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**RESINS**

Resins are amorphous product of complex chemical substances which are formed in schizogenous or schizolysigenous ducts in cavities in the plants.

1. Schizogenous ducts are formed by the separation of cells possessing definite boundaries.
2. Schizolysigenous ducts are formed by the breakdown of cells and don’t possess definite boundaries.
3. Resins are end product of metabolism
4. Some investigator says that these are the oxidative product of terpenes.
5. Chemically these are oxidative hydrocarbons

**Production**

Resins are produced as:

* 1. Physiological product
  2. Pathological product

1. **Physiological products**

If produced naturally then called physiological products, e.g. turpentine resins.

1. **Pathological products**

If produced during injury of cell, or destruction by bacteria or by oxidation then called pathological products, e.g. benzoin, balsams etc

**General Properties**

1. These are amorphous bitter solid hard, transparent, and translucent amber coloured with yellowish luster.
2. They become softened after heating & become melt and finally leave or yield adhesive fluid.
3. These are insoluble in water and soluble in alcohol and other organic solvent
4. When it is evaporated, resins are left as a varnish like film.
5. Upon burning, These gives smoky flame.

**Occurrence**

Resins occurred in combination with other compounds in plants

1. **Glycoresins:**

These are resins in combination with glycosides

These are formed by resin acid and sugar by glycosidic linkage

**Example**

Jalap and Podophyllum.

1. **Oleo-resins:**

These are resins in combination with volatile oil

**Example**

Terpentine, ginger and capsicum

1. **Oleo-gum resins:**

These are resins in combination with gum and volatile oil

**Example**

Asafoetida and Myrrh.

1. **Balsam:**

These are resinous mixture with cinnamic acid and benzoic acid or both or esters of these two acids

**Example**

Benzoin, Peru balsam and Tolu balsam.

**Chemical Constituents**

Chemically resins are the mixture of

* 1. Resins acids
  2. Resin alcohol
  3. Resenes

1. **Resin Acids:**

These are the oxy-acids having the property of carboxylic acid and phenol.

**Occurrence:**

These exist free or in the form of esters

**Colloidal solution & Suspension:**

They form colloidal solution with aqueous alkali or soap like colloidal suspension with dil. alkali.

**Resinates**

With metallic salts the metallic salts and named as resinates.

These resonates are used in preparation of cheap soap and varnishes.

**Examples:**

Abietic acid in Rosin

1. **Resin alcohol:**

These are high M.W alcohol

**Types of Resin alcohol** These are of two types

1. Resinols
2. Resinotannols

**Difference between Resinotannols & Resinols**

Resinotannols give tannin test with FeCl3 reagents and resinols do not give this test.

**Occurence**

Resins occur in the form of alcohol or in free state

**Examples of resinotannols:**

* 1. Peruresinotannol in Peru balsam
  2. Aloeresinotannol in Aloe
  3. Siaresinotannol and sumaresinotannol in Benzoin

**Example of Resinol** Benzoresinol in Benzoin

1. **Resenes:**

These are neutral substance without any characteristics chemical properties.

The don’t form salts or esters

**Solubility:**

They are insoluble an alkalies.

**Hydrolysis:**

They resist hydrolysis by Alkali

**Example:** Copalresene in Copal

**General Production of Pharmaceutics Resins**

**1st method:**

They are solubilised in alcohol and precipitated in H2O **2nd Method:**

They are obtained by distillation process

**3rd Method:**

They are obtained by artificial functioning of plant.



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**PURE RESINS**

**ROSIN**

**Synonyms:**

Colophony

**Botanical origin:**

*Pinus Palustris*

**Family:**

Pinaceae

**Part used:**

Residue (resin) left after the distillation of volatile oil from crude terpentene.

**Habit & Habitat:**

1. Plant is a tree
2. grow in Pakistan, US, Spain, France, Greece, Italy, Portugal, China, Newzeland and India

**Production:**

1. Collect crude terpentene from cup in which it is collected and transfer into the barrels
2. These barrels are finally transferred to terpentene still.
3. Terpentene still have capacity of 20, 30 barrels.
4. Still consists of large copper kettle name as retort having neck and condenser open into receiver.
5. This condenser is passed to a water tank.
6. There are furnace just below still temp is about 300Fo
7. When distillation starts water is added to terpentene to avoid scorching volatile oil is formed which is collected in receiver.
8. After the evaporation of volatile the crude material left is called rosin.
9. Which is then separated.

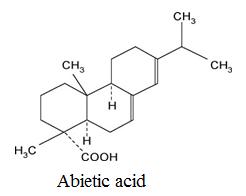
**Characteristics**

1. Rosin occur as angular, translucent shiny, sharp pale yellow amber colour mass covered with yellowish luster.
2. It has characteristic taste and odour.
3. It produce smoky flame upon heating soluble in alcohol, either, glacial acetic and other organic solvents.

