LIPIDS
(WAXES,FATS,FIXED OILS)

1.CASTOR OIL (FIXED OIL)

Synonyms: *Ricinus*

Biological source : Castor oil is the fixed oil obtained by the cold expression of the seeds of ***Ricinus communis***.

Family : ***Euphorbiaceae***

Geographical source : Castor seeds are produced in almost all tropical and sub tropical countries. In india castor is one of the major oil seed crops and india is the second largest producer of castor seeds in the world, producing about 2,80,000 tonnes per annum.Brazil,USSR,Thailand,USA and Romania are other countries producing the drug on large scale. In india it is largely grown in Andhra Pradesh, Gujarath and Karnataka.

COMPOSITION OF SEEDS

- Seeds contain some of the toxic substances. Castor seeds consists of **75% kernel** and **25% hull.**
- Seed weigh from 0.1 to 1gm. Castor seeds are rich in phosphorous content.
- **Hull** is rich in mineral and also contains an alkaloid **ricinine,** resin, pigment etc.
- The oil content of the **kernel** varies from 36% to 60%.
- Amongst different varieties the hydrated muggalai variety is supposed to be the richest about 48% in the oil content castor seeds contains several **enzymes lipase, maltase** and **invertase**.
- The proteinous **toxic principle Ricin**.

PREPARATION OF MEDICINAL CASTOR OIL

- Castor oil can be prepared by 2 different methods.
- By crushing the seeds in hydraulic presses and the second method is known as **GHANI** by manually operated screw press driven by bullocks.
- For commercial production the first method is used the oil thus produced is a non medicinal castor oil. This oil is known as cold drown oil. This oil is steamed at 80℃ to destroy the enzyme lipase and ricin (toxic protein) it is then bleached and de acidified with sodium carbonate to remove free fatty acid.
- Finally it is treated with activated earth or animal charcoal to remove impurities by adsorption and filled in to the containers.

DESCRIPTION

Colour – pale yellow or almost colourless liquid

Odour – slight and characteristic

Taste – Bland, slightly acrid usually nauseating

Nature – it is a viscous and transparent liquid

Solublity : It is soluble in alcohol, miscible in chloroform, solvent ether, glacial acetic acid and petroleum ether. It is in soluble in mineral oil.

CHEMICAL CONSTITUENTS: Chief constituent is tri glyceride of **Recinolic acid (80%),** iso recinolic acid, linolic, stearic and iso stearic acids.The viscosity of the castor oil is due to Ricinolic acid. It also contains hepataldehyde(heptanol)and sebacic acid.

IDENTIFICATION TESTS

1. It mixes with half of its volume of petroleum ether (40-60) but insoluble in double the volume of petroleum ether.

2. Add to the oil an equal volume of ethanol, clear liquid is obtained. On cooling with 0℃ and on storage for 3 hours the liquid remains clear.(distinction from fixed oils).

USES

- Castor oil is cathartic, lubricant.
- It is used in preparation of paints, enamel, varnishes, grease, polishes, printing ink.
- Castor oil imparts transparency to soaps.
- Dehydrated castor oil is used in the manufacture of linoleum and alkyl resins.

2. CHALMOOGRA OIL (FIXED OIL)

Synonyms: Hydnocarpus oil, Gynocardia oil.

Biological source: Hydnocarpus oil is the fixed oil obtained by cold expression method from ripe seeds of the plant ***Taraktogenos kurzii*** king and ***Hydnocarpus anthelmintic***, ***Hydnocarpus heterophylla*** and other species of the ***Hydnocarpus.***

Family: *Flacourtriaceae*

Geographical source

- Chaulmoogra plant is native of Myanmar, Thailand and East india.
- It is also found in sri lanka and Bangladesh.In india it is grown in Assam and Tripura.

METHOD OF PREPARATION

Seeds are ovoid, angular and 2 cm in length. Chalmoogra seeds contain 40 – 50% fixed oil. Seeds are de corticated by machine after grading the kernals are pressed with the hydraulic press and the oil obtained is filtered.

DESCRIPTION

Colour – yellow to brownish yellow

Odour – characteristic

Taste – Acrid

Solublity – slightly soluble in alcohol, soluble in chloroform, ether, benzene and carbondisulphide. It is soft white solid below 25℃

CHEMICAL CONSTITUENTS

Chalmoogra acid 27% and hydnocarpic acid 48%, gorlic acid, proteins 20%,cyanophoric glycosides and glycerides of palmitic acid and oleic acids.

