

# **RESINS**

## **(Introduction, Classification, Properties and Extraction)**

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## ❖ INTRODUCTION :

- ◉ The word resin comes from
  - French - **RESINE**
  - Greek - **RHETINE**
  - Latin - **RESIN**
- ◉ Plant resins have a very long history that was documented in ancient Greece by **“Theophrastus”** and in ancient Rome by **“Pliny the Elder”**.



# RESINS

The resin produced by most plants is a viscous liquid, composed mainly of terpenes, with lesser components of dissolved non-volatile solids, which make resin thick and sticky. The individual components of resin can be separated by fractional distillation.

The composition of resins varies with the species. The most common terpenes in resin are the bicyclic terpenes, monocyclic terpenes and smaller amount of tricyclic sesquiterpene.



## INTRODUCTION

Resins are amorphous products of complex chemical nature. They are transparent or translucent solids, semi-solids or liquid substances containing large number of carbon atoms. They are hard, electrically non-conductive and combustible masses. They are usually formed in schizogenous or schizolysigenous cavities or ducts as end products of metabolism.

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 and ether.



# OCCURENCE

- entirely resin e.g. benzoin
- oleo-resin e.g. turpentine oil
- gum-resin e.g. copaiba resin
- oleo-gum-resin e.g. myrrh
- balsam (benzoic+ cinnamic acid): benzoin, tolu balsam, peru balsam, storax
- gluco-resin e.g. Convolvulaceae family drugs

## ❖ DISTRIBUTION:

- ◉ Distributed throughout the entire plant kingdom  
Mostly - *Spermatophyta* (seed plants)  
Rarely - *Pteridophyta* (ferns)  
Absent - *Thallophyta* (sea-weeds, fungi)
- ◉ Resins are the overall net results of metabolism in higher plants.
- ◉ Important Resin-Containing families are :-
  - Pinaceae* (colophory/rosin)
  - Leguminosae* (tolu balsum)
  - Dipterocarpaceae* (garijari)
  - Burseraceae* (myrrh)
  - Umbelliferae* (asafoetida)

## ❖ PROPERTIES :

- ⦿ **Physically** :- Resins are usually hard, transparent or translucent . When heated, they soften and finally melt.
- ⦿ **Chemically** :- They are complex mixtures of resin acids , resin alcohols, resin phenols (resinotannols).
- ⦿ **Solubility** :- Insoluble in water & petroleum spirit . Soluble in alcohol, chloroform & ether.

## CLASSIFICATION

**Based on occurrence, it is classified into five types. They are**

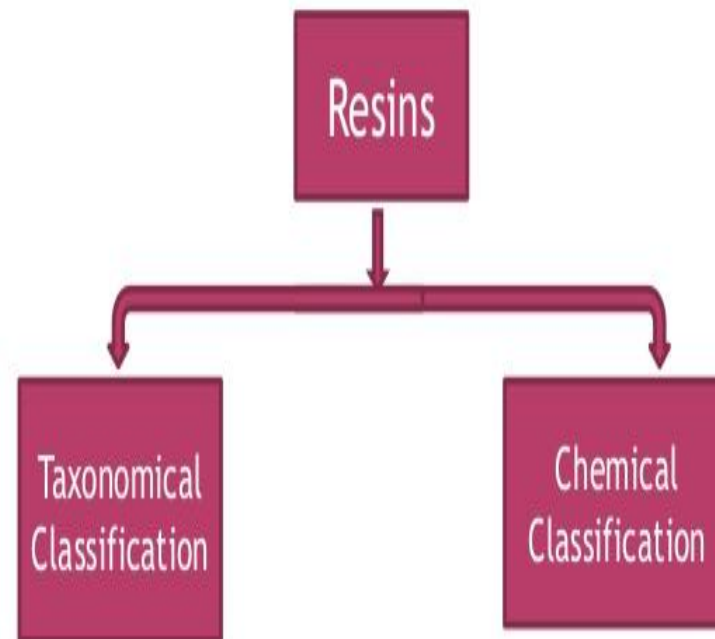
1. Oleo resin
2. Gum resin
3. Oleo-gum resin
4. Glucosin/ Glycosins
5. Balsam

