EXTRACTION

- The process of extraction is a generally
- accepted method of the active constituents.
- ● Extraction will remove only those substances which can be dissolved in the liquid known as solvent.

EXTRACTION

- The undissolved portion of the drug that remains after the extraction process is completed is known as the marc.
- The product of the extraction process is known as the extractive and is usually a mixture of substances.

EXTRACTION

- Usually drugs are grinded before extraction to decrease particle size and increase surface area available for solvent to extract the material, and hence increasing the efficiency of extraction.

TYPES OF EXTRACTS

- **Dry extract: all the solvent has been removed.**
- **Soft extract: contains 15-25% residual water.**
- **Fluid extract: one part of the crude drug is contained in one or two parts of the extract.**

TYPES OF EXTRACTS

- {a liquid preparation, containing alcohol , or other liquids, as a solvent or as a preservative, that contains in each cubic
- centimeter (ml) the medicinal activity of one gram of the crude drug.}

TYPES OF EXTRACTS

- **Tincture: is prepared by extraction of the crude drug with 5 to 10 parts of ethanol of varying concentration, without concentration of the final products.**

CHOICE OF SOLVENTS

- The ideal solvent for a certain pharmacologically active constituents should:
- 1. Be highly selective for the compound to be extracted.
- 2. Have a high capacity for extraction in terms of coefficient of saturation of the compound in the medium.

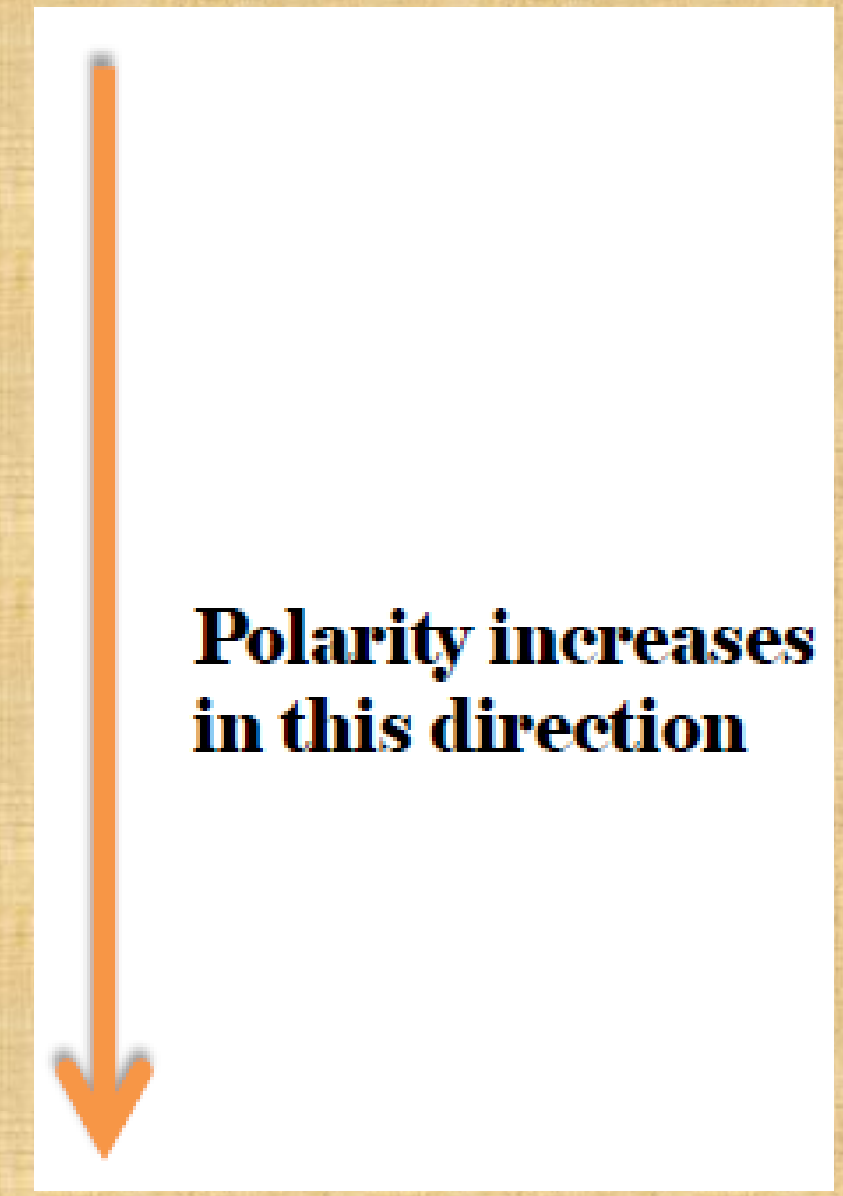
CHOICE OF SOLVENTS

- 3. Not react with the extracted compound or with other compounds in the plant material.
- 4. Have a low price.
- 5. Be harmless to man and to the environment.
- 6. Be completely volatile.