**Constituents:**

1. Abietic acid 90%
2. Sylvic acid decomposed product of Abietic acid.
3. Pimeric acid
4. Sapinic acid
5. Resene
6. Small amount of volatile oil

**Structure:**

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**Uses:**

1. Rosin is used as stiffening agent in rosin cerates (type of plaster) plasters and ointments.
2. Diuretic
3. Abietic acid also possess antimicrobial property.
4. Used as an ingredients in varnishes in the manufacturing of soap, adhesive tapes, printers ink, rosin oil and rosin spirit.

**Cannabis**

**Synonyms:**

Indian hemp or bhang , (Arabic/Persian) Hashish,

Marijuana (Mexican cannabis) Marihciana, Charas

**Botanical origin:**

*Cannabis sativa (Mexican)*

*Cannabis indica (Indian)*

**Family:**

Moraceae

**Part Used:**

Dried leaves and flowering tops.

**Habit & Habitat:**

1. The plant is an annual herb
2. Indigenous to Central and western Asia
3. Cultivated in Pakistan, US, Africa, Mexico, Brazil and India.

**Production:**

1. **Hemp:**

Cannabis is cultivated for its fibres which constitute Hemp.

Hemp is a biomass remaining after the removal of Active ingredients.

Hemp grown for long fibres used for the manufacturing of ropes, sacks and bags.

1. **Bhang:**

When dried leaves and flowering tops are used as drug it is named as Bhang. Bhang is used in smoke with or without tobacco.

1. **Charas:**

When resin is collected separately by heating flowering tops and leaves in cotton cloth and spread on ground, the greenish brown soft mass is named as Charas.

It is mixed with many smoking mixtures.

**Constituents:**

Drug contains 60 compounds generally be named as Cannabinoids, including:

1. Cannabinol
2. Cannabidiol
3. 9-tetrahydro cannabinol
4. Cannabigerol
5. Cannobidiolic acid
6. Cannabichromene
7. Canabene



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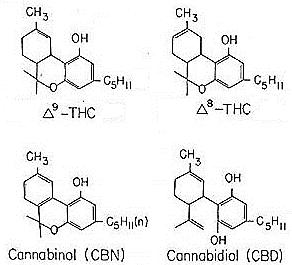


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**Structure:**

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**Uses:**

1. Also used as analgesics
2. Also uses as delerifacient
3. Anticonvulsant
4. Neuralgia
5. Used in bronchial asthma
6. Antiemetic properties
7. THC causes euphoria.
8. Used in spasmodic cough
9. Uses as sedative in migraine, neuralgia spasmodic cough.
10. In high doses it produces determine with hallucination followed by sleep
11. Also produces marked weakness.
12. Plant is a cerebral stimulant
13. It stimulates the CNS specially right phychic centre producing mental excitement
14. Commercially uses is used in production of robes, carpets, bags, clothes oil of cannabis is useful for cooking
15. Also used in soap or point industry.

**OLEO GUM RESINS**

**ASAFOETIDEA**

**Synonyms:**

Gum asafoetida, thing

**Botanical origin:**

*Ferula asafoetida*

*Ferula foetida*

**Family:**

Umbelliferae

**Part used:**

Oleo gum resin obtained by the incision of living roots and rhizomes.

1. **Habit & Habitat:**
   1. Plant is a perennial Herb.
   2. Indigenous to Iran & Afghanistan.
   3. Grow in Pakistan & Turkistan.

**Collection:**

1. The collection involve the removal of stem and cutting the successive slices of the roots.
2. Oleo-gum resin exudate out from these roots and become harder.
3. Now it is collected packed and export.

**Characteristics of Drug:**

1. Asafoetida is a semi solid or soft mass.
2. Soft irregular mass of ovoid tear or agglutination of tears.
3. Finally they attain the Reddish brown colour.
4. On drying they become hard and brittle.
5. When broken the tear they are milky white and opaque.
6. Strong alliaceous odour.
7. Taste bitter and acrid.

**Constituent:**

It contains:

1. Volatile 4-20%

o Isobutylpropyl disulphide

1. Resin 40-65%

o Isaresinol ferulate o Free ferulic acid o Vanillin

o Resino-tannol

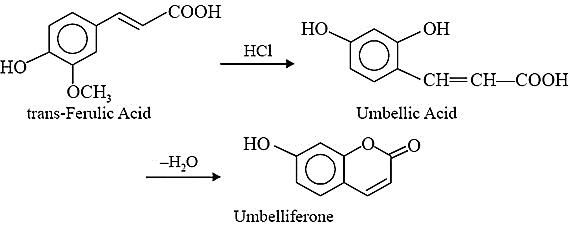
1. Gum 25%

o Glucuronic acid o Arabinose

o Galactose o Rhamnose

**Identification Test:**

1. Boil with HCl and filter it.
2. Now Ammonia is added.
3. Green fluorescence appear due to the formation of Umbelliferone.



**Uses:**

1. It is used as carminative
2. It is used as expectorant
3. It is used as Antispasmodic
4. It is used as Laxative
5. Nervous stimulant used in Hysteria.
6. Commercially it is used as condiments, flavouring agent and in the preparation of alcoholic and non-alcoholic beverages.



