

[DEPTH OF BIOLOGY]

Reaction of Fats & oils:

- ① Hydrolysis / saponification
- ② Hydrogenation
- ③ Hydrogenolysis
- ④ Rancidification
- ⑤ Drying.