USES

Bactericidal effect against ***Mycobacterium leprae*** and ***Mycobacterium tuberculosis***. It is used in the treatment of Tuberculosis, Leprosy, Psoriasis and Rheumatism. It is used only externally. It can not be used in food for animals.

STORAGE

It is stored in closed containers away from light and in cool place.

3.WOOL FAT

Synonym: Hydrous wool fat, Lanolin, Adeps Lanae.

Biological source: Hydrous wool fat is the purified fat like substance obtained from the wool of the sheep ***ovis aries***.

Family: *Bovidae*

It contains 25 – 30 % of water. It is the secretion of sebaceous glands of sheep deposited on to the wool fibers.

Geographical source: Commercially lanolin is manufactured in Australia, USA and to a very less extent in india.

METHOD OF PREPARATION

- Raw wool contains about 31% wool fibers, 32% of earthy matter and about 25% wool grease or crude lanolin.
- **Crude lanolin** is separated by washing with sulphuric acid or suitable organic solvent or soap solution.
- It is further purified and bleached .
- The product is known as an hydrous lanolin or wool fat.
- The hydrous wool fat is produced by mixing wool fat with 30% of water.

DESCRIPTION

Colour – whitish yellow

Odour – Faint and characteristic

Taste – Bland

- It is found in the form of ointment like mass and on heating in water bath it separates in to 2 layers.
- **Solublity-** insoluble in water but soluble in chloroform and solvent ether with separation of water.

CHEMICAL CONSTITUENTS

- It is a complex mixture of esters and polyster of 33 high molecular weight alcohols and 36 fatty acids.
- Hydrous wool fat contains mainly esters of cholesterol and iso cholesterol with carnaubic, oleic, myristic, palmitic, lignoceric and lano palmitic acids.
- It also contains 50% water

IDENTIFICATION TESTS

Dissolve 0.5 gm of hydrous wool fat in chloroform and to it add 1ml of acetic an hydride and 2 drops of sulphuric acid. A deep green colour produced indicates the presence of chlosterol.

USES

- The lanolin is mainly used as water absorbable ointment base.
- It is a common ingredient and base of several water soluble creams and cosmetic preparations. it can be allergic also.

4.BEES WAX

Synonyms: Yellow bees wax, cera flava

Biological source: Yellow bees wax is purified wax obtained from the honey comb of the bees of ***Apis mellifera*** and other species of ***Apis.***

Family: *Apidae*

Geographical source: It is processed and commercially prepared in France, Italy, west Africa, Jamaica and india.

Description

Colour – yellow to yellowish brown

Odour – Agreeble and honey like

Solublity – In soluble in water, soluble in hot alcohol, ether, chloroform, carbon tetra chloride, fixed and volatile oils.

PROCESSING AND PREPARATION

- The combs and capping of honey comb are broken and boiled in soft water.
- These are then enclosed in a porous bag weighed to keep under water.
- The boiling causes oozing of the wax which gets collected outside the bag and forms a cake after cooling.
- The debris on outer surface is removed by scrapping.

- Bees wax is purified by heating in boiling water or dilute sulphuric acid and settling.
- This process is repeated several times and finally wax is skimmed off.
- Various techniques are adopted to bleach wax such as treatment with hydrogen peroxide, chromic acid, ozone etc.
- Some times with charcoal, chlorine or potassium permanganate.
- Natural bleaching by exposing the wax to the sun light in thin layers.

CHEMICAL CONSTITUENTS

- It consists of esters of straight chain mono hydric alcohols with straight chain acids.
- The chief constituent of the bees wax is **myricin** or **myricyl palmitate** (about 80%) free **cerotic acid** (about 15%) small quantities of **melissic acid** and aromatic substance **cerolein** are the other constituents.
- **White bees wax** is obtained by bleaching the yellow wax it should not be used for ophthalmic purposes.

CHEMICAL TEST

Saponification claud test: Boil 0.5 gm of bees wax with 20 ml of aqueous caustic soda solution for 10 minutes cool it .No turbidity is produced.

USES

- Bees wax is used in the preparation of ointments, plasters and polishes.
- It is used in ointment for hardening purposes and in the manufacture of candles, moulds and in dental and electronic industries.
- It is also used in cosmetics for preparation of lipsticks and face creams.
- Pharmaceutically it is an ingredient of paraffin ointment IP.

ADULTERANTS

- Colophony
- Hard paraffin
- Stearic acid
- Japan wax
- Spermaceti
- Carnauba wax
- Adulteration can be detected on the basis of solublity and melting point.
- The original wax should not give turbidity.