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**MYRRH**

**Synonyms:**

Gum Myrrh

**Botanical origin:**

*Commiphora Molmol*

*Commiphora sinica*

*Commiphora myrrha*

**Family:**

Burseraceae

**Part used:**

Oleo-gum resin obtained from the stem

**Habit & Habitat:**

1. Plant is a small tree
2. Indigenous to Arabia
3. Cultivated in Ethiopia & Somalia

**Collection:**

1. Oleo-gum resin exudate naturally or by incision of bark.
2. It is at first yellowish white viscous fluid and become harden in the intense heat of these countries.
3. It also become darker and collected.

**Characteristics:**

1. Occur as irregular tear or masses, covered with yellowish or brownish yellow cover.
2. It has aromatic odour and bitter acrid taste.

**Constituents:**

Volatile oil 7-17%

1. Pinene o Eugenol o Cuminol

o Cuminic aldehyde o Dipentene

o Sesquiterpene Resin 25-40%

o Free resin acid

o α-β-myrrholdic acid (ether soluble) o α-β-γ-Commiphoric acid

o Phenolic compounds like pyrocatechin insoluble in ether and protocatechoic acid. Gum 57-61% (water soluble)

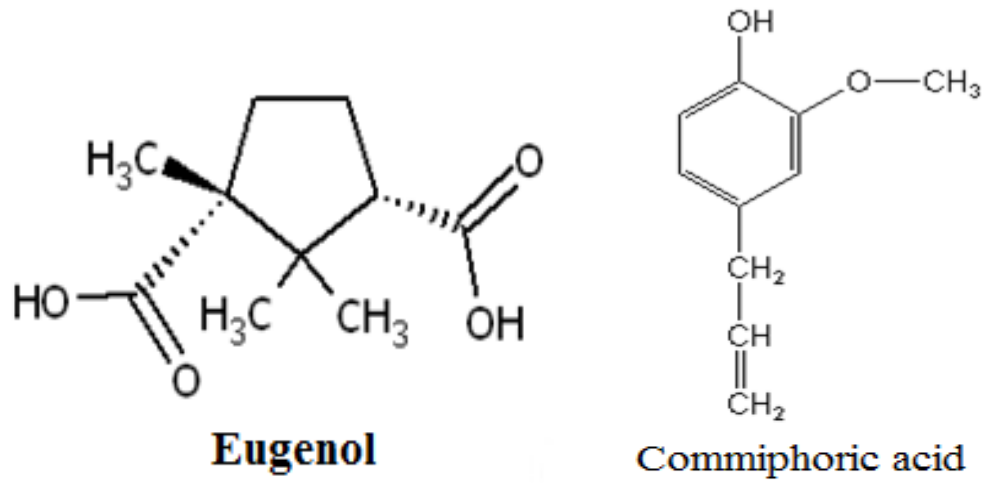
o Arabian gum o Glucuronic acid o Galactose

o Oxidase enzyme

**Chemical Tests:**

1. A yellow brown emulsion is produced on trituration with water.
2. Ethereal solution of Myrrh turns red on treatment with bromine vapours. Solution becomes purple with nitric acid.

**Structure**

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**Uses:**

1. Used as antiseptic in mouth wash preparation
2. Used as emmenogogue
3. Also used in perfumery
4. As tonic & stomachic
5. Carminative, antispasmodic, antifungal, diuretic, anti-rheumatic property.
6. Expectorant property.
7. Fumes of burn myrrh are useful in chronic bronchitis and tuberculosis.
8. Incense, i.e. burn of drug give sweet smell.

**GLYCORESINS**

**PODOPHYLLUM**

**Synonyms:**

Mapple root, umbrella plant

**Botanical origin:**

*Podophyllum peltatum* (American variety) *Podophyllum emodi & P. hexandrum* (Indian variety)**Family:**

Berberidaceae

**Part used**:

Dried tuberous roots and rhizomes

**Habit & Habitat:**

1. Plant is a perennial herb.
2. American variety: America & Northern Carolina
3. Indian variety: Pakistan, India, Afghanistan & Tibet.

**Collection:**

1. Roots and rhizome are collected when 1 meter early in spring or in autumn when aerial parts are died off.
2. Roots and rhizomes are dug out, wash, cut into pieces and sun dried.
3. Extraction:
4. Podophyllin resin is extracted with alcohol, precipitated with acidified water, then washed with twice of water, then dried and powder.



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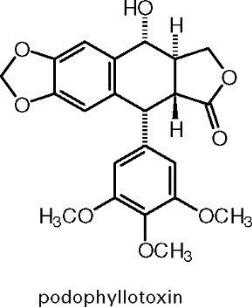
**Constituents:**

They contain resin whose active principle are *lignans* (phenolic compounds):

1. Podophyllin 2-8% (American variety)
2. Podophyllin 6-12% (Indian variety)
3. Podophyllotoxin 20% (American variety)
4. Podophyllotoxin 40(Indian variety) They also contain:
5. α-peltatin 10%
6. β-peltatin 5%
7. Starch
8. Calcium oxalate crystals

Indian variety contain more thicker resin than American variety.

