

Production (Management) of crud drugs



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

 **Cultivation**

 **Collection**

 **Drying**

 **Storage**



Cultivation

Crude medicinal drugs may be collected from: -

🌱 Wild growing medicinal plants.

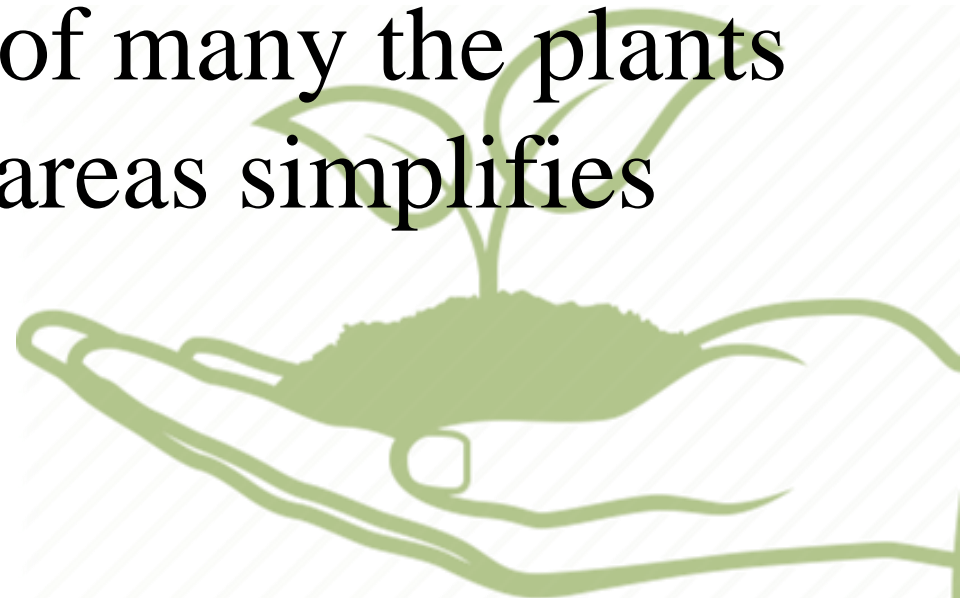
🌱 Cultivated medicinal plants.

Cultivated of medicinal plants

Cultivation of Crude drugs has the following advantages:

