

Lab. (4)

Methods of extracting active compounds from medicinal plants



- M.Sc. Dhuha Mohsen Abbas
- University of Mustansiriya,
 - College of Science,
 - Department of Biology,
 - Medicinal Plants
 - Plant physiology



Methods of Extraction

- After selection of the plant parts, dried them very carefully by avoiding to exceed the temperature over 45-50°C. In order to extract medicinal ingredients from plant material, the following sequential Steps Involved in the Extraction of Medicinal Plants are:
 - 1. Size reduction
 - 2. Extraction
 - 3. Filtration
 - 4. Concentration
 - 5. Drying
- Before the extraction we should notice the following:
 - 1) The chemical constituents which need is be extracted and isolated such as alkaloid, Glycosides, saponins or Tannins.. ect.
 - 2) The plant parts need to be extracted should be known such as leaves, Roots, flowers, seeds or Barks.
 - 3) Choose the write organic solvents to extract the plant parts. The soulvent should be:

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Characteristics of a good organic solvent used in the extraction process

- **The solvent should be:**
- - Be highly **selective** for the **compound to be extracted**.
- - Have a **high capacity** for extractions in .
- - **Not react** with the extracted compound or with other compound in the plant material.
- - Have **low price**.
- - **Be harmless** to man and environment.
- - **Be completely volatile**.

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- **Types of solvents according to their polarity**
- **Aliphatic alcohol** :with up to three carbon atoms, or mixtures of the alcohols with water, are the solvent with the **greatest extractive power** for almost all natural substances of low molecular weight like **alkaloids, suaponines and flavonoid**.
- **Ethyl alcohol** :is the solvent of choice for obtaining classic extracts such as: **tincture and fluid**.
- **organic solvents polar** such as **ethanol, methanol**.
- **organic solvents intermediate polarity** such as **chloroform, Butanol, Acetone**, However.
- **the low polar solvents** such as **Benzene, Ether or Hexane** used to **extract oil**
In addition
- **water** could be used to extract some chemical constituents as **polar solvents**.

Types of solvent

- 1) Water:(polar) extraction Glycosides.
- 2) Steam water: extract to essential and volatile oil.
- 3) Alcoholic: (polar) Ethanol or Methanol could be used.
- 4) organic solvents: (non-polar) such as chloroform,Acetone solvents.
- 5) Oil extraction:(low polar) be used ether or Benzenc or Hexane,
- **Note:** water which is a polar solvent similar to **EOH** and **MeOH**.
- **Note:** more there one organic solvents could be used to extract the
- chemical constituents from the plant parts. This procedure could be
- followed gradually and start with first organic solvents until the isolation
- of all compounds.

Extraction

- **Extraction**: involves the separation of medicinally active portions of plant or animal tissues from the inactive or inert components by using selective solvents in standard extraction procedures.
- **The products so obtained** from plants are relatively impure **liquids, semisolids or powders intended** only for oral or external use.
- classes of preparations known as **decoctions, infusions, fluid extracts, tinctures, semisolid extracts and powdered extracts**.

The purpose of the process of extracting from plant parts

- The extract thus obtained may be ready for **use as a medicinal agent** in the form of tinctures and fluid extracts, it may be further processed to be incorporated in any dosage form such as **tablets or capsules**, or it may be fractionated to isolate individual chemical entities such as **ajmalicine, hyoscyne and vincristine**, which are modern drugs. Thus, standardization of extraction procedures contributes significantly to the final quality of the herbal drug

General Methods of Extraction of Medicinal Plants

- **1-Maceration:**
- **2-Infusion:**
- **3-Digestion:**
- **4-Decoction:**
- **5-Percolation:**
- **6-Hot Continuous Extraction (Soxhlet):**
- **7-Aqueous Alcoholic Extraction by Fermentation:**
- **8-Aqueous Alcoholic Extraction by Fermentation:**
- **9-Counter-current Extraction: In counter-current extraction (CCE)**
- **10-Ultrasound Extraction (Sonication):**
- **11-Supercritical Fluid Extraction:**