**Structure:**

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**Uses:**

1. Cathartic and purgative
2. It is act as hydrogogue cathartic
3. Suspension of podophyllum resin 25% in mineral oil and ointment containing the resin is administered for the removal of soft warts.
4. It is beneficial in some types of tumours.
5. Semisynthetic variety of podophyllotoxin name as Etoposide is used in lung cancer, testicular cancer, lymphoma and leukaemia.
6. Other derivative like Teniposide is used in neuroblastome, leukaemia and brain cancer in children

**IPOMOEA**

**Synonym:**

Oriza jalap, Male jalap root

**Botanical origin:**

*Ipomoea orizabensis*

***Ipomoea*** means worm like or twinng vine

***Orizabensis*** means City of Mexico

**Family:**

Convolvulaceae

**Part used:**

Dried tuberous roots (secondary roots)

**Habit & Habitat:**

1. Plant is a perennial vine or climber
2.  Native to Mexico.

**Collection:**

* 1. Roots are collected
  2. Sliced or cut into several pieces.
  3. Dried under sun

**Extraction:**

Resin is extracted with alcohol and water in ratio with:

1. : 10

Alcohol : Water

**Constituents:**

It contains:

1. Resin 6-18%
2. Starch
3. Glucose
4. Fatty acid
5. Volatile oil

Resin contains glycosides of:

1. Jalapinolic acid
2. Jalapin (resin)
3. Ipuranol
4. Ipurganol
5. Methyl pentoside
6. Scammonin (Mexican Scammony)
7. Dihydroxy cinamic acid
8. Phytosterol

**Uses:**

Plant is used as Purgative and Cathartic

**JALAP**

**Synonyms:**

Jalap root

**Botanical origin:**

*Exogonium purga*

**Family:**

Convolvulaceae

**Part used:**

Dried tuberous root

**Habit & Habitat:**

1. Perennial twinner
2. Native to moist Forests of Mexico.

**Collection:**

1. Roots are gathered in the fall (autumn) from the mature plant
2. Larger roots are peeled and cut long before drying.
3. Dried in a net over fire and then drug will attain the smoky odour.

**Extraction:**

Resin is extracted with alcohol. Precipitated with water (twice), dried and powdered which is yellowish brown in colour.

**Constituents:**

It contains:

1. Resin 9-18%
2. Starch
3. Volatile oil



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1. Gum
2. Calcium oxalate crystals Resin contains:
3. Convolvulin (ether insoluble & alkaline soluble)
4. Jalapin
5. Ipurganol (glycoside)
6. β-methyl exculetin
7. Stearic & Palmatic acid

**Uses:**

1. Used as hydragogue cathartic
2. Used as emmenogogue
3. Drastic purgative
4. Anthelmintic
5. Cause nausea gastro enteritis cramp like pains
6. Depressing action

**Contraindication:**

Contraindicated in patients with nephritis, inflammation of intestine, during menstruation and pregnancy

**COLOCYNTH**

**Synonyms:**

Bitter apple, bitter cumber & colocynth apple.

**Botanical origin:**

*Citrullus colocynthis*

**Family:**

Cucurbitaceae

**Part used:**

Dried pulp of fully grown but unripe fruit.

**Habit & Habitat:**

1. Pant is an annual or perennial herbaceous vine
2. Indigenous to temperate region of Africa & Asia
3. Cultivated in Pakistan, Syria, Cyprus, Turkey, North Africa, Spain and India.

**Collection:**

1. Fruit is collected when fully grown.
2. Epicarp is removed and dried under sun
3. After drying seeds are removed and pulp is used.

**Constituents:**

It contains glycoresin including:

1. Citrullol
2. Colocynthin
3. Colocynthetin
4. Cucurbitacin E (Elatericin)

**Uses:**

1. Used as purgative and cathartic
2. Cucurbitain E has been reported for its Anti-Cancer activity
3. Used as tonic
4. Carminative
5. Insecticidal
6. Anthelmintic
7. Used in veterinary medicines.

**OLEO-RESIN CONTAINING DRUGS**

**Terpentene**

**Botanical origin:**

*Pinus Palustris*

**Family:**

Pinaceae

**Part used:**

Oleo-resin obtained from the plant

**Habit & Habitat:**

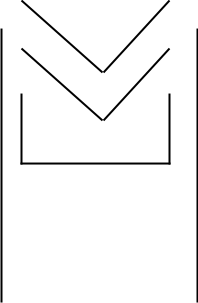
1. Plant is a tree
2. Native to Florida, Virginia, Texas
3. Major supply comes from Florida and Georgia.
4. Commercial supply comes from Mississippi, North and South Carolina.

**Production & Collection:**

Oleoresin is formed in oleo-gum reservoir present just beneath the cambium in the sap wood. Two general method of collection of oleo-resin

* 1. Cup and Gutter method
  2. Chemical stimulation

1. **Cup and Gutter method**
   1. There is V shaped incision in trunk of tree
   2. Which is about 1-2 apart
   3. There is aluminium cup attached just beneath incision for collection.
   4. Tow al strips or metal gutter arranged to dissect the flow of oleo resins in the gum.
   5. Oleo resins stars flowing and collected in the cup
   6. When the cup become filled, it is emptied in the wooden barrel.
   7. After each 7-10 days flow of oleo resin decreased.
   8. A Service of new incision are made above the first one
   9. Production is continued up to 32 weeks.



