Production of crude drugs

Pharmacognosy stage2

By

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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

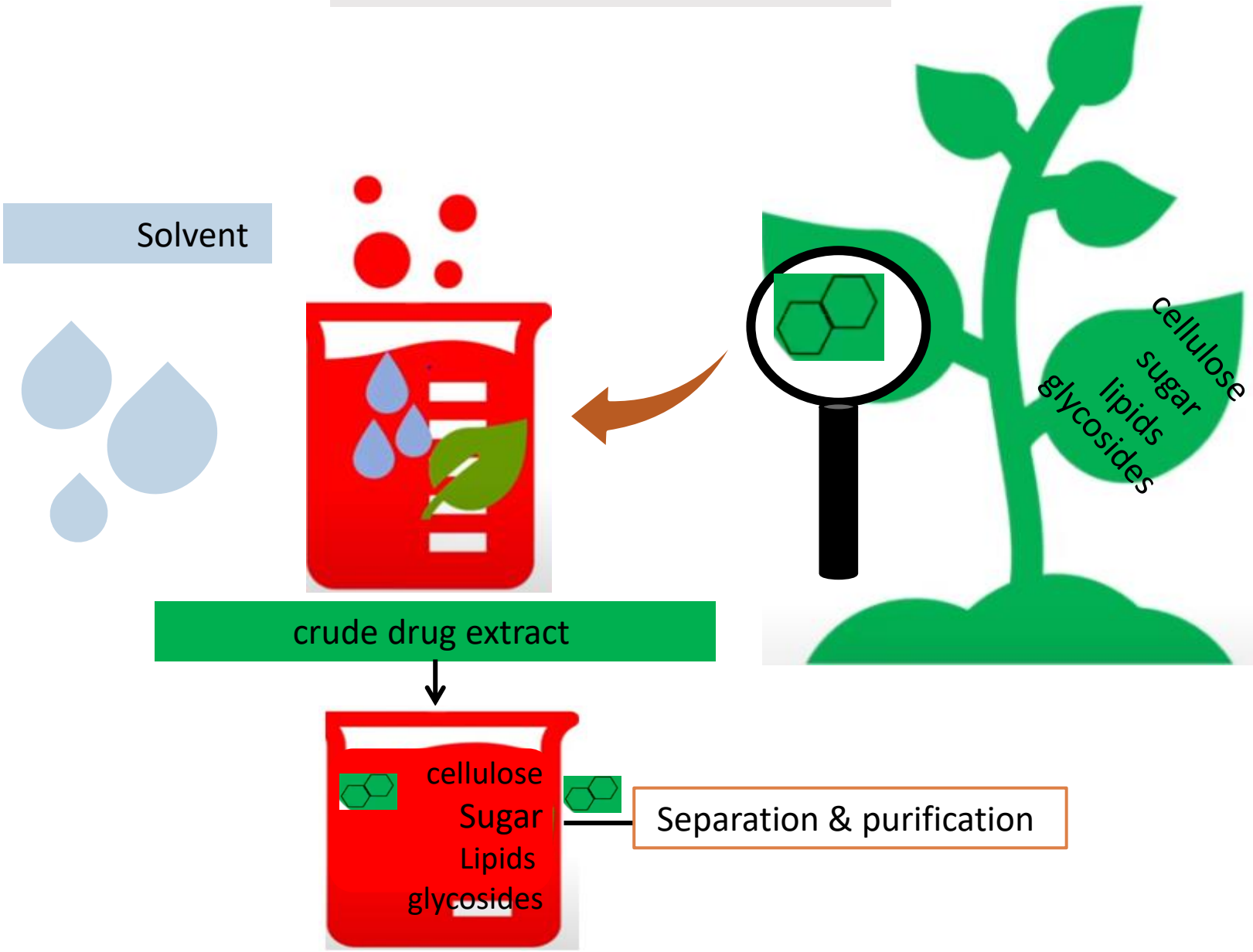
Collection & drying

Grinding

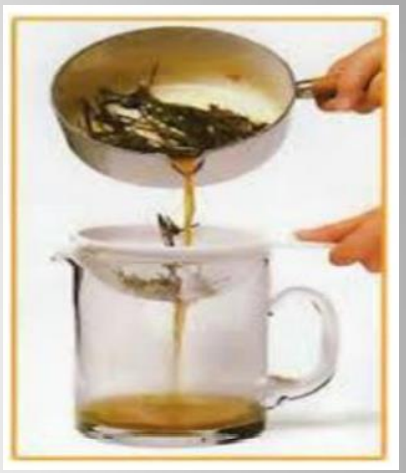
packing or marketing

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



Q:- Crude extract extracted from specific plant contain only glycoside



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

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.