TYPES OF SOLVENT

- The following list contains the names of solvents arranged from low to high polarity.

- Petroleum ether
- Cyclohexane
- CCl_4 (Tetrachlormethane)
- Benzene
- $CHCl_3$ (Chloroform)
- Ethylic ether
- Acetone
- n-butanol
- Methanol
- Water



Exp. No.1: Extraction Methods

* Extraction involves the separation of the medicinally active constituents of plants or animal tissues from the active or inert component by using solvent (s) and by using one of the standard extraction procedures.

Exp. No.1: Extraction Methods

* The products that obtained from plants are relatively impure liquids, semisolid or powders, intended معدonly for oral or external use. These total extractive products are called Galenical, Which came from the name Galen, the 2nd century Greek physician.

* Methods of extraction can be divided into:
* 1- Cold Methods.
* 2- Hot methods.

I- Cold extraction methods:

* Is the process whereby a substance is extracted from a mixture via cold solvent. The procedure carried out at room temperature (15-25 0 C).

1- Maceration :تعطين

* This simple widely used procedure involves leaving the pulverized المسحوقplant to soak in a suitable solvent in a closed container simple maceration is performed at room temperature by mixing the ground drug with the solvent (drug solvent ratio : 1:5 or 1:10) and leaving the mixture for several days with occasional الحين والحين shaking or stirring. The main disadvantage of maceration is that the process can be quite time-consuming, taking from a few hours up to several weeks.

2- Percolation : الترشيح

* Percolation (from Lat. percōlāre, to filter) concerns the movement and filtering of fluids through porous materials. The powdered plant material is soaked initially in a solvent. In a percolator جهاز تصفية, additional solvent is then poured on top of the plant material and allowed to percolate slowly (drop wise) out of the bottom of the percolator. Additional filtration of the extract is not required because there is a filter at the outlet of the percolator.

2- Percolation : الترشيح

II- Hot Extraction Methods:

* 1-Infusion :صب

* Infusion is the process of extracting chemical compounds or flavors from plant material in a solvent such as water, oil or alcohol by allowing the material to remain suspended in the solvent over time. In this procedure we have special container called ‘Infusion pot’ which contain sieves المناخلand cover with heavy lid غطاء.

1-Infusion :صب

* After the addition of the solvent ,boiling water, left for a while for the extraction of active constituent during that time the volatile oil evaporated with steam and condenses on the lid, after that we take the solvent which contain the active constituent.

2-Decoction :الإستخلاص بالإغلاء

* The term على المدىdates back to 1350–1400, from present participle المضارع المستمرstem of Latin decoquere (meaning to boil down), de "from"+ coquere "to cook". Decoction is a method of extraction by boiling, of dissolved chemicals, from hard plant material, which may include stems, roots, bark and rhizomes on a source of heat or direct flame then agitating مهيجuntil the active constituents will be dissolved in the solvent.

2-Decoction :الإستخلاص بالإغلاء

* Here the solvent used depend on the active constituent and source of heat e.g. chloroform and ether can’t be used because we used direct source of heat. In addition to that the active constituent should be heat stable.

3-Digestion :الهضم

* In this method the plant material is placed together
* with the solvent and application of gentle heat, so that the solvent will increase its power for extraction and this method is used in cases were moderately elevated temperature is required. e.g.

* Tea is the brew تخمير
* made from the leaves of the Camellia sinensis plant.

