PharmacognosyII

Lec. 6 **3rd stage 1st semester** **Year 23-24**

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Lipids

(fixed oils, **fats and waxes)** are esters of long chain fatty acids and alcohols or of closely related derivatives. The difference between these substances is the type of alcohol. In fixed oils and fats, the alcohol is glycerol. In waxes, the alcohol has a higher molecular weight, for example, cetyl alcohol.

Most animal fats are solid except cod liver oil (liquid) while plant oils are liquid except coconut oil (solid).

Fixed oils are sometimes classified into drying oils, semidrying oils and non drying oils. This classification is based on their ability to absorb oxygen from the air. Oxygen saturates the double bonds to form oxides that may polymerize to form hard films. This property of drying oil is of great importance in the paint industry, for example, linseed oil.

Hydrogenation will saturate the double bond result in formation of solid mass use in cooking (margarine).

Saturated fixed oil

Ester of glycerol with saturated acids like lauric and myristic acid. Examples, coconut oil and palm oil.

Monounsaturated fixed oil

Ester of glycerol with unsaturated acid like oleic acid and liquid; examples, olive oil, castor oil and peanut oil.

Polyunsaturated fixed oil

Ester of glycerol with polyunsaturated acids (contains many double bonds). Examples, soya bean oil, cottonseed oil, almond oil corn oil, sunflower oil, linseed oil and cod liver oil (source for vitamin A and D).

Fats

Theobroma oil (cacao seeds). Theobroma is Greek name means foods of the god.

Yellowish white sold used pharmaceutically as a suppository base.

Lanolin is a fat like substance from the wool of sheep that contains 25% water therefore, is commonly called **anhydrous wool fat**.

Waxes

Sources:

Plant origin: carnuba wax and Bayberry wax.

Animal origin: Beeswax, wool-fat, spermaceti.

Function:

In plants, waxes protect the loss of water. It also protects the penetration of water to the inner part. Waxes are employed in pharmaceuticals to harden ointments and cosmetics creams.

Waxes

Ester of higher straight chain fatty acid with long chain alcohol, for example, bees wax, carnuba wax and jojoba oil.

Prostaglandines

Lipid metabolites formed in the body from essential unsaturated fatty acids of the diet. Is biosynthesised from linoleic acid conversion to arachidonic acid.

The three classes of prostaglandin (A, E and F) are distinguished on the basis of the functional groups around the cyclopentane ring. Used for termination of second trimester pregnancies and PGE2 used for ripening cervix which leads to induce labor.

Bees wax

Bees wax is a yellow or white bees wax is the purified wax from the (fam: Apidae).

Composition: The wax is yellowish to brownish yellow or white, piece or plates, translucent when thin, soft to brittle, honey like odor, slight balsamic taste. Bees wax consists mainly of palmitate, free cerotic acid, aromatic cerolein, hydrocarbon, lactone moisture, cholesteryl ester, pollen, pigments and propolis (bee glue).

Uses: - in the formulation of medicinal preparation for treating skin infection.

- in cough syrup preparations.

fixed oil

Castor oil: Is a Fixed oil obtained by cold expression from the Ripen seed (castor bean or castor oil seed) of Ricinus communis.

Composition: Castor oil is a pale yellowish or almost colourless, transparent, viscid liquid. It has a mild odor and a bland characteristic taste.

Castor oil is composed of a mixture of triglycerides, about 75% of which is tri-ricinoleic. The fixed oil consists of the glycerides of ricinoleic (87%), isorlcinoleic, stearic (1%), dihydroxystearic (traces), linoleic (7%), and palmitic (2%) acids.

Uses

1. Castor oil is a stimulant cathartic.
2. Castor oil is used as a stiffening agent in some pharmaceutical formulations
3. Used in ointment base.

Linseed oil

Biological source: Linseed is the dried, ripe seed of *Linum usitatissimum* Linn. Linseed oil is obtained by expression of linseed.

Composition: linseed is a yellowish liquid with a peculiar odour and bland taste. On hydrolysis, linseed oil produces unsaturated acids like linolenic acid (30-50%), linoleic acid (23-24%), oleic acid (10-18%) together with saturated acid-myristic, stearic and palmitic (5-11%).

Uses:

1-Linseed is used as demulcent in rheumatic swelling.

2-Internally for gonorrhea and irritation in the genitourinary system.

3-Linseed oil has emollient, expectorant, diuretic.

4-Externally in lotion and liniments.

Coconut oil

Biological sources: Coconut oil is a fixed oil obtained by expression or extraction from the seed of the coconut palm.

(Family: Palmae).

Composition: The oil consists of a mixture of glycerides in which 80 to 85% of the acids are saturated, it is a semisolid at 20c. It consists of the triglycerides of mainly lauric and myrestic acids, together with smaller quantity of caproic. caprylic, oleic, palmitic and stearic acids.

Uses:

1-coconut oil is used in dietary supplements.

2-used as non- aqueous medium for oral administration of some medicaments.

Olive oil

Biological sources: Olive oil is a fixed oil obtained from the ripe fruit of *Olea europeae* (family: Oleaceae). Olive oil is sometimes called sweet oil.

Composition: olive oil is a pale yellow or light greenish-yellow due to presence of chlorophylle or carotene, non-drying oily liquid with a pleasant delicate flavor. The taste is bland becoming faintly acrid.

Olive oil contains mixed glyceride of oleic acid (83%), palmitic acid (9.4%), linoleic acid (7%), stearic acid and arachidic acid.

Uses:

1-For dental cement.

2-In the preparation of soap, and liniment.

3-Used as demulscent, emollient, laxative.

4-Nutrient in salad.

Types of olive oil

Type of oil	Best uses
Extra-version olive oil	For salad
Virgin olive oil	Cooking, salad
Refined olive oil	Only for cooking
Pure olive oil	Cooking, body massage, preparing herbal oil
Olive pomace oil	Cleaning purpose (furniture polish)

Extra-version: is the best type among all. It extracted by cold-pressing method to prevent the natural content from being altered by exposure to high temperature. It has lower acidity content compared to standard version type, it retains most of natural aroma and flavor.

Virgin-olive oil: it is unrefined form, extracted by cold pressing method, it contains slightly high acidity content between 1 to 4 percent. This specific type of olive oil is temperature resistant as well.

Refined olive oil: this type of oil is extracted from black and ripe olive fruit, it has least amount of virgin olive oil.

Pure olive oil: although the name suggests it is pure, this type of oil is not at all pure, in fact, it is blend of extraversion or virgin type olive oil with.

Olive pomace oil: the pomace type is the lowest quality olive oil. It is extracted from the residue that remains after the fruit is pressed. After the actual fruits are pressed, they leave residue containing oil and water. Once the water and oil are removed, the residue contains some amount of oil and can be extracted.

Evaluation of fixed oil

Certain tests are used to determine the identity, quality and purity of fixed oil. These tests are based on the chemical constitution of fatty acid.

1. **The acid value or acid number**: it is the number of miligram of potassium hydroxide (KOH) required to neutralize the free fatty acid in one gram of the substances, it indicates the amount of free fatty acid present in the oil.
2. **The saponification value**: it is the number of miligram of potassium hydroxide (KOH) required to neutralize the free acid and saponify the ester contained in one gram of substance.
3. **Iodine number**: it is the number of gram of iodine absorbed by 100 g of the substance, it indicates the degree of unsaturation.