



CHEMISTRY 2

Biochemistry

Lipids Lec. 2

Course prof.
Dr. Ahmed Mohamed
Lecturer at Dep. Of
Biochemistry

Rancidity

Definition:

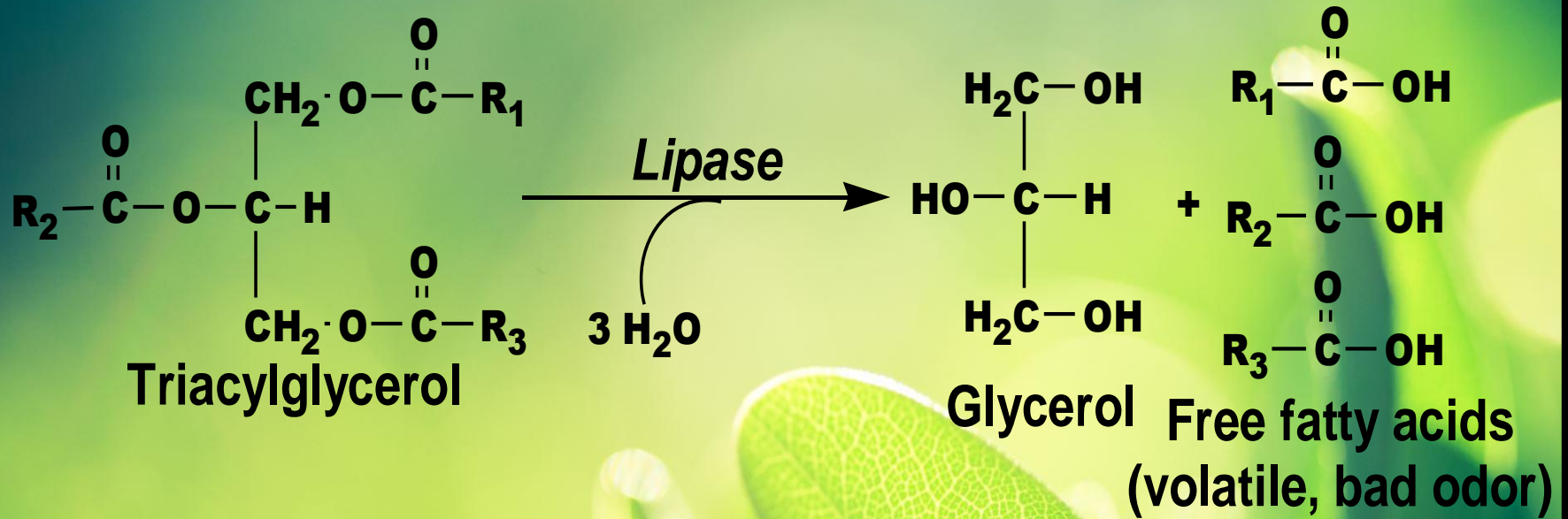
- It is a physico-chemical change in the natural properties of the fat leading to the development of **unpleasant odor or taste or abnormal color** particularly on aging after exposure to atmospheric oxygen, light, moisture, bacterial or fungal contamination and/or heat.
- Saturated fats **resist rancidity** more than unsaturated fats that have unsaturated double bonds.

Types and causes of Rancidity

- **Hydrolytic rancidity**
- **Oxidative rancidity**
- **Ketonic rancidity**

1-Hydrolytic rancidity:

- It results from slight hydrolysis of the fat by **lipase** from bacterial contamination leading to the liberation of free fatty acids and glycerol at high temperature and moisture.
- Volatile short-chain fatty acids have unpleasant odor.



2-Oxidative Rancidity:

- It is oxidation of fat or oil catalyzed by exposure to **oxygen**, light and/or heat producing **peroxide derivatives** e.g., **peroxides, aldehydes, ketones and dicarboxylic acids** that are **toxic and have bad odor**.
- This occurs due to oxidative addition of **oxygen** at the **unsaturated** double bond of **unsaturated fatty acid** of oils.

Hazards of Rancid Fats:

- 1. The products of rancidity are toxic, i.e., causes food poisoning and cancer.**
- 2. Rancidity destroys the fat-soluble vitamins (vitamins A, D, K and E).**
- 3. Rancidity destroys the polyunsaturated essential fatty acids.**

1-Iodine number (or value):

- **Definition:** It is the number of **grams of iodine** absorbed by **100 grams** of fat or oil.
- **Uses:** It is a measure for the degree of unsaturation of the fat, as a natural property for it.
- **Unsaturated fatty acids absorb iodine at their double bonds, therefore, as the degree of unsaturation increases iodine number and hence biological value of the fat increase.**

References:

- https://www.google.com/search?q=cholesterol&source=Inms&tbm=isch&sa=X&ved=2ahUKEwiag-735L0AhXUasAKHTutCPgQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1
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- https://www.google.com/search?q=digestion+and+absorption+of+lipids&source=Inms&tbm=isch&sa=X&ved=2ahUKEwj09a3BhpP0AhXNRPEDHb1BCsgQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1

For communication:

ahmed.mohamed@fagr.bu.edu.eg

<https://bu.edu.eg/portal/index.php?act=46&username=ahmedmohamed6>