**Extraction of plant material**

Extraction of plant material : The choice of extraction procedure depends on the texture & water content of the plant material being extracted & on the type of substance that is being isolated . Dried materials are usually powdered before extraction where as fresh plants ex: leaves can be homogenized with the solvent ex: alchohol. The methods of extraction are different , they are either cold or hot extraction depending on whether the components to be isolated are heat stable or not.

**Cold extraction:**

**1.Percolation:**it is usually one of the most widespread methods employed for plant extraction since it does not require much manipulation or time . The equipment used is a conical glass container with a tap at the base of the apparatus used to set the rate of the solvent elution. Hot or cold solvent may be used. In the former case , a metalic percolator is required .





Very fine powders , resins , & powder that swell or give a viscous eluent cannot be extracted by this method since perculation would be disrupted. The sample should be **coarsely fragmented** , &**particles that pass through a 3-mm sieve would be adequate**. Particles of too large a size may produce a high-elution rate precluding the necessary equilibrium for the dissolution of the metabolites , & the menstruum (solvent) would percolate unsaturated .



**2-Percolation:** is more efficient than maceration since it is a continuous process in which the saturated solvent is constantly being displaced by fresh menstruum. Normally , percolation is not used as a continuous method because the sample is steeped (soaked) in solvent in the percolator for 24 hour (for up to three times), & then the extracted material are collected & pooled. It has been observed that after a triple-solvent extraction , the remaining marc does not contain valuable material.



**2.Maceration :**

In this method the plant is introduced into a suitable container & a sufficient quantity of the required solvent is added & the container is tightly clossed & left in away from heat & light for 24 hours after which the solvent can be replaced by a new quantity after filtering the first quantity for another 24 houres & so on until there is exhaustion of the active constituents. Sometimes one time of maceration is enough & this might be left for more than 24 houres.

The efficiency of this method may be increased by occasionally shaking the container or by using a mechanical or magnetic stirrer to allow homogenization of the final solution & saturation of the solvent. It is a discontinuous method & the solvent should be renewed until the plant material is exhausted. This requires occasional filtration steps that may produce loss of solvent, metabolites &/or plant material. Such problems may be avoided in part by suspending the ground material in a tied bag in the upper part of the solvent.

**Hot extraction** ( for heat stable material):

There are different methods for hot extraction:

**Non continuous hot extraction:**

**1.Infusion:** where by the plant is introduced in a container & a hot solvent is poured on it & the container is covered & left for a certain time then strained)artificial).

**2.Decoction:** In this method the plant is boiled with the solvent princely water for certain time taking in consideration the quantity of the solvent so that to avoid dryness and burning of the plant material

**Continuous hot extraction**:

1.**Reflux extraction**: Here the plant is boiled with the solvent in a round flask on which a condenser is placed to insure a complete extraction with out reduction in the quantity of the solvent.



**2.Soxhlet extraction**: In this method a special apparatus is used called the soxhlet in which the powdered plant is placed in thimble ( which is made from cellulose) & the thimble is introduced in the apparatus after plugging it i.e the thimble with cotton wool & the apparatus is placed on a round flask containing the solvent & a cooling condenser is placed on the top of the flask



**3.Distillation** : which is either :

-steam distillation

-fractional distillation which is used for separation of compounds with different boiling point

