Unit III

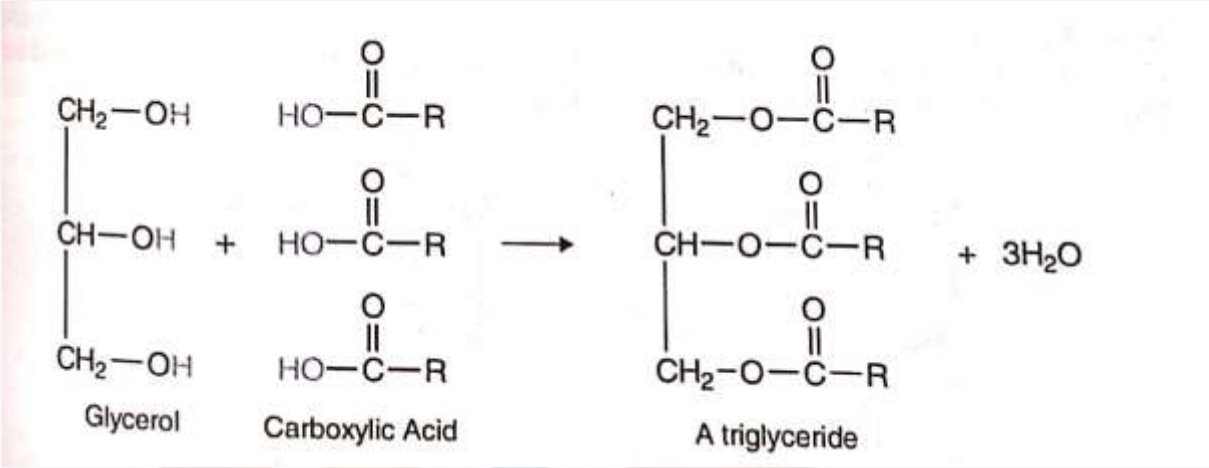
FATS AND OILS: EXTRACTION

Introduction

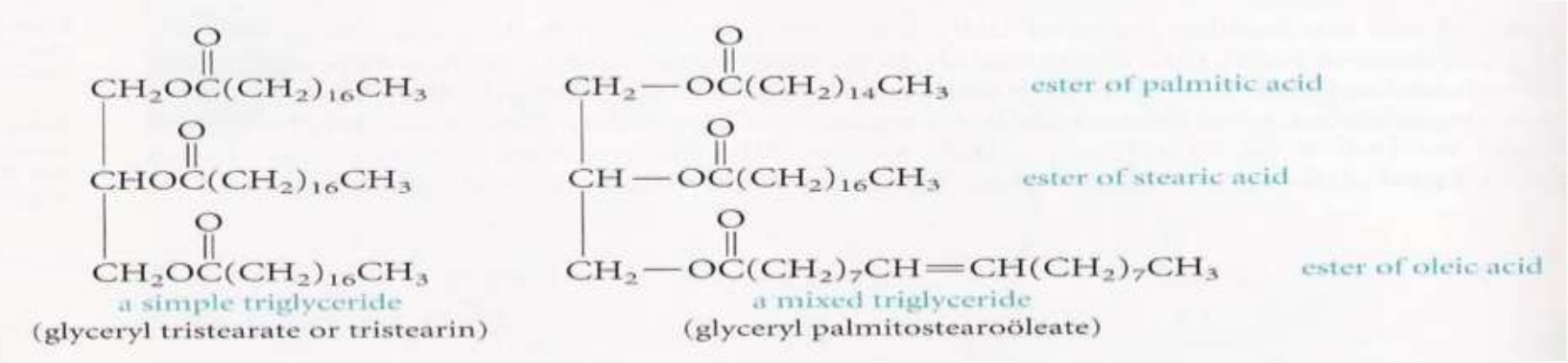
- Oils and fats belong to a group of organic compounds known as lipids.
- Oils and fats are natural occurring esters.
- Fats are found in animals.
- Oils are found in both animals and plants.
- Fats and oils are esters of the three carbon trihydroxy alcohol, glycerol and various monocarboxylic acids known as fatty acids.
- All fats and oils are a mixture of saturated fatty acids and unsaturated fatty acids.
- Fatty acids containing 12-18 Carbon atoms per molecule.

What are **fats** & **oils**?

- ***Fats*** and ***Oils*** are triesters of glycerol with carboxylic acids, also known as Triglycerides.
- FATS are differentiated from oils on the basis on their saturation. **FATS** consist of saturated carboxylic acid chains while**, OILS** contain unsaturated carboxylic acid chains in their triesters.
- Another difference between fats and oils is that **FATS** are generally solid at room temperature while **OILS** are mostly liquid.



The triglycerides are the esters of three similar or different fatty acids with glycerol. Simple triglycerides are are those that have only one kind of fatty acids, whereas the mixed triglycerides are made up of different fatty acids.



Fats

- Fats are generally solid at room temperature
- Fats have higher melting points
- Fats are saturated with all the carbon atoms bonded to hydrogen atoms and lack the capacity to add any more hydrogen atoms.
- Fats are generally derived from animals

• Oils

- Oils are liquid at room temperature
- Oils have lower melting point
- Oils are unsaturated and can add more hydrogen atoms to carbon atoms
- Oils are obtained from plants

Fats

- Fats are oily substances in the. animal body, found under the skin or around organs
- Increase the level of cholesterol in the blood and Increase the risk of cardiovascular disease.
- Butter, cream, meat, and lard are examples.
- Oxidative Rancidity is low

• Oils

- Oil are viscous liquids that occur in fruits or seed, of plant.
- Lower the cholesterol level in the blood and reduces the risk of cardiovascular disease.
- Coconut oil, olive oil and corn oil are examples.
- Oxidative Rancidity is high

Extraction

- Fats and oils are extracted from either plants or animals. Extraction methods vary. They are extracted from natural products by 3 operation:

1. Rendering
2. Pressing
3. Solvent extraction

Rendering

The animal tissue containing the fat are chopped off and then it is heated in steam or water in order to melt the fat.

The melted fat then rises , water and remaining tissue settle below.

The melted fat is then separated by skimming or centrifugation.

Rendering

- The fat can be obtained from any of the following 3 methods :
- Dry rendering
- Wet rendering
- Low – temp wet rendering

Pressing

Pressing: used for removing oils from oilseeds or fruit rich oils. The oil bearing tissue are rolled , crushed or ground into flakes and then pressed and heated by steam at 70 deg. C.

Various types of mechanical presses e.g. hydraulic press are used to squeeze oil from oil seeds.

Pressing

Seeds are usually first cooked slightly to partially break down the cell structure and to melt the fat for easier release of oil .

The heat from cooking or grinding should not be excessive or it may darken the color of oil.

With some seeds e.g. corn only the germ portion of the seed is pressed to obtain oil.

Solvent extraction

It is often applied to residue after pressing or rendering for complete removal of oil.

It is common large scale operation to remove oil.

The solvents used include petroleum , ether and benzene.

Physical properties of oils and fats

- Oils and fats are liquids and solids having greasy feel . When pure , they are colorless, odorless, tasteless.
- They are insoluble in water but soluble in organic solvents such as ether, chloroform, benzene and alcohol.
- They have a lower specific gravity than water and consequently will float on the surface when mixed with water.
- They readily form emulsion when agitated in water in presence of soap gelatin or other emulsifiers.
- Oils are liquid at 20 deg. C , they contain higher proportion of unsaturated fatty acids.
- Fats are solid at room temp and contain saturated long chain fatty acids.

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