It is the beverage شرابmost consumed مستهلكworldwide, after water

4-Contiuous hot extraction methods:

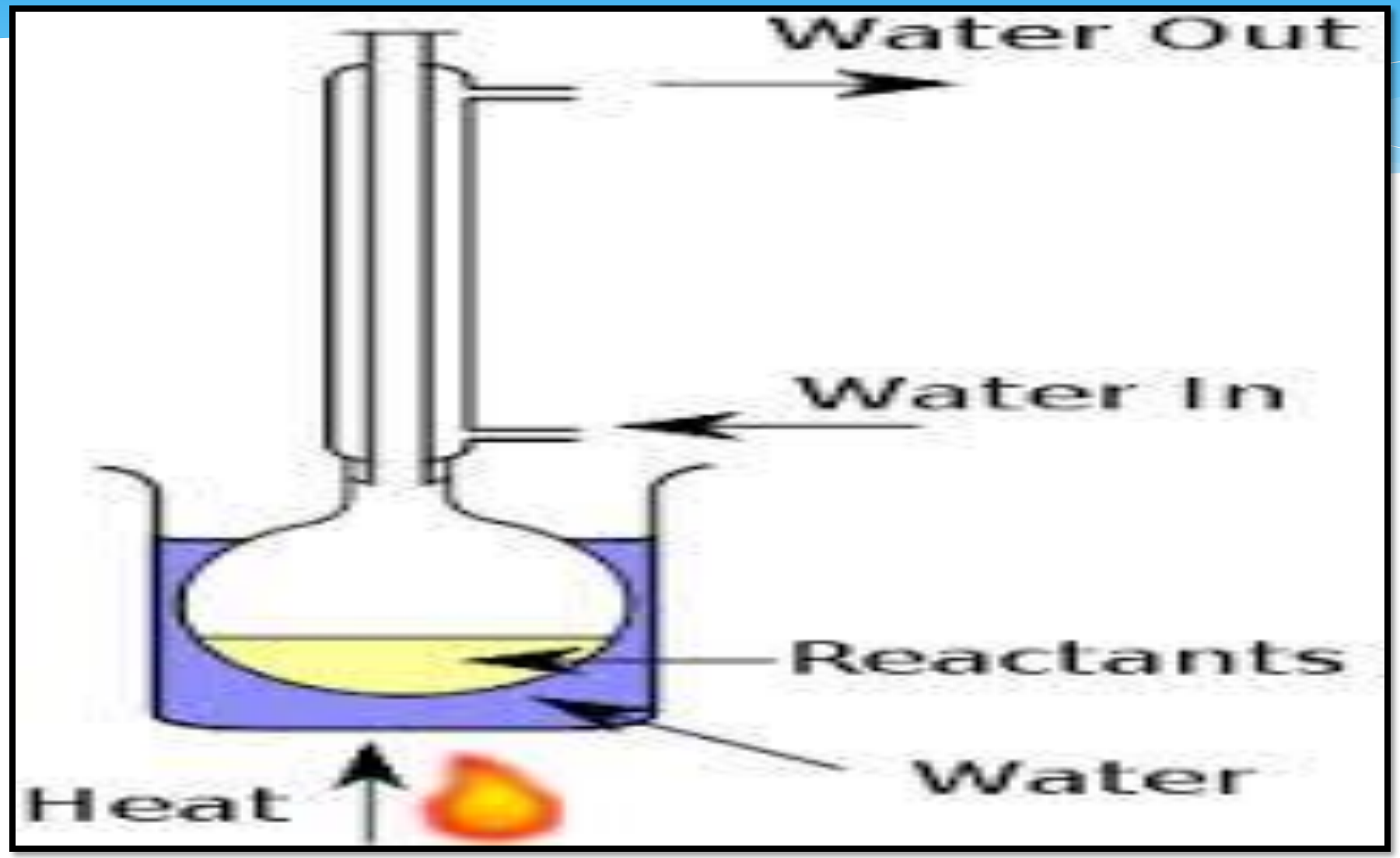
* **a) Reflux condenser:**

* **Plant material is immersed in a solvent in a round-bottomed flask, which is connected to a condenser.**

* **The solvent is heated until it reaches its boiling point. As the vapor is condensed, the solvent is recycled to the flask.**

4-Contiuous hot extraction methods:

* **a) Reflux condenser:**



4-Contiuous hot extraction methods:

* **b) Soxhlet apparatus:**

* **The plant powder is placed in a cellulose thimble حلقة معدنيةin an extraction chamber, which is placed on top of a collecting flask beneath تحتa reflux condenser. A suitable solvent is added to the flask, and the setup is heated under reflux. When a certain level of condensed solvent has accumulated in the thimble, it is siphoned تحويله into the flask beneath.**