General rules for collection of crude drugs:

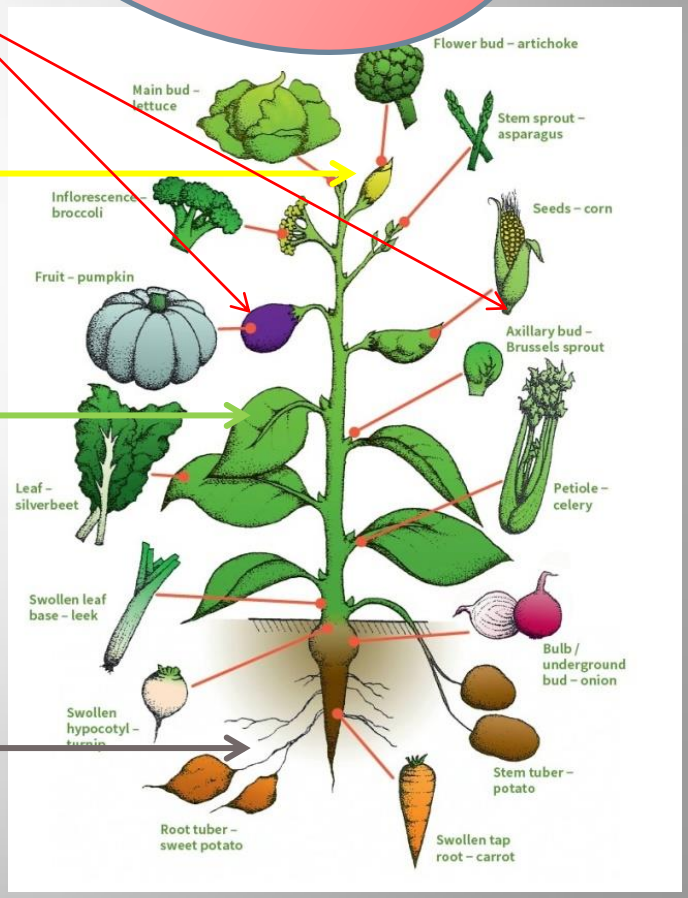
In certain cases as with cloves (*Eugenia caryophyllata*), the unopened flower is picked.

4- Fruits and seeds are collected when fully ripe

3- Flowers are usually gathered when fully developed.

2- Leaves and herbs are collected at the flowering stage

1- Roots and rhizomes are collected at the end of the vegetation period, i.e. usually in the autumn. In most cases they must be washed free of adhering soil and sand.



5-Bark is collected in the spring

6- whole plant should be collected during flowering stage

The choice of promising plant depends upon the following:
1-A plant which have a biological activity.
2-A plant used in folk medicine.
3- A plant which show a particular toxicity

Drugs may be collected from both wild and cultivated sources .

1. Wild source:

collecting the drugs from wild sources care must be taken to avoid-

- Wrong identification of the source,
- admixture with similar looking plants,
- Collection from too young or too old or diseased plants

2. Cultivated source:

Advantages of cultivation:

- It ensures a correct natural source of the drug.
- Drying and storage of the drugs from cultivated

sources can be regulated and controlled

- Purity of finished product is assured under cultivation as weeds and other contaminations can be removed.
- Quality and production of the drug can be improved under cultivation.

