

**AL-Mustaqbal university**  
**Pharmacy college**



# **Pharmacognasy I**

**lec2**

**Dr. Ghada Ali**

**[ghada.ali@uomus.edu.iq](mailto:ghada.ali@uomus.edu.iq)**



# Classification of natural products



**Natural or vegetable drugs are usually arranged for study in one or other of the following ways:**

**1- Alphabetical:** using either **Latin** or **English** names; the drugs are arranged in an alphabetical order. This arrangement is employed in pharmacopeias or dictionaries & although its suitable for quick reference. No indication of interrelationship between drugs.



**2-Taxonomic:** the drugs are arranged according to systems of **botanical classification**; the drugs are according to the plants from which they are obtained in **classes, orders, families, genera and species**. It allows for a precise and ordered arrangement and includes any drug without obscurity. **As the basic botanical knowledge of pharmacy students decreases over the years this system is becoming less popular for teaching purposes.**

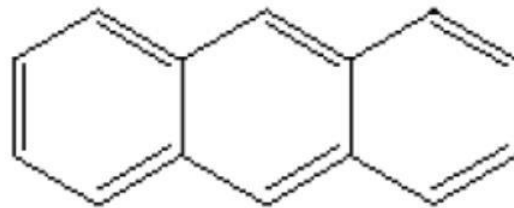






**3- Morphological:** dividing the drugs into groups e.g. leaves, flowers, fruits, seeds,..... which are referred to as "organized drugs", and groups as dried lattices, extracts, gums, resins, oils, fats and waxes which are known as "unorganized drugs". **These groupings have some advantages for the practical study of crude drugs; the identification of powdered drugs is often based on micro-morphological characters.**

**4- Chemical:** the drugs are divided into groups according to their most important constituents e.g. drugs containing volatile oils, glycosides, alkaloids, bitter principles, tannins, saponins,..... or their **biosynthetic pathways** form the basis of classification of the drugs. This is a **popular** approach when the teaching of pharmacognosy & phytochemically biased.



## **5- Pharmacological and therapeutic effects:**

grouping of drugs according to the pharmacological action of their most important constituents or their therapeutic use. e.g. astringent, irritant, drugs affecting the gastrointestinal tract, drugs promoting systemic effects on the muscle and nervous system, drugs affecting the circulatory system, drugs used chemotherapeutically for the treatment of infectious diseases, etc....





