



CHEMISTRY 2

Biochemistry

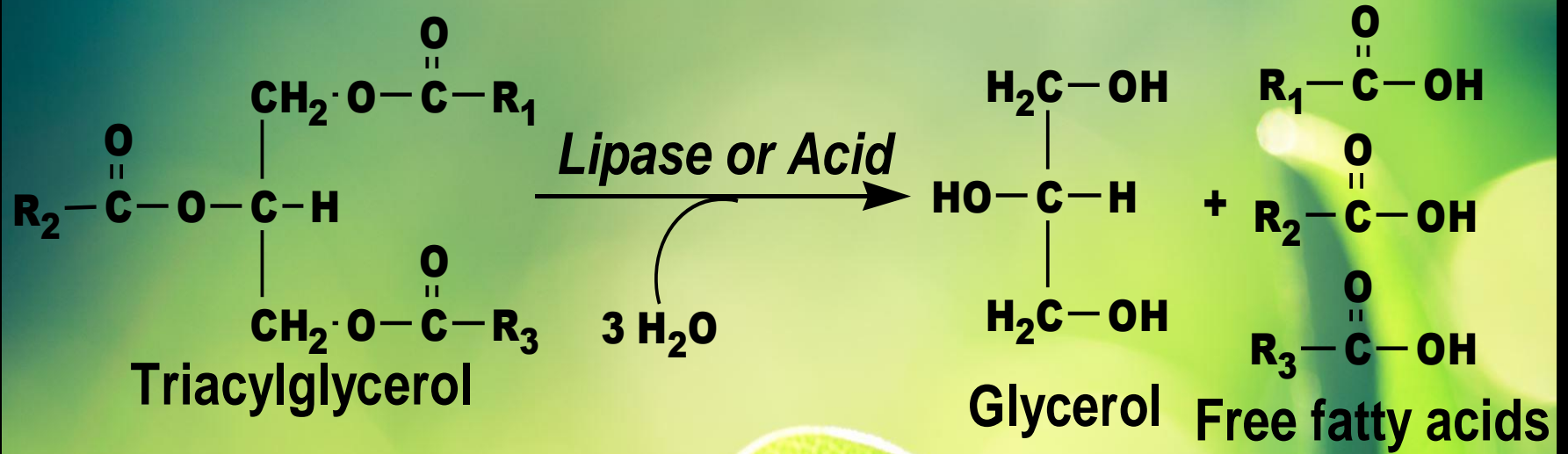
Lipids Lec. 2

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Chemical Properties of fats and oils:

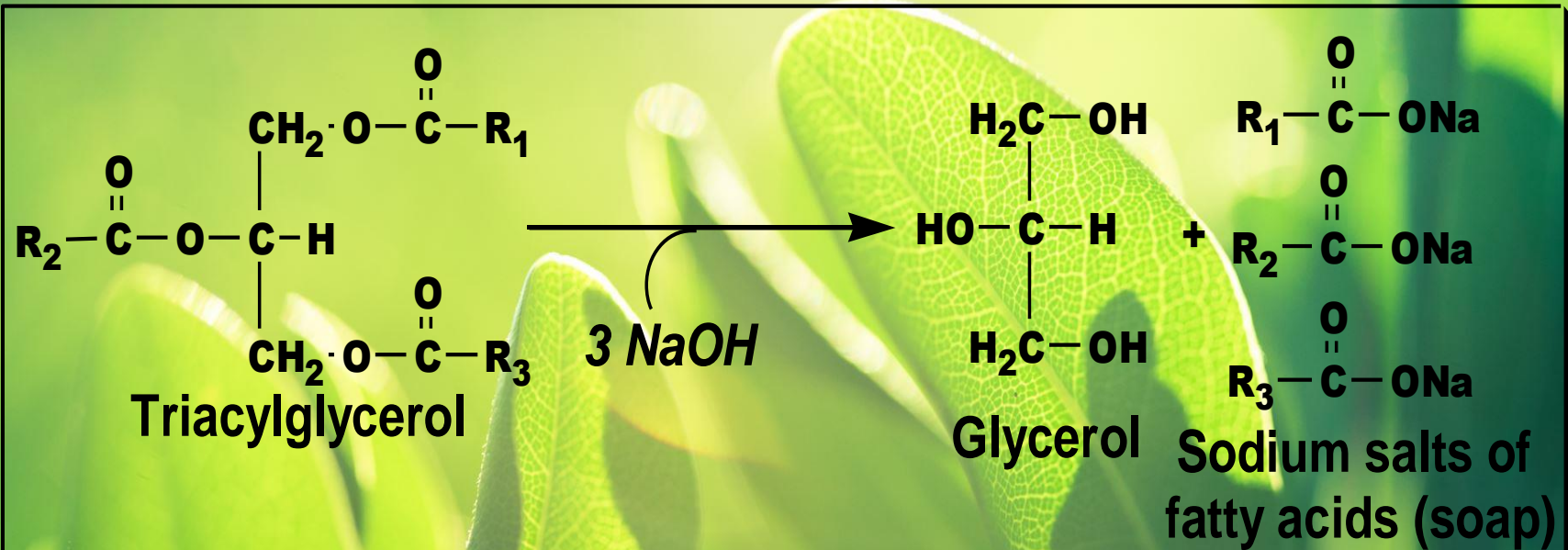
1-Hydrolysis:

- They are hydrolyzed into their constituents (**fatty acids and glycerol**) by the action of super heated steam, acid, alkali or enzyme (e.g., lipase of pancreas).
- During their enzymatic and acid hydrolysis glycerol and free fatty acids are produced.



2-Saponification: Alkaline hydrolysis produces glycerol and salts of fatty acids (**soaps**).

- Soaps cause emulsification of oily material this help **easy washing** of the fatty materials



3-Hydrogenation or hardening of oils:

- It is a type of **addition reactions** accepting hydrogen at the double bonds of **unsaturated fatty acids**.
- The hydrogenation is done under **high pressure** of hydrogen and is catalyzed by finely divided **nickel** or **copper** and **heat**.
- It is the base of hardening of oils (**margarine manufacturing**), e.g., change of **oleic acid** of fats (liquid) into **stearic acid** (solid).

Oils *Hydrogen, high pressure, nickel* **Hard fat**
(liquid) (margarine, solid)
(with unsaturated fatty acids, e.g., oleic) (with saturated fatty acids, e.g., stearic)

4-Oxidation(Rancidity):

- This **toxic** reaction of triglycerides leads to **unpleasant odour or taste** of oils and fats developing after oxidation by oxygen of air, bacteria, or moisture.
- Also, this is the base of the drying oils after exposure to atmospheric oxygen. Example is linseed oil, which is used in **paints and varnishes manufacturing**

References:

- https://www.google.com/search?q=cholesterol&source=Inms&tbm=isch&sa=X&ved=2ahUKEwi aq- 73 5L0AhXUasAKHTutCPgQ_AUoAXoECAEQAw &biw=1366&bih=657&dpr=1
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