

## LECTURE 6

### 6.0 LIPIDS

Lipids are natural substances which are insoluble in water, but soluble in non-polar solvents such as hexane, benzene, carbon tetrachloride, ether etc. Chemically, they can be described as actual or potential derivatives of fatty acids or closely related substances.

### 6.1 CLASSIFICATION

- Simple lipids
- Composite lipids
- Sphingo lipids
- Derived lipids

### 6.2 SIMPLE LIPIDS

- Glyceryl esters

They are formed as a result of esterification of glycerol molecule with fatty acid units. They can be:

- Monoglyceride – glycerol + 1 Fatty acid
- Diglyceride - glycerol + 2 fatty acid
- Triglyceride - glycerol + 3 fatty acid

Most natural fats and oils are Triglycerides ( $TC_a$ )

If the  $TC_a$  exists as solid at room temperature it is a FAT

If the  $TC_a$  exists as liquid at room temperature it is an OIL

#### 6.2.1 FATTY ACIDS

Aliphatic carboxylic acids. They can be divided into 2 main types:

- Saturated fatty acid (No double bond)
- Unsaturated fatty acid (Double bond present)
- Saturated fatty acids – are homologous series with a general formula and gradation in properties (physical and chemical) e.g. Butyric acid, caproic acid etc.
- Unsaturated fatty acids makes up the fatty acids contained in majority of oils from plant sources e.g. oleic acids, Linoleic acid, etc.

- Glycerol esters can be simple or mixed TC<sub>a</sub>  
Simple TC<sub>a</sub> have all the 3 fatty acid units the same.  
Mixed TC<sub>a</sub> have all the 3 fatty acid units different.
- Most natural fats and oils are mixed TC<sub>a</sub>

## 6.3 **PROPERTIES OF TRIGLYCERIDES**

### 6.3.1 Physical properties

- Colourless, odourless, tasteless and water  
Insoluble – melting point – Refractive index
- Plasticity – Specific gravity – smoke, flash and fire prints etc.

### 6.3.2 **Chemical properties**

- Hydrolysis (Saponification)
- Oxidation (Antioxidation)
- Iodine value
- Acid/free fatty acid value etc.