1. **Chemical stimulation:**
   1. In this method incision are made is the bark.
   2. 50% H2SO4 is sprayed on inscision
   3. Flow of gum is stimulated
   4. And treat it until collapse the outer thin walled parenchymal cells that lines the resin duct (There is discret passage)
   5. Flow of resins become stimulated and reduced the chances of Hardening solution that block the outlet.
   6. This acid enables the oleo resins from duct to escape thus prolong the flow of the gum.
   7. 50-60% yield is produced in this way.



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***Virgin terpentene***

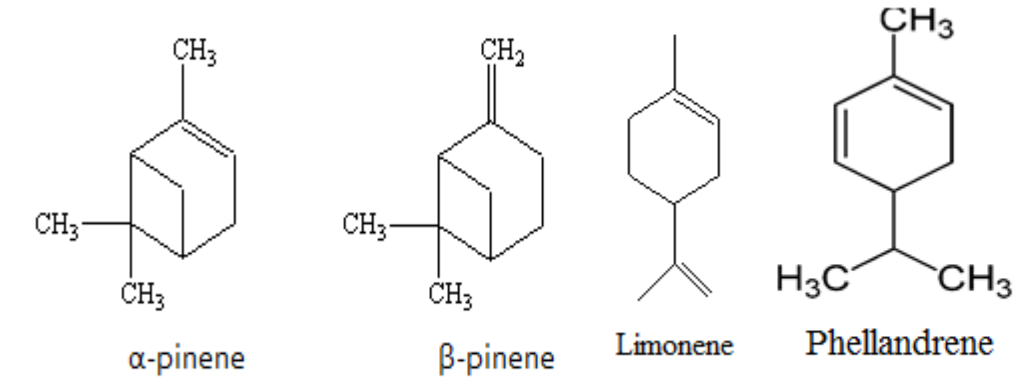
* 1. First year gum obtained by insicision is named as virgin terpentene.
  2. Yellow Dip Terpentene
  3. Oleo resin after 1st year is called yellow DIP turpentine.
  4. These have low cone of volatile oil as in of virgin terpentene.

**Constituents:**

It contains volatile oil which is about 10-30% including.

1. α- pinene
2. β- pinene
3. Phellandrene
4. Limonene

**Structure:**

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**Uses:**

1. Used in the products of varnishes, cerates, ointment, Rosins.
2. Externally it is counter irritant.

**CAPSICUM**

**Synonyms:**

Red pepper, Long pepper, African pepper, Chillies, Mirch, Spanish pepper

**Botanical origin:**

*Capsicum frutescens*

*Capsicum annuum*

**Family:**

Solanaceae

**Part used:**

Dried ripe fruit

**Habit & Habitat:**

1. Plant is a small shrub
2. Indigenous to America
3. Cultivated in Pakistan, Japan, Europe, Mexico, Africa (Kenya) Tanzania and India.

**Collection:**

1. Collected in December or January when fully mature or ripe & quality of drug depends on its colour.
2. They are dried under sun and powdered.

**Constituents:**

1.  **Capsaicin 69%**
2. When powdered drug is treated with petroleum ether and aqueous alkali, finally carbon

dioxide gas passed through the solution, capsaicin is precipitated.

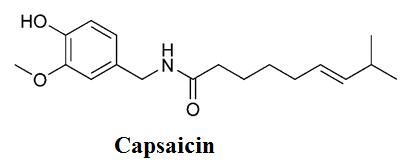
1. Capsaicin retain its pungency in dilution of part in 11 million part of H2O. o Its pungency is unaffected by alkalis

1. Carotenoids o Capsanthin o Zea xanthin

o Cryptoxanthin

1. α and β carotene
2. Capsacutin
3. Ascorbic acid 0.2%
4. Tocopherol 204 mg/100g (trace amount)
5. Provitamins (A, B, B2 & B6)
6. Carbohydrates in the form of galactose and fructose.
7. Fixed oil
8. Volatile oil 1.5%

**Structure**

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**Uses:**

1. Externally used as stimulant rubefacient, counter irritant
2. Rubefacient at initial dose or application causes profound pain but repeated application produce desensitization with analgesic and anti-inflammatory effects.
3. Used in yellow fever
4. Used as condiment, plaster and medicated wool
5. Used in treatment of rheumatism
6. Also used for pungency of other spicy drug

**GINGER**

**Synonyms:**

Zingiber

**Botanical origin:**

*Zingiber officinale*

**Family:**

Zingiberaceae

**Part used:**

Dried rhizomes

**Habit & Habitat:**

Plant is a perennial herb

It is native to Asia

Cultivated in Pakistan, West Indies, Japan, Nigeria, Jamica, Srilanka, China, Africa and India.

