Fennel	Angiosperm	Dicotyledone	Umbellflorae	Umbelliferae	Foeniculum	Vulgare
3	Nux vomica	Angiosperm	Dicotyledone	Gentianales	Loganiaceae	Strychnos	Nux-vomica
4	Scilla	Angiosperm	Monocotyledons	Liliflorae	Liliaceae	Urginea	Maritima
5	Vanilla	Angiosperm	Monocotyledons	Microspermae	Orchidaceae	Vanilla	Planifolia
6	Ephedra	Gymnosperm	----------	Genetales	Ephedraceae	Ephedra	Equisetina

4- Pharmacological Classification : التصنيف الدوائي

In this system grouping of drug according to their **pharmacological action or of most important constituent or their therapeutic use**. This classification is more relevant and is mostly followed method . Drugs like digitalis , squill and strophanthus having cardiotonic action are grouped together.

S. No.	Pharmacological action	Drugs
1	Anticancer	Vinca, Taxus, podophyllum
2	Antimalerial	Cinchona, Artemisia
3	Antiasthematic	Ephedra, lobelia
4	Anti-inflammatory	Colchicum seed, Turmeric
5	Antispasmodic	Datura, hyocyamus
6	Antiamoebic	Kurchi, ipecac
7	Anthelmintic	Quassia, male-fern
8	Astringent	Myrobalan, Ashoka bark
9	Purgative	Senna, aloe, rhubarb
10	Carminative	Coriander, fennel, caraway, cinnamon
11	Narcotic analgesic	Poppy
12	Expectorant	Liquorices, Vasaka, balsam
13	Cardiotonic	Digitalis, Strophanthus, squill
14	Hallucinogens	Cannabis, cocaine
15	Bitter	Chirata, Gentian root
16	Tranquillizer	Rauwolfia

5 - Chemical classification : تصنيف الكيميائي

The crude drugs are divided into different groups according to the **chemical structure** of their most important constituent . Since the pharmacological activity and therapeutic significance of crude chemical classification of drugs is dependent upon the grouping of drugs with identical constituents . An out of this classification is as follow :

CHEMICAL CLASSIFICATION OF CRUDE DRUGS

S. No.	Chemical constituents	Drugs
1	Alkaloids	
	• Amine	Colchicum, Ephedra
	• Tropane	Belladonna, Datura
	• Quinoline	Cinchona
	• Isoquinoline	Ipecac, Opium
	• Pyridine and Piperidine	Areca, Nicotiana
	• Indole	Rauwolfia, Vinca, Nux-vomica, Ergot
	• Purine	Tea, Coffee
2	Carbohydrate	
	• Gum	Acacia, Tragacanth
	• Mucilage	Ispaghula
3	Glycoside	
	• Anthraquinone	Senna, Aloe, Rhubarb
	• Saponin	Dioscorea, Liquorise
	• Isothiocyanide	Mustard
	• Cyanophore	Wild cherry bark
	• Lactone	Cantheride insect
	• Aldehyde	Vanilla
	• Cardiac glycoside	Digitalis, Squill
4	Lipid	
	• Fixed oil	Castor oil, Cotton seed oil, Almond oil
	• Fat	Theobroma, Lanolin
	• Wax	Bees wax, Spermaceti
5	Proteins	Gelatin
6	Resin	
	• Resin	Cannabis, Podophyllum
	• Oleoresin	Capsicum, Ginger
	• Oleo-gum resin	Asafoetida, Benzoin, Myrrh
7	Volatile oils	Cardamom, Cinnamon, Clove, Fennel, Mentha, Orange peel, coriander, caraway
8	Tannins	Catechu, Ashoka bark, Myrobalan and Behra

6- Chemotaxonomic Classification :

This system of classification relies on the chemical simillarity of taxon

i.e. it is based on the **existence of relationship between constituents in various plants**(chemical structure

similarity) It is the latest system of classification and gives more scope for understanding the relationship between chemical constituents .eg:volatile oils are mostly found in rutaceae family , tropan alkaloid are mostly found infamily. solanaceae

Sandalwood خشب الصندل, Spearmint نعناع, Cassia القرفة , Clove القرنفل , Saffron زعفران , Chamomile بابونج , Anise يانسون , Bitter orange peel قشر البرتقال المر , Capsicum الفلفل , Caraway كراوية, Cardamom الهيل , Colocynth الحنظل, Coriander الكزبرة , Cumin كمون, Dill شبت, Fennel الشمرة , Lemon peel , Senna pod , Star anise , Tamarind التمر الهندي , Bitter almond اللوز المر , Black Mustard الخردل, Cardamom الهيل , Colchicum , Linseed بذر الكتان, Garlic الثوم , Ginger الزنجبيل , Glycyrrhiza العرق سوس, Rhubarb الراوند , Turmeric الكركم , Valerian نبات الناردين, Ephedra الافدرين, Datura نبات الداتورا, Hemp قنب , Silk الحرير , Flax الكتان . Opium الخشخاش, Papain الغراء.Aloe الصبار, Beeswax شمع النحل, Spermaceti الشموع العطرية , Acacia صمغ الشجر , Colophony المخدرات الموضعية, Mastic البستج , Coal tar فحم القطران , Tar القطران , Anise يانسون , Coriander كزبرة, Peppermint نعناع, Rosemary اكليل الجبل , Sandalwood خشب الصندل , Cinnamon القرفة , Nutmeg جوز الطيب, Camphor الكافور, Castor الخروع , Coconut جوز الهند, Cotton seed بذور القطن , Linseed الكتان, Olive اللوز , Sesame السمسم , Almond اللوز المر, fennel الشمرا, ginger الزنجبيل , garlic الثوم mint نعناع, rosemaryاكليل الجبل lavender الخزامي . Mucilaginousالصمغيات astringent قابضة, styptic مضاد للاجهاد العقلي. red raspberry توت العليق الاحمر. aloeصبار , liquorice عرق السوس , pumpkin يقطين, senna, barberry الاشجار الشائكة, yam root جذر اليام, alfalfa نبات الفصة , asparagus نبات الهليون , thistle النباتات الشوكية , buchu نبات البارسمة, chaparral البلوط , corn silk حرير الذرة, dandelion الهندباء , grapevine نبات الكرمة.