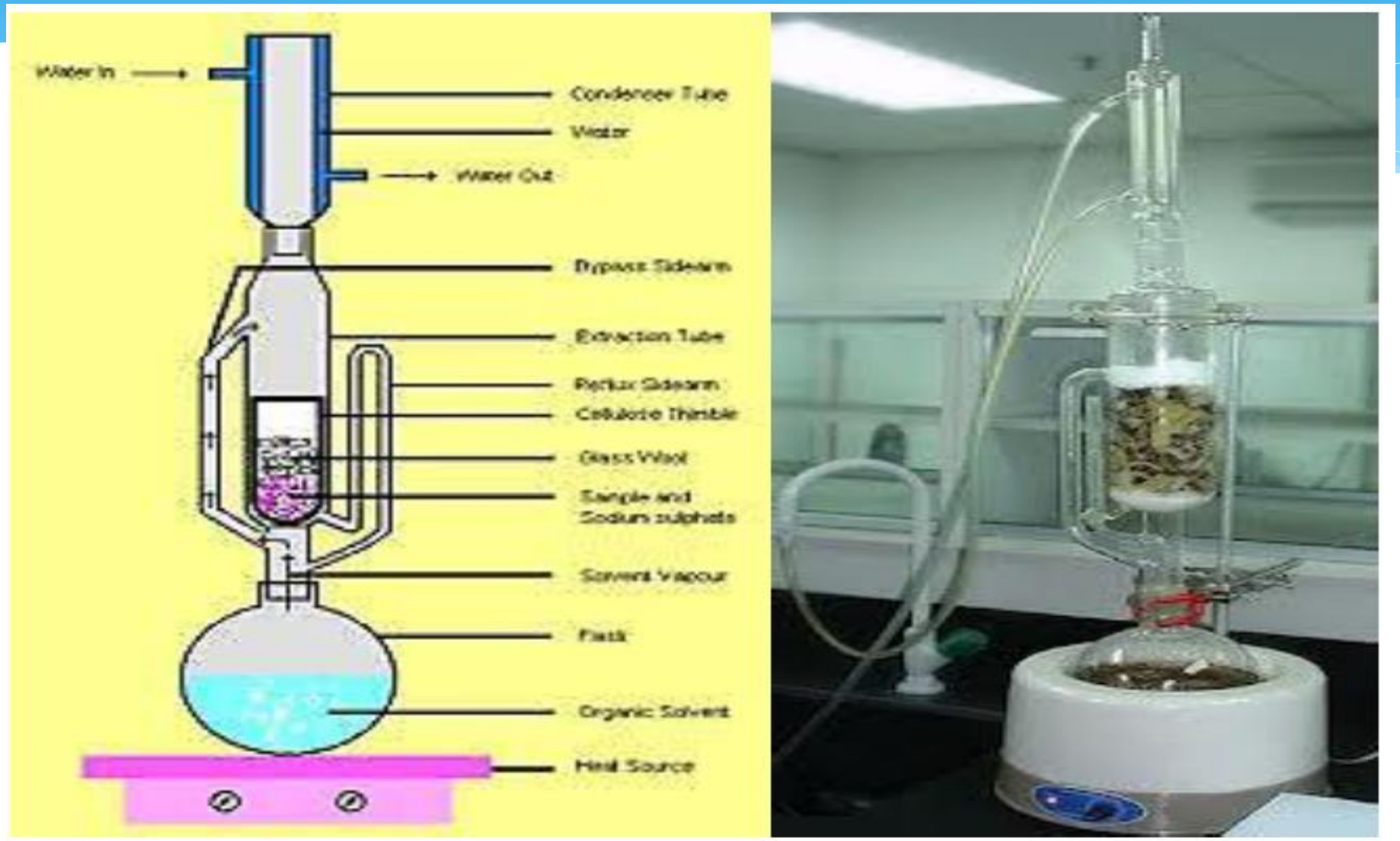
4-Contiuous hot extraction methods:

* **b) Soxhlet apparatus:**

* **The main advantage of Soxhlet extraction is that it is a continuous process for the extraction of active constituents decomposed by direct heat.**

4-Contiuous hot extraction methods:

b) Soxhlet apparatus:



4-Contiuous hot extraction methods:

* **c) Clavenger:**

* **In this method we used a special apparatus which is called ‘Clavenger’, it is used mainly for extraction of volatile compounds, e.g. orange peels has been used for the extraction of orange oil.**

4-Contiuous hot extraction methods:

* **c) Clavenger:**

Clevenger Apparatus

(Oil heavier than Water)

Clevenger Apparatus

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