**Varieties of Ginger:**

1. They have different varieties according to their habitat
2. They have low varieties
3. Less pungent



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1. Small size

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**Four Varieties:**

* 1. Nigerian Gingers
  2. Cochin Gingers
  3. African Ginger
  4. Colcutta Ginger

1. **Nigerian Ginger**

 It is darken in colour  Small in size

1. **Cochin Ginger**

 Larger in Size

 Having mere starch

1. **African Ginger**

 Darken in colour  More Pungent

1. **Calcutta Ginger**

 Darken in Colour  More Pungent

**Collection:**

1. Ginger is planted by cutting method having the bud.
2. It is planted in March and April.
3. Rhizome are dug out in Summer or January.
4. These Rhizome are boiled in water.
5. Then peeled off and washed
6. Finally dried under the sun.
7. Bleached rhizomes are obtained by treating with dilute sulphuric acid, chlorine or dusting with calcium carbonate and calcium sulphate.

**Constituents:**

It contains resin 5.8%

1. Gingirol
2. Zingerone
3. Shogaol

It contains volatile oil 1.2%

1. Monoterpenes o Phellandrene o Cineole

o α & β pinene o camphene

o Cumene o Limonene o Myrcene

1. Sesquiterpene hydrocarbons o Zingiberene

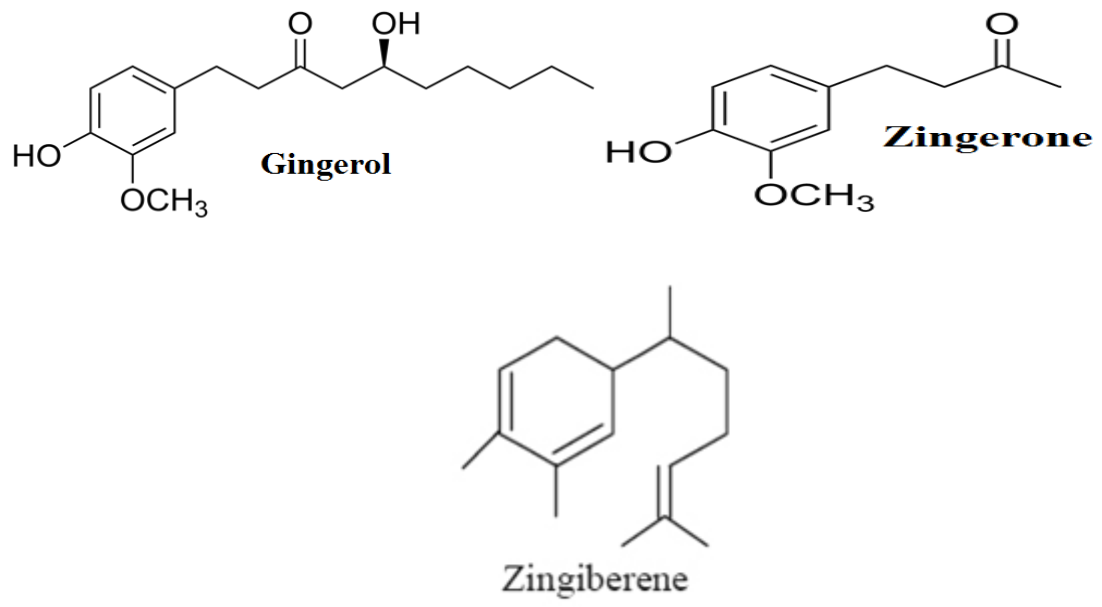
o Farnesene

1. Sesquiterpene alcohol
2. o Zingiberol

o Gingerol (Pungent principle)

* 1. Starch 50%
  2. Protein 2-3%
  3. Sugar (Sucrose, Glucose)

**Structure:**

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**Uses**:

1. It is used as carminative
2. It is used as condiment
3. It is used as flavouring agent
4. Prescribed in dyspepsia, flatulence, colic, vomiting and spasm
5. Also used in painful infection of stomach, cold, cough and asthma.
6. The chewing of fresh ginger is useful in sore throat, hoarseness and loss of voice.
7. Circulatory stimulant.
8. Appetizer
9. Pulmonary stimulant
10. Rheumatism
11. Inhibit platelet aggregation.

**BALSAM**

**STORAX**

**Botanical Origin:**

*Liquidambar orientalis* (Lavant or Asiatic)

*Liquidambar styraciflua* (American storax)

**Family:**

Hammaelidaceae

**Part used:**

Balsams obtained from the trunks of trees.

**Habit & Habitat:**

1. Plant is a tree
2. Orientalis variety grow in Asia minor
3. Styraciflua variety grow in Northern & Central America



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**Production & Collectoin:**

**Asiatic**

1. Storax is pathological product which is produce in young wood and bark of tree by mechanical injury.
2. Due to injury cambium is stimulated to produce the young wood containing schizolysigenous cavities or reservoirs in which balsam is secret.
3. Balsam flow out and retain in bark spaces.
4. Bark saturated with balsam
5. Now separate the bark and press to get balsam.
6. Boiled with water and press the bark again to get balsam.
7. Now packed into barrels or cans.

**American storax**

1. American storax exudes into natural spaces present in between the bark and the wood.
2. The presences of the balsam in space may be detected by excrescences on the outside of the bark from these pockets the balsam is tapped with gutter into containers which are exported in cans.