**Based on chemical constituents, it is classified as:**

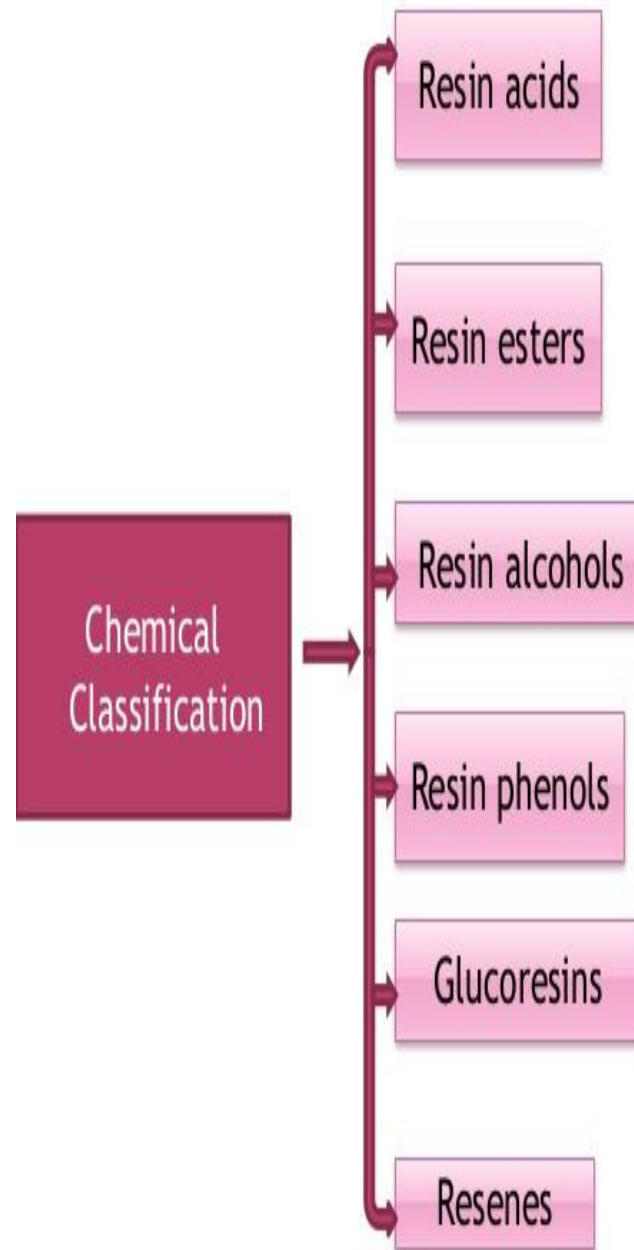
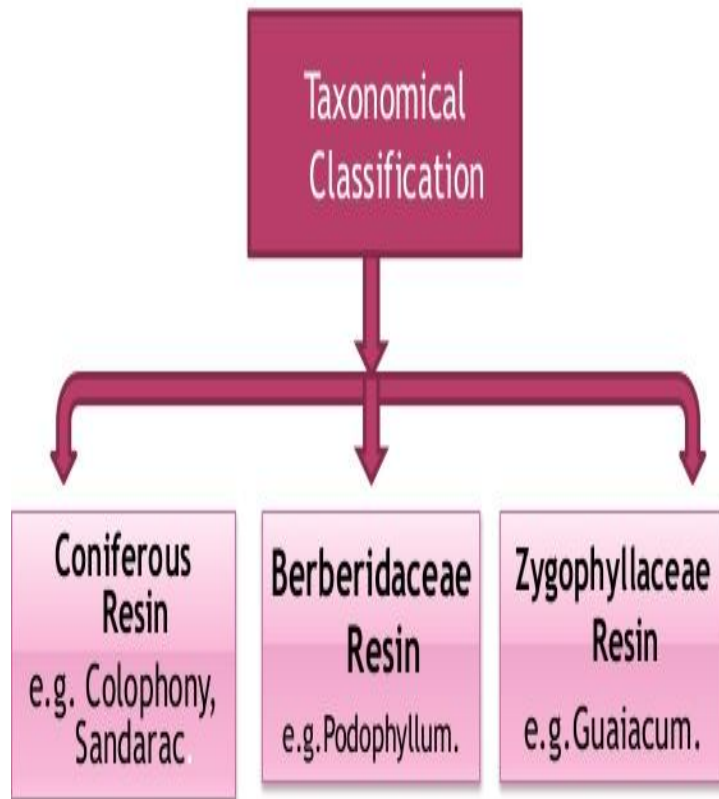
1. Resin Acids/ Resinolic Acids
2. Resin Alcohols/ Resin Esters
3. Resenes/ Inert Resins