Influence of time of collection on drugs quality:

1- Camphor الكافور

From *Cinnamomum camphora*

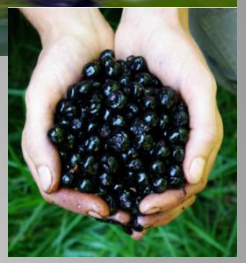
it cultivated for camphor production. Camphor is a white, crystalline substance with a strong odor and pungent taste; there are many pharmaceutical applications for camphor such as topical analgesic, antiseptic, anti-inflammatory, etc. Camphor can normally start when the tree is 15 years oldhas the best yield when it is obtained from old trees

2- Atropine

نبات ست الحسن

From *Atropa belladonna*

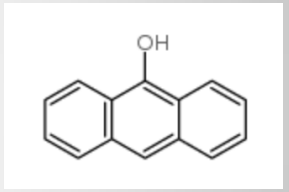
used to decrease saliva and other fluid production during surgery. Is best collected when the plant is 3 years old (young plant)

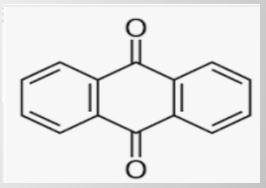


3-Anthraquinone

راوند

From *Rheum palmatum* or rhubarb is reported to contain no anthraquinone derivatives in winter but anthranols which, on the arrival of warmer weather, are converted by oxidation into anthraquinones. It acts as a laxative to treat constipation and deficiency of the blood.





Datura stramonium الداتورا

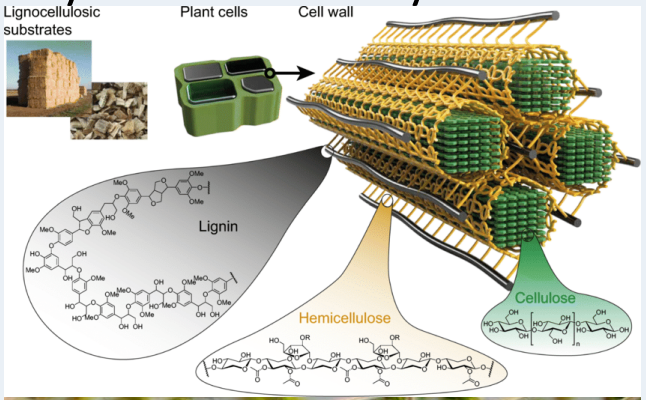
leaves ,collected in the morning ,containing a higher proportion of alkaloid than those of collected in the evening

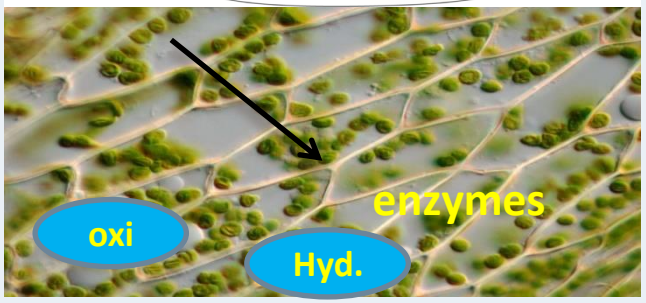
Preservation of plant material

The plant material must first be preserved so that the active compounds will remain unchanged during transport and storage. The cells of living plants contain not only low molecular-weight compounds and enzymes, but they also have many kinds of barriers that keep these constituents apart.

When the plant dies, the barriers are quickly broken down and the enzymes then get to promote various chemical changes in the other cell constituents, e.g. by oxidation or hydrolysis.

Preservation aims at limiting these processes as far as possible





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.

Living plant material has a high water content:

leaves may contain… 60-90%

roots and rhizomes… 70-85%

lowest percentage, often no more than 5-10%, is found in seeds.

So , drying is necessary -

To keeping quality of the drug,

To prevent moulding,

To stop enzymatic hydrolysis,

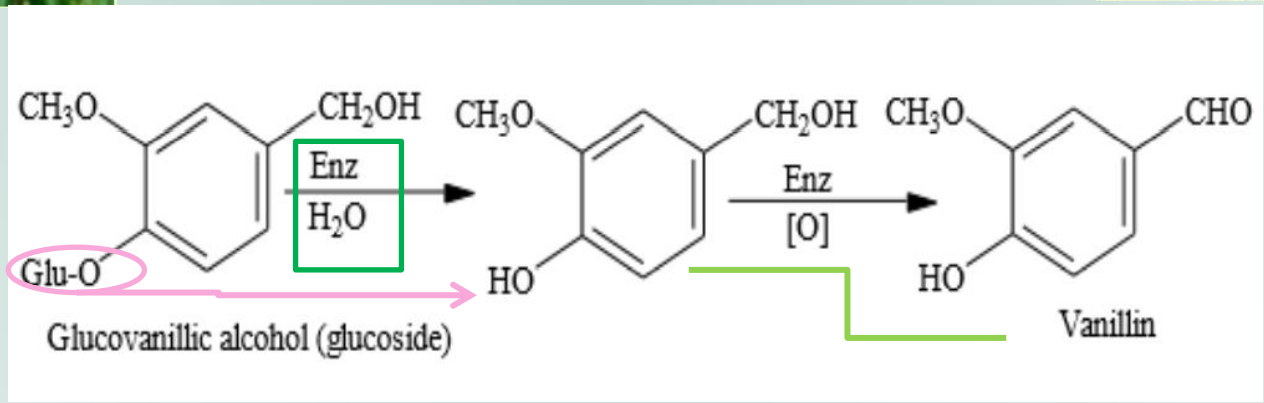
To discourage growth of bacteria and insects