**Characteristics:**

1. Levant strox is a viscous, semi liquid greyish, sticky, opaque mass which deposits as, a dark, brown, heavier, oleo-resinous product on standing.
2. American storax is a semisolid sometimes solid mass softened by warming become opaque and darker coloured.
3. It is insoluble in water, almost completely soluble in warm alcohol, ether acetone and carbon disulphide.
4. Odour is agreeable and taste is balsamic.

**Chemical Constituents:**

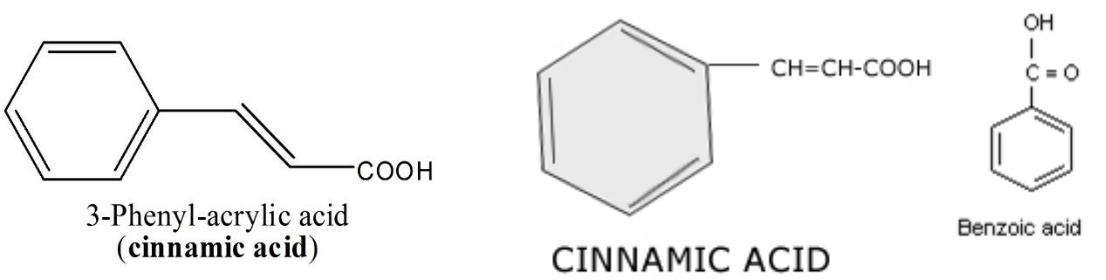
Storax is rich in two resin alcohol:

1. 50% α storesin and β stroresin
2. Balsamic acid

It also contains:

1. Cinnamyl cinnamate
2. Cinnamic acid 17-23% (Asiatic)
3. Cinnamic acid 28% (American storax)
4. Benzyl cinnamate
5. Styrol
6. Phenylpropyl cinnamate
7. vanillin

**Structure:**

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**Uses:**

1. Used as stimulant
2. Used as expectorant
3. Used as antiseptic
4. Used in preparation of compound benzoin tincture.
5. Used in toilet preparation.
6. In perfume industry
7. Antiseptic
8. Anti-inflammatory
9. Antimicrobial

**BENZOIN**

**Varities:**

It has two varieties

1. Sumatra Benzoin
2. Siam Benzoin

**Botanical origin:**

*Styrax benzoin* (Sumatra Benzoin) *Styrax tonkinensis* (Siam Benzoin)

**Family:** Styraceae

**Part used:** Balsamic resin

**Habit & Habitat:**

1. Plant is a medium size tree
2. Cultivated in Asia and East Indies
3. Sumatra Benzoin cultivated in Sumatra
4. Siam Benzoin cultivated in Thailand

**Collection:**

1. The plants are medium size trees Sumatra benzoin is a pathological resin which is formed by making incision and the attack of fungi.
2. In Sumatra the seeds are sown in the rice fields.
3. The rice plants provide protection to benzoin plant during the first year.
4. After harvesting of the rice crop the trees are allowed to grow when they are 7 years old.
5. 3 triangular wounds are made in a vertical now about 40cm apart from each other at base exposing the xylem.
6. After injury Cambium will produce new wood with resin reservoir.
7. Balsams oozes out from injured part as a white liquid.
8. When it dried and hard it is scraped and picked off and packed into suitable container according to size.

**Head Benzoin:**

First 3 years product is more fragrant and contain white tears named as Head Benzoin.

**Belly Benzoin:**

7-9 years old product is brown in colour and named as Belly Benzoin.

**Foot Benzoin:**

After 12 years trees are fell down and stem is split and low quality products are obtained which are dark brown in colour and named as Foot Benzoin.



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**Characteristics:**

1. Sumatra benzoin consist of hard opaque whitish or reddish blocks or tears, brittle, softening on warming and grifting on chewing.
2. Odour is balsamic
3. Taste is slightly acrid, aromatic and resinous.
4. 60-70% benzoits of resin alcohol
5. Coniferyl benzoate
6. Free cinnamic acid
7. Free benzoic acid
8. Siaresinolic acid
9. Vanillin
10. Cinnamyl benzoate

Sumatra variety contains:

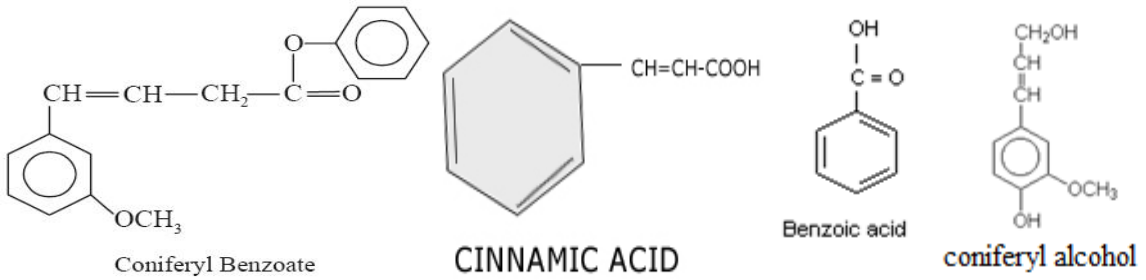
1. Ester of cinnamic acid and benzoic acid along with free acids.
2. Two Alcohols

o Coniferyl alcohol o Benzoresinol

1. Phenylpropyl ester of cinnamic acid
2. Benzaldehyde
3. Styracin

**Structure:**

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**Uses:**

***Siam Benzoin***

1. Skin care soap
2. Lotions
3. Cosmetics
4. Fixation of perfume ingredients (as fixative)

***Sumatra Benzoin***

1. Stimulant
2. Expectorant
3. Diuretic
4. Antiseptic
5. Antifungal
6. Compound benzoin tincture
7. Confectionery (vanilla cream)

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**PERUVIAN BALSAM**

**Botanical origin:**

*Myroxylon pereirae*

**Family:**

Leguminosae

**Part used:**

Balsam is obtained by the incision of stem of tree.