## ❖ CLASSIFICATION:

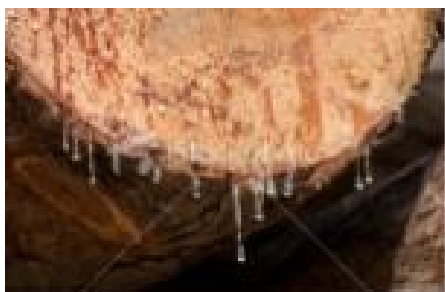
- Classified under 2 major categories:











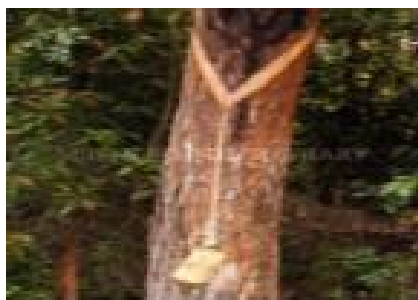
# FORMATION

- formed in special passages or tubes called resin ducts.
- Ducts-anastomose-so- a single incision can drain the resin from considerable area of the plant.
- turpentine are naturally produced but some are produced only when cambium is injured.
- Such resins formed by the injury of cambium and the formation of secondary wood are called pathologically produced resin.
- While resins are usually produced in ducts or cavities, that may be found in other positions-for example, in the resin cells of bloodroot, in the elements of the heartwood of guaiacum, in the external glands of Indian hemp, in the internal glands of male fern or in the glands on the surface of the loc insect

# METHODS OF EXTRACTION

1. Extraction by using solvents
2. Extraction by Distillation
3. Extraction by making Incisions
4. Extraction by heating the plant part containing resin
5. Extraction of resin from Encrustations





## CHEMICAL COMPOSITION AND ISOLATION

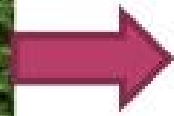
- complex mixture of acids, alcohols, phenols, esters, glycosides or hydrocarbons.
- When associated with volatile oils, contains monoterpenoids, sesquiterpenoid and diterpenoids.
- gums when associated with resin: acacia gum: oxidase enzymes.

### ISOLATION:

- difficult task due to presence of various combinations.
- Extraction with alcoholic solvents and then the subsequent precipitation by adding concentrated alcoholic extract to a large proportion of water.
- Hydro distillation or distillation can be used for separation of volatile oils from resins. (separation of resin from turpentine)



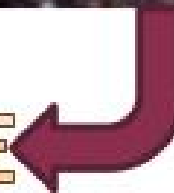
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CANNABIS



PINE



GINGER



## ❖ EXAMPLES OF VARIOUS RESINS & RESIN COMBINATIONS:

| S.No | Resins                 | Examples                               |
|------|------------------------|----------------------------------------|
| 1.   | <b>Chemical Groups</b> |                                        |
| i)   | Resin acids            | Colophony ,Myrrh ,Sandrac,<br>Guaiacum |
| ii)  | Resin esters           | Benzoin ,Dragon's blood                |
| iii) | Resin alcohols         | Storax ,Benzoin                        |
| iv)  | Resin phenols          | Balsam of tolu ,balsam of<br>peru      |
| v)   | Glucoseresins          | Jalap                                  |
| vi)  | Resenes                | Asafoetida                             |
| vii) | Mixed composition      | Shellac                                |

| S.No | Resins                               | Examples                                      |
|------|--------------------------------------|-----------------------------------------------|
| 2.   | <b>Resins with Gum/Essential oil</b> |                                               |
| i)   | Gum resins                           | Ammonicum ,Gamboage                           |
| ii)  | Oleoresin                            | Turpentine ,Copaiba ,<br>Ginger ,Canada resin |
| iii) | Oleogum resin                        | Myrrh ,Asafoetida ,<br>Olibanum               |
| 3.   | <b>Balsams</b>                       | Tolu balsam ,Peru<br>balsam                   |





## USES

- It reflects light. This decreases the heat on the flowers, thereby protecting them.
- They are used in the preparation of emulsions.
- Solid resenes are available as adhesives.
- They are used externally as mild antiseptic agents in the form of ointments and plasters.
- Animals do not chew the leaves of resinous plants. Hence, they can be used as outdoor plants.
- Resinous drugs possess the action of anthelmintic, counter-irritant, expectorant, hydragogue, laxative, and sedative.

THANK YOU