To stop chemical and other changes in the drug

Roles of drying

1. If enzymatic action is encouraged (support), for conversion some constituents from in active to active state, slow drying at a moderate temperature is necessary used e.g. ‘vanilla pods’.

Freshly pecked vanilla beans do not have any vanillin, whereas the fermentation of the pods causes its production, involving the enzymatic hydrolysis of glycoside



2- If enzymatic action is not desired, drying should be take place as soon as possible after collection.

3-In other cases the drying process is not necessary for the part used in case of the plants that containing Volatile Oils in order not to lose the oils .Therefore the plant parts which contain Volatile Oils must be either drying in shade

(at room temperature 25℃) or store under either frozen or distilled immediately at the time of collection

4-Rapid drying helps flowers and leaves to retain their color and aromatic drugs their aroma, but the temperature used in each case must be governed by the constituents and the physical nature of the drug.

5- Leaves herbs and flowers may be dried between 20 and 40 C° while barks and roots between 30 and 65C°

Medicinal plants can be dried by any of the following two methods:

1. **Drying in open air by natural heat,**
2. **Drying indoor by artificial heat.**

Open air drying: may be done by either in the sun or in the shade, depending on the material to be dried.

Sun drying is used for those drugs whose constituents are not affected by the direct action of sunlight

shade drying is employed for those drugs is desirable and whose constituents are affected on exposure to direct sunlight.

Indoor drying: it is most commonly used method. This method has the following two advantages over open air drying method.

a) It stops enzymatic action more rapidly

b) Less time consuming

It involves the use of various mechanical drying devices , like oven.

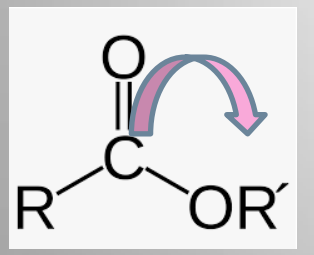
3- Grinding of the dried plants

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.

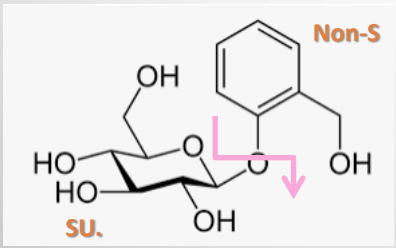
4-Storage &Packing of crude drugs

Storage of the plant drugs needs knowledge of their physical & chemical properties

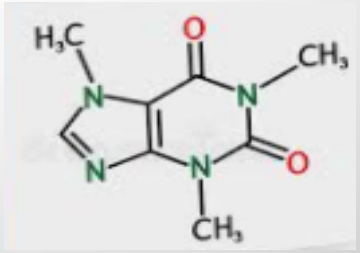
- All drugs should be preserved in a well closed & filled container. Drugs containing glycosides and esters are usually less stable than those containing alkaloids



Ester



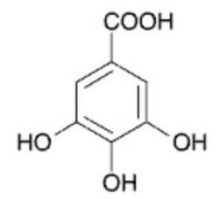
Glycoside



Alkaloid

Drugs with volatiles oils deteriorate rather quickly through evaporation, oxidation and polymerization of the substances constituting the essential oil.

Tannins on the other hand, have an almost unlimited durability. component as in clove, cinnamon, peppermint



In order to keep crude drugs as long as possible:

1. It is essential to store them in a dry condition in carefully closed containers at low temperature.
2. It is also advisable to exclude light, because - even if it does not affect the active constituents - it almost causes changes in the appearance of the drug, especially loss of color.
3. It is also necessary to protect the drug against insect attack.