**Lecture 9 b
 Chemistry 2
 (Biochemistry)**

**Desert land and reclamation program
Level 1**

**Presented By**

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**Classification of Lipids:**

|  |  |  |
| --- | --- | --- |
| Derived lipids | Compound lipids | **Simple lipids** |
| -These are substances derived from simple lipids and compound lipids by hydrolysis. Also, include substance related to lipids 1- Fatty acids. 2- glycerol. 3- Steroid. 4- Isoprenoids. 5- Eicosanoids | -They are formed of : -Lipid component + -Non-lipid component1- Phospholipids. 2- Glycolipids. 3- Sulpholipids. 4. lipoproteins | **-They are formed of fatty acids and alcohol****1- Fats and Oils 2- Waxes** |

**1- Simple Lipids :**

 Simple lipids are esters of fatty acids with different types of alcohols. The alcohol may be glycerol (trihydric alcohol) or other long alcohol. ♣ R1 – COOH + R1 – OH ----------- RCOOR1 + H2O ♣ Fatty acid + Alcohol Ester + Water Simple lipids are classified into: fats, oils and waxes, according to the type of alcohol they contain.

1-Fats and oils(neutral fats) They are esters of : fatty acids with glycerol. They are similar chemically, but they differ in physical properties: as oils are liquid while fats are solid at room temperature. They are called triglycerides because they are triesters formed of glycerol and 3 fatty acids.



**Oil: is a triacylglycerol that is liquid at room temperature.Made by more unsaturated fatty acids (Unsaturated triacylglycerols).Corn, cotton seed, safflower and sunflower (plant sources).**



Triglycerides (TG) may be :

a- Simple TG: The fatty acids are the same e.g. palmitic or stearic acids forming>>>> tripalmitate or tristearate respectively.



b- Mixed TG: Triglycerides with 3 different fatty acids.

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**2- Waxes**  They are esters of fatty acids + Long chain Monohydric alcohol. They are solid at room temperature. The most important waxes in human body are cholesterol esters, which are present in blood and other tissues.

|  |  |  |
| --- | --- | --- |
| Waxes | **Fats and oils** |  |
| SolidAbsentPresentNegativeundergo rancidityNot Digested by lipaseCan not be utilized | **Fats are solid Oils are liquid****Present****Absent****Positive****rancidity Not****digested by lipase****Can be utilized**  | Consistency at room temperatureGlycerol Long chain alcohol Acrolein test Rancidity undergo Digestion Utilization by human  |

**1- Waxes :**

a) are liquid at room temperature.

b) have positive acrolin test.

c) ester of long chain alcohol with a single fatty acid

d) can be digested by human

**2 - Complex lipids**

**Complex Lipids (Phosholipids, Glycolipids and Lipoproteins)
\*\*Complex lipids: (a. Phospholipids)
 • Made up of fatty acid, glycerol or other alcohol, phosphoric acid and nitrogenous base. • phospholipids are amphipathic in nature Tail (Non polar, hydrophobic) Head (Polar, hydrophilic)
b. Sphingolipids
 Present in the brain and formed a quarter of the weight of the brain**

**3. Derived lipids Such as:**

**Fatty acids – diacylglycerols - Vitamins A,D,E,K**

**Activity**

**1-Give the hydrolytic product of :**  - Tripalmitin. - Cholesterol wax.

 **2-Compare between neutral fat and waxes.**

Choose the best correct answer :

1- Lipids are formed mainly of alcohol and fatty acids combined together by:

a) ether link.

 b) peptide bond.

 c) glycosidic bond.

 d) ester bond