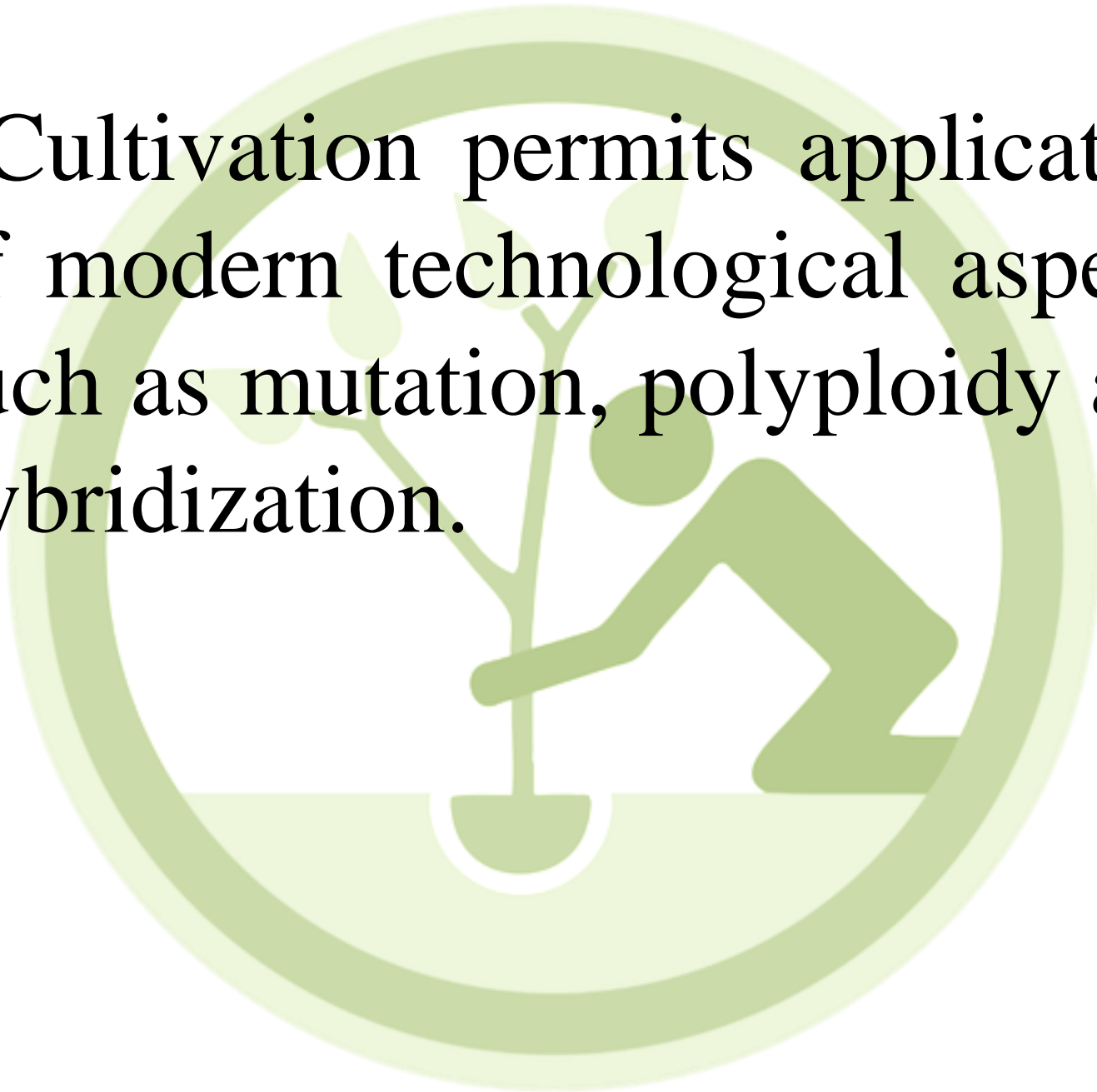
🌱 It ensures quality and purity of medicinal plants.

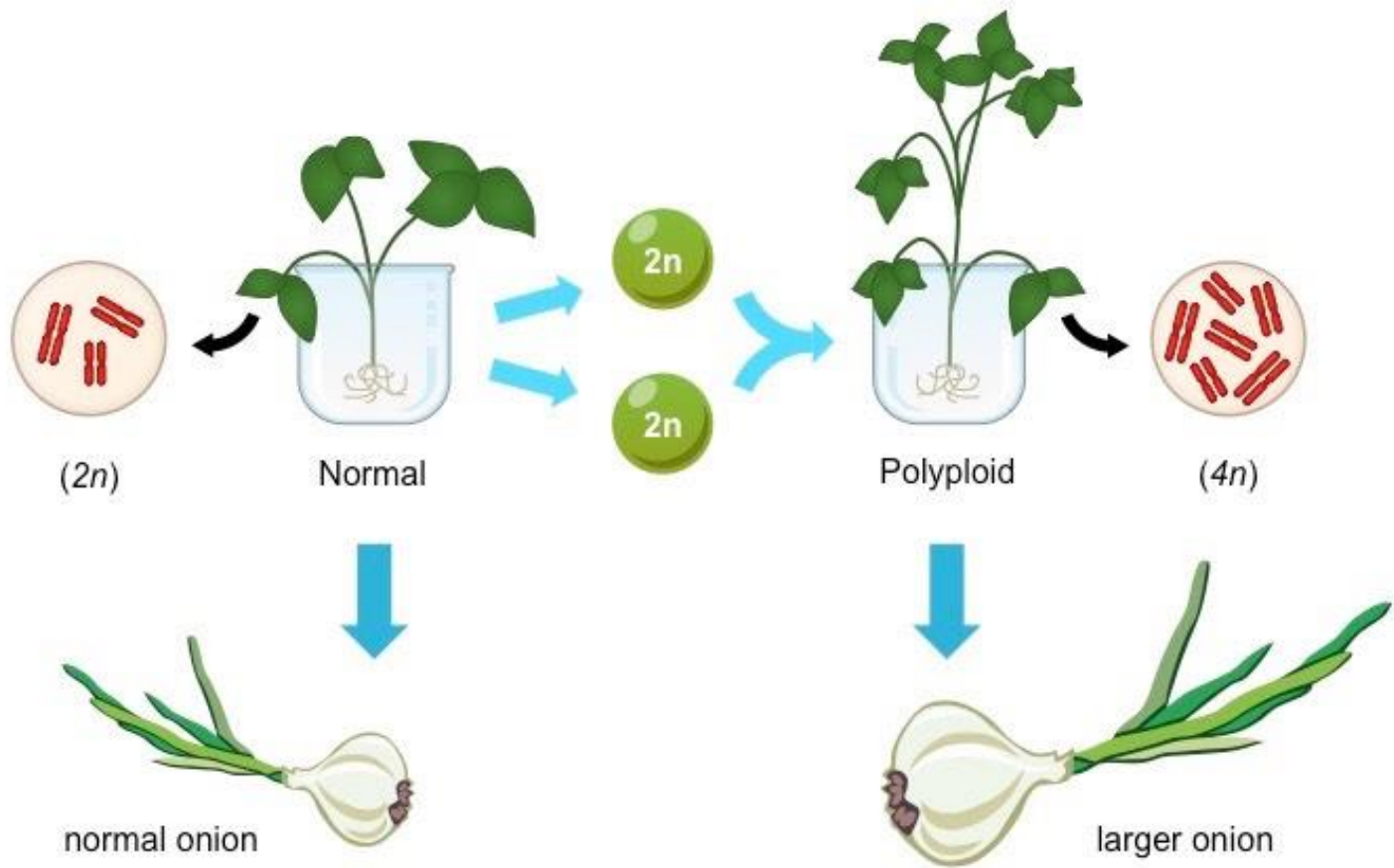
🌱 The concentration of many the plants that need it in small areas simplifies collection.





