

RESINS

Resins are amorphous (having no definite shape, form or structure) products of complex chemical nature. These are amorphous mixtures of essential oils, oxygenated products of terpene and carboxylic acids found as exudation from the trunk of various trees.

Properties:-

- They are transparent or translucent acids, semi-acids or liquid substance containing large number of carbon atoms. Most of the resins are heavier than water.
- They are insoluble in water, but soluble in alcohol, volatile oils, fixed oils, chloral hydrate and non-polar organic solvents like benzene or ether.
- They are hard, electrically non-conductive and combustible masses. When heated they soften and ultimately melt.
- They are usually formed in schizogenous or schizolysigenous cavities or ducts as end products of metabolism.
- Chemically they contain organic acids, alcohols, esters, and neutral resins.

Classification:- Depending upon the type of constituents of resins they are classified as:

- **Acid resins:-** Following are few examples of this type of resins along with their acids: colophony (abietic acid), sandrac (sandracolic acid), copaiba (copaivic and oxycopaivic acids), myrrh (commiphoric acid), and shellac (alleuritic acid).
- **Ester resins:-** This group contains esters as chief constituents of the resins e.g.:- benzoin and storax. Benzoin contains coniferyl benzoate and storax contains cinnamyl cinnamate.
- **Resin alcohols:-** The contents are the complex alcohols of high molecular weight. They are either found in free state or as esters. The examples are the balsam of the peru with peruresinotannol.
- **Resenes:-** These are the complex natural substances without any specific chemical properties. They are chemically inert. They neither form any salt nor they get hydrated. Examples of the drugs containing resins are the gum copal, gutta purcha, also asafoetida, colophony and dammar.
- **Oleoresins:-** Resins and oils in homogeneous mixtures are called oleoresins eg: - Canada balsam, caspicum etc.

- **Oleo-gum resins:-** Oleo-gum resins are homogeneous mixtures of volatile oils, gum and resins eg: -myrrh, guggul and asafoetida.
- **Glycoresins:-** Glycoresins are made up of resins and sugars and are present in jalap and ipomoea.
- **Balsam resins:-** If the resins contain benzoic acid and/or cinnamic acid, it is called as a balsam eg: - balsam of tolu, storax, balsam of peru etc.

Isolation of Resins:-

Pharmaceutical resins are obtained from the plants and animals by one of the following methods:

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- By extraction with alcohol and precipitation with water e.g.: -jalap, podophyllum, ipomoea etc.
- By distillation for separation of oil eg:- copaiba, colophony etc.
- By heating the plant part eg:- g *Guaiacum*
- As plant exudates by incisions eg: - myrrh, asafoetida, balsam etc.
- By processing the encrustations (hard coating on the surface of something) i.e, shellac (Shellac is a resin secreted by the female lac bug on trees in the forests of India and Thailand.).
- By collecting fossil resins eg:- Copal, kauri etc

Bio-sources:-

- Family- zingiberaceae, eg:- Ginger has resin cells.
- Family- pinaceae, eg:- pine wood contain resins in the schizogenous ducts or schizolysigenous ducts or cavities.
- Family- Moraceae, eg:- cannabin contain resins in their glandular hair.
- Usually, the production of resins takes place in the ducts and cavities present in the plant.
- In some plants, resins are not present in the especially modified secretory structures but get imbibed (absorbed) in the adjoining tissues, for example, *Guaiacum Offiicinale* Linn and *Guaiacum sanctum* Linn , (*Zygophyllaceae* family), which means they are present in vessels (xylem and phloem), fiber parenchyma, medullary rays etc.

Therapeutic uses:-

- Most of the plants, especially the coniferous (trees and shrubs that produce cones and leaves are resembling to needles) trees secrete a gummy hydrocarbon called resin, which is quite useful and valuable because of its purposes such as:-
- Podophyllum → purgative
- Colocynth, gamboge, ipomoea → cathartic action
- Asafoetida → laxative
- Jalap → hydragogue properties (a cathartic that causes copious watery discharges from the bowels)
- Cannabis → sedative
- Capsicum, Turpentine → counter-irritant properties
- Aspidium → anthelmintic action
- White pine, copaiba, storax, Tolu balsam, benzoin → used as expectorants.

Resins possess mild antiseptic properties, hence they are used topically in the form of plaster, ointments and cerates (a consistency intermediate between that of an ointment and a plaster.).

They are also used for preparing emulsions.

Commercial applications: -

- Act as adhesives for synthesizing organic substances, resins act as valuable raw material.
- Fossilized resins (hard natural resin) are considered to be an excellent source of amber (Amber is fossilized tree resin that has been appreciated for its color and natural beauty since Neolithic times).
- Resins are also used in industries related to incense and perfumes.
- Used in cosmetics like nail polish.
- Resins like copals, mastic, dammar and sandarac are hard and transparent therefore used in varnishes and cement.
- For increasing friction on stringed instruments such as violin, rebec, erhu, sarangi etc rosin (a form of resin) is applied to the bows of such instruments.
- At the archeological sites, conservation uses resins for joining delicate and fragile substances like bones.

Identification tests:-

TEST-1: About 100 mg of resin powder is dissolved in 10 ml acetic anhydride. A drop of concentrated sulphuric acid is added. A purple violet colour is formed (colophony resin).

TEST-2: Shake the powder resin with pet- ether and filter. Add about twice the volume of dilute solution of copper acetate to the filtrate and shake. Allow to stand. The pet- ether layer becomes emerald green in colour. (colophony resin).

Add Ferric chloride to an ethanolic solution of the resin. A deep blue colour is produced. (Guaiacum resin)