Pharmaceutics | Chapter-4

Unit-6 — Extraction.

Extraction refers as to process for the isolation of the active ingredients from drug materials. This may be by physical means or by dissolving in a suitable medium menstruum or solvents and obtained the therapeutically desirable portion and eliminate the inert material from crude drugs.

Ideal characteristics of menstruum—

- Highly selective in nature and cheaply.
- Shows high capacity of extraction.
- Do not react with the extracted compound or with other compounds in the plant materials.
- Does not cause any toxic effects on man and to the environment.
- Completely volatile in nature.

Some crude drugs contains a number of constituents that may be soluble in a given solvent, the products of extraction , termed extractives, do not contain just a single constituents but rather varying constituents, depending on the drug used and condition of extraction. Extractive solvents are highly selective in nature because some active ingredients are soluble in particular solution.

Classification of Extraction process— In pharmaceutics extraction proceed by many process—

1. **Maceration**— In maceration the drugs are left in contact with the menstruum, usually alcohol but sometimes water is permitted to soak in the menstruum until the cellular structure is softened and penetrated by the menstruum and the soluble constituents are dissolve. For drug containing little or no cellular material, such as benzoin, aloe, and tolu, which are dissolve almost completely in the menstruum.
   Maceration is the most efficient method of extraction and it is usually conducted at a temperature of 15^0 to 20^0C for 3 – 7 days until the soluble matter is dissolved. Example- Tincture preparation, benzoin extract.

However, extraction is incomplete since, mass transfer will cease when equilibrium is set up. This problem overcomes by using a **Multistage Maceration Process.** It is like the normal maceration process.

On the basis of drug nature it is further divide into two parts—

A. **Maceration for organized drugs**— Drug is mixed with the entire volume of menstruum and shakes occasionally for 7 days. After that, strain the liquid and press the marc. Finally mix the liquid and clarify by filtration without any volume adjustment. Example-tincture of lemon.

B. **Maceration for unorganized drugs**— Drug is mixed with the 4/5 of menstruum and shakes occasionally for 2 - 7 days. After that, decant liquid, and marc is not pressed. Finally filter the liquid and final volume is adjusted by the remaining menstruum.

2. **Percolation**—The drug is packed in a special extraction apparatus termed a percolator, with the collected extractive called the percolate. Most drug extractions are performed by percolation.
   - Initially the powdered drug is dampened with the menstruum left for four hours then packed into a percolator; sufficient menstruum is added to cover the drug and left for twenty four hours.
   - In this process the flow of liquid is generally downward to the exit orifice, drawn by the force of gravity as well as the weight of the column of liquid (about twenty drops per minute).
   - In certain specialized percolation, additional pressure on the column is exerted with positive air pressure at the inlet and suction at the outlet or exit.
   - Finally collect the liquid, then marc is pressed and more menstruum added to make the specified volume, then the whole liquid is clarified.
   - Percolation on a small scale generally involves the use of glass percolators but at large industrial scale stainless steel or glass lined metal vessels are used.

3. **Infusion**— Infusions are prepared by simply soaking a drug in water for a specified time. This might be hot or cold, depending on whether decomposition of ingredients could occur at higher temperatures. Infusions would normally be prepared for immediate use, as there is no preservative present. In some cases concentrated infusions might be prepared by boiling to reduce the water then adding a preservative such as alcohol.
4. **Decoction**— Decoctions are prepared in a similar way to infusions but with the ingredients and water boiled for a specified period (about 15minutes) of time or until a certain volume is achieved.
5. **Digestion**— Maceration with continued heating during maceration period. The temperature is between 40^0 – 60^0C.

General method or step involved in Extraction.

- Initially extracting substances are reducing to small size and converts the suitable form like powdering or moistening.
- Then place the substances in a closed vessel with suitable menstruum like percolator.
- Dissolution of the active principle by menstruum like continuously shaking.
- Then liquid strained off and then perform the clarification process.
- Separation of the dissolved active principles from the marc by filtration and evaporation.

Uses/ Applications.

- Extraction is mainly used for crude substance for obtaining the desirable chemical constituents and removes the undesirable constituents.
- By use of selective solvent it also helps in removing of inert substances.
- Extraction is performing for the quantitative and qualitative analysis.
- By the extraction we design the drugs dosages form like tablets, capsules syrups and solutions etc.