# Production (Management) of crud drugs





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

 **Cultivation**

 **Collection**

 **Drying**

 **Storage**



**Crude medicinal drugs may be collected from: -**

🌱 **Wild growing medicinal plants.**

🌱 **Cultivated medicinal plants.**

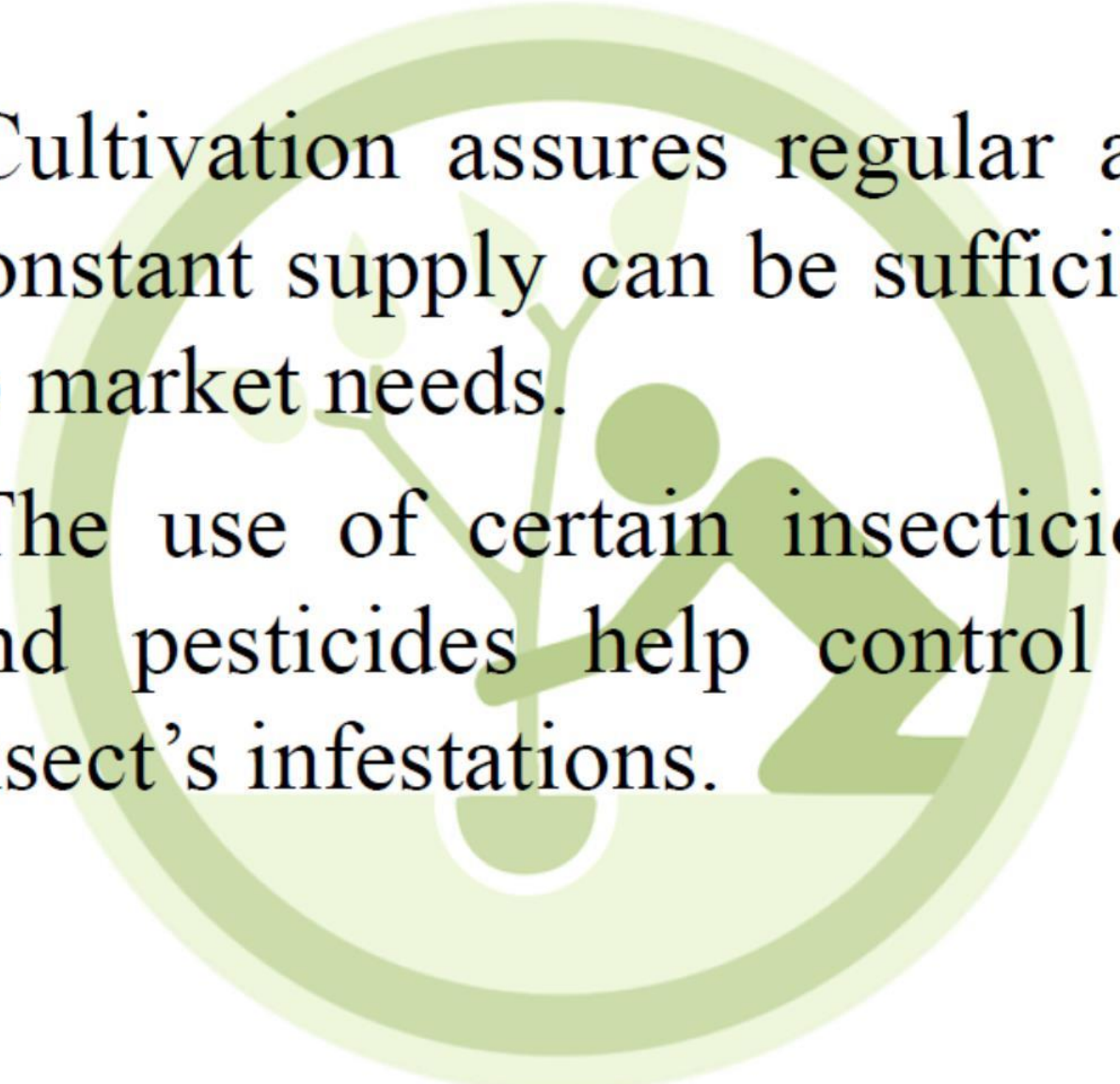
# Cultivated of medicinal plants

## Cultivation of Crude drugs has the following advantages:

- 🌱 The concentration of many the plants that need it in small areas simplifies collection.
- 🌱 Cultivation provides an excellent mean for control of the purity of the crude drug.





- 
- ④ Cultivation assures regular and constant supply can be sufficient to market needs.
  - ④ The use of certain insecticides and pesticides help control of insect's infestations.

## 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.



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.**

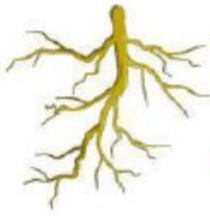




**Leaves** are collected as the **flowers** are beginning to **open**.



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

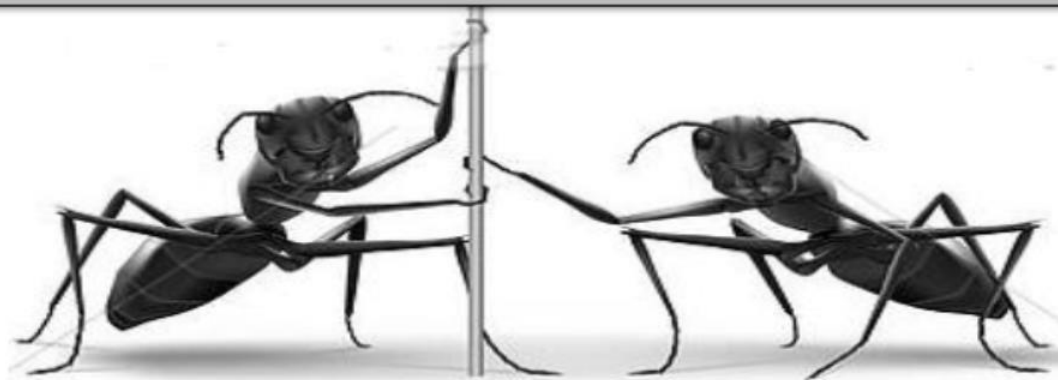


**Underground** organs as the aerial parts die down.



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

- **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.



# Drying



Is the third process of drug production, it is achieved to **remove water** from the plant to **retain the activity & prevent spoilage** & the conversion of the **active** compound to **inactive** one. Drying consists of removal of sufficient moisture content of the crude drug so as to improve its quality & make it **resistant** to the **growth of m.o.**






- If enzymatic action is **to be encouraged**, **slow drying** at a moderate temperature is necessary. e.g. 'vanilla pods' and 'gentian roots'.
- 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.

- Drugs containing volatile oils are **liable to lose their aroma** if not dried or if the oil is not distilled from them **immediately**, and **all moist drugs are liable to develop mould**. For these reasons, drying apparatus and stills should be situated as near to the growing plants as possible.



 **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

- Steam-heated ovens: pump used to extract air
- Low pressure to ensure rapid and complete drying
- Expensive method
- Reserved for expensive herbs and which cannot be sufficiently dried through other methods.

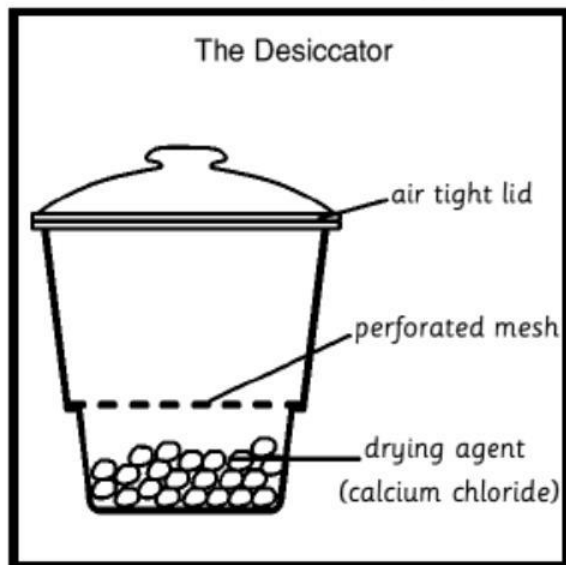




**As a general rule**

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

**For rural tropical areas, solar dryers**  
**have some distinct advantages over**  
**conventional artificial heat dryers.**





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.(some of them can absorb moisture up to 25% of their weight).

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



- Radiation due to direct sun light also causes destruction of active chemical constituents as in case of Ergot, Cod liver oil & digitalis. Fixed oil in powdered leaves of Ergot can be rancid.



**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.

# End of Lecture

## Good Luck!

See you  
in next lecture...



THE END