**Habit & Habitat:**

1. Plant is a tree
2. Indigenous to south and central America, Sri-Lanka, and Jamaica

**Production:**

1. Peru balsam consist of the balsam generated from scorched tree trunks of myroxylon baslam.
2. The bark of 10 years old trees is removed just above ground level and this area is scorched with flame after which the balsam is collected in cloths placed on the scorched area.
3. The balsam is purified by melting, straining and solidifying

**Collection:**

1. It is a pathological product.
2. First beaten the tree on four side its cracked bark is scorched by torch after a week it is dropped off a cloth is wrapped around the stem because balsam are out from effereted stem.
3. This cloth is saturated with balsam. Another cloth is then wrapped time by time this balsam is separated by boiling in water this is then cooled and dried.

**Characters:**

1. Fresh peru, balsam is a soft yellow viscous liquid or semi-solid, on keeping it become dark brown, or nearly black, brittle sold.
2. It softens on heating in which crystals of cinnamic acid may be visible under microscope.
3. It is insoluble in water and olive oil but soluble in alcohol, chloroform glacial acetic acid.

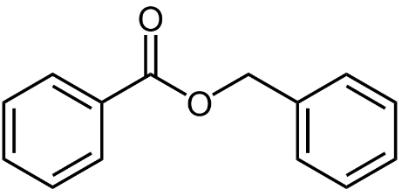
**Chemical Constituents:** The drugs contains:

1. Balsamic ester (56-66%) like benzyl cinnamate (cinnemein)

It also contains:

1. Benzyl benzoate
2. Benzyl cinnamate
3. Cinnamyl Cinnamte
4. Peruresinotannol
5. Peruvial
6. Farnesol

**Structure:**

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**Benzyl Benzoate**

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**Benzyl Cinnamate Uses:**

1. Uses as medicine for indolent wounds
2. Used as scabicide
3. Used in skin disease
4. Used as local protectant, rubificient



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1. Used internally as expectorant
2. Used as Flavouring agent in chocolates.
3. Used as antiseptics.

**Pharmacology:**

1. Promotes granulation process
2. Decrease the inflammation of mucous membrane & respiratory tract.

**TOLU BALSAM**

**Botanical origin:**

*Myroxylon balsamum*

**Family:**

Leguminosae

**Part used:**

Balsam tolu is obtained by incision of stem of trees

**Habit & Habitat:**

Colombia, West indies, Cuba, Venezuela and Peru.

**Collection:**

1. Balsam tolu is a pathological resin and is formed in trunk tissues as a result of injuries.
2. It is collected all the year except the period of heavy rains by making V-Shaped incisions in the bark and sap wood.
3. Calabash cups are placed to receive the flow of balsam many other incisions are made on higher portion on the trees.
4. Collected balsam is transferred into larger tin containers and exported.

**Characteristics:**

1. Tolu balsam occur as soft, yellowish brown or brown semi-solid or plastic solid transparent in thin layers, brittle when old, dried or kept in cold.
2. Aromatic odour and taste is aromatic.
3. Vanilla like and slightly pungent.
4. It is insoluble in water and petroleum ether, soluble in alcohol, benzene, chloroform and partially soluble in carbon disulphide and NaOH solution.

**Chemical Tests:**

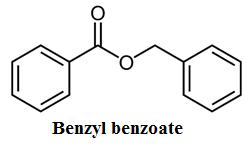
1. Alcoholic solution of balsam Tolu (1g) gives green colour with ferric chloride due to toluresinoannels
2. Alcoholic solution of balsam tolu is acidic to litmus paper.
3. To filtered solution of balsam Tolu (1g) in water (5ml) aqueous potassium permanganate solution is added and heated for 5-10 minutes. Odour of benzaldehyde is produced due to oxidation of cinnamic acid.

**Constituents:**

Tolu balsam contains resin (80%) which is a mixture of resin alcohol combined with cinnamic and benzoin acids.

1. Benzyl benzoate
2. Styrene
3. Benzyl cinnamate.
4. Eugenol
5. Tolu resinotannol cinnamate.

**Structure:**

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**Uses:**

1. Used as expectorant
2. Used as stimulant
3. Used as an antiseptic
4. Used in cough syrup
5. Used in compound, benzoin tincture
6. Used as flavouring agent
7. Fungicide
8. Allergic
9. Cause the contact dermatitis.
10. Allergic reaction have been reported in conjunction with Tolu balsam

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