Cultivation permits application of modern technological aspects such as mutation, polyploidy and hybridization.





Disadvantages of cultivated medicinal plants are:

- ✂ Some medicinal plants require **particular habitat** for their growth and the procedures of their cultivation usually failure. i.e. Cannabis **requires tropical climate** to the production of **narcotic resin** while Aloes require a heavy rainfall.
- ✂ For successive cultivation of medicinal plants and production of crude drugs with quality, it is **necessary to study the conditions under which medicinal plants flourish** in their wild state and trying to reproduce these conditions or improve them.

Collection



Medicinal plant materials **should be collected** during the **suitable season or time period** to ensure the best possible quality of both source materials and finished products. It is well known that the **quantitative concentration** of biologically active constituents **varies with the stage of plant growth and development.**

Rules for collection



Roots and rhizomes are collected at the end of the vegetation period, i.e. usually in the autumn



Leaves are collected as the **flowers** are beginning to open.



Flowers just before they are fully expanded, in certain cases as with cloves (*Eugenia caryophyllata*), the unopened flower is picked.

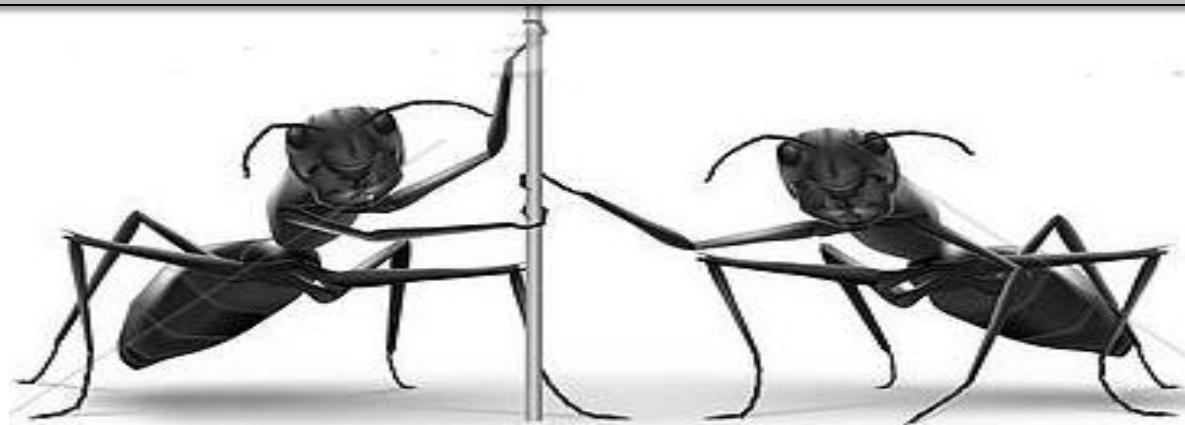


Fruits and seeds: when fully ripe and grown, or nearly grown.



Bark is collected in the spring

- **Leaves, flowers and fruits** should not be collected when covered with **dew** or **rain** to prevent any possible harmful effects due to increased moisture levels, which promote microbial fermentation and mold.
- Any discolored or attacked by **insects** or **slugs** should be rejected
- **Age** affect the quantity & the quality.



Camphor from
Cinnamomum camphora
(which is used as antiseptic
& carminative) has the
best yield of camphor
when it is obtained from
old trees



While **atropine** (which is an anticholinergic drug which is used to decrease the production of saliva and other fluid secretions during surgery) from **Atropa belladonna** is best collected when the plant is 3 years old (young plant).



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**.



- **The composition of a number of secondary metabolite varies throughout the day & night**
example: the *Datura* spp. in morning & *Digitalis purpurea* in night.

Drying



Is the third process of drug production, it is achieved to

1-remove water from the plant to retain the activity

2- prevent moulds growing

3- Inhibiting of some enzymes & reactions which can convert some of the plant constituents from active to in active state




- If enzymatic action is **to be encouraged**, 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.



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

- 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°C) or store under either frozen or distilled immediately at the time of collection



 **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.





Drying Methods

🔑 Air Drying

☰ Artificial Drying

🧑 Vacuum Drying

Air drying included:



Sun Drying



Shade Drying

Artificial Drying :

☰ Generally the most acceptable form of drying herbs.

☰ Rapid (less exposure to heat less chances of chemical alteration).

☰ Control temperature (normally 40°C) & ventilation (allows dry air to replace wet air).

Vacuum Drying

- **Vacuum drying is performed under low pressure conditions. The heat transfer effect is produced by the convection or radiation method is used in order to dry heat-sensitive herbs quickly and effectively**

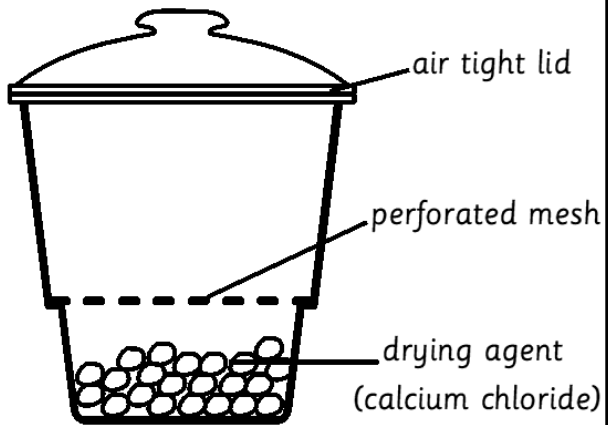


As a general rule

leaves herbs and **flowers** may be
dried between **20** and **40C°** and
barks and **roots** between **30** and
65C°.



The Desiccator





Storage

- **Preservation** of the plant drugs needs sound **knowledge** of their physical & chemical properties
- All drugs should be preserved in a well **closed & filled** container.
- The premises should be **water proof, fire proof & rodent proof** are ideal for storage. A number of drugs absorbed moisture from the atmosphere & become susceptible to growth of m.o.

- **The main factors effect on plant preservation are:**

1-moisture

- Excessive moisture facilitate enzymatic reactions resulting in a decomposition of active constituents such as digitalis leaves. Ergot excessive moisture can lead to mould infestation.



Atmospheric oxygen is also destructive, this is why the containers should be filled & filled completely or the air in the container should be replaced by an inert gas like nitrogen as in shark liver oil.





Temperature is a very important factor to be considered in the preservation, since it can accelerate several chemical reactions leading to decomposition of the active constituent. So most of drugs need to be stored in a temperature between 1-5 C° to prevent microbial growth.

Finally, end of the lecture

**See you
next week**