Production of Crude Drugs

Definition:

Crude drugs are substances having therapeutic properties and pharmacological action, derived from natural sources such as plants, animals, or minerals and have undergone no further treatment to advance medicinal value except collection and drying for preservation, packing or marketing.

Medicinal plant

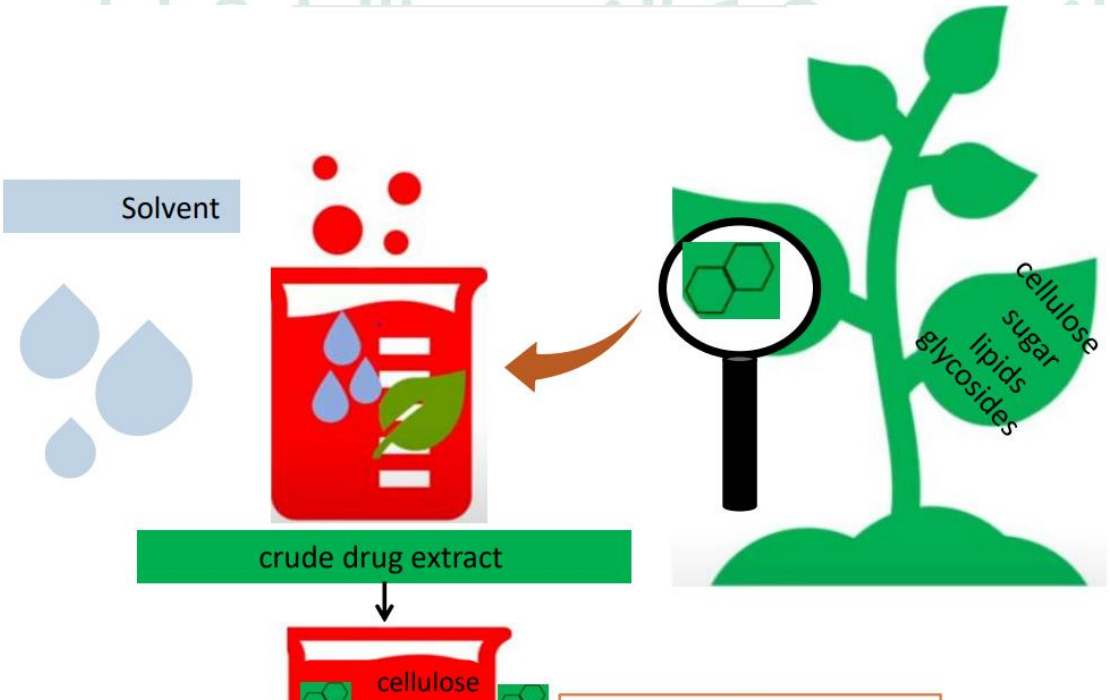
Collection & drying

Grinding

packing or marketing

Plant classified as a source for crude drugs based on the major component, such as glycosides (anthraquinone or cardiac), tannins, carbohydrates, alkaloids, phenolics, fixed fats, and proteins.

Prepare crude drug extract



Production of crude drugs from their medicinal plants following steps: involves

1- selection & collection of medicinal plants.
2- drying of plants
3- grinding of the dried plants
4- storage & packing of crude drugs

1. Collecting of medicinal plants:

Medicinal plant materials should be collected during the appropriate season or time period to ensure the best possible quality of both source materials and finished products. The amount of a constituent is usually not constant throughout the life of a plant. The stage at which a plant is collected or harvested is, therefore, very important for maximizing the yield of the desired constituent. The differences are sometimes not only quantitative but also qualitative.

2-Drying:

The most common method for preserving plant material is drying. Enzymic processes take place in aqueous solution. Freshly collected plant drugs contain as much as 55 to 82 precent of water. This high percentage of water encourages enzymatic and other chemical reactions and growth of moulds and bacteria in them, which bring about many undesirable changes in their constituents. Immediately after collection crude drugs should be dried to stabilize the condition of The drug and to fix their chemical constituents

3- Grinding:

the dried plants Is grinding of the plant material to a powder of suitable particle size. It is important that the particles are of as uniform

in size as possible. Excessive dust should be avoided, as it can clog percolators and result in a turbid extract which is hard to clarify. Large particles take a longer time for complete extraction than small ones and large differences in particle size thus slow down the extraction process.

4-Storage &Packing of crude drugs:

Storage of the plant drugs needs knowledge of their physical & chemical properties All drugs should be preserved in a well closed & filled container. • Drugs containing glycosides and esters are usually less stable than those containing alkaloids

Q1-What is meant by *Taxonomical Classification* in biology, and why is it important in the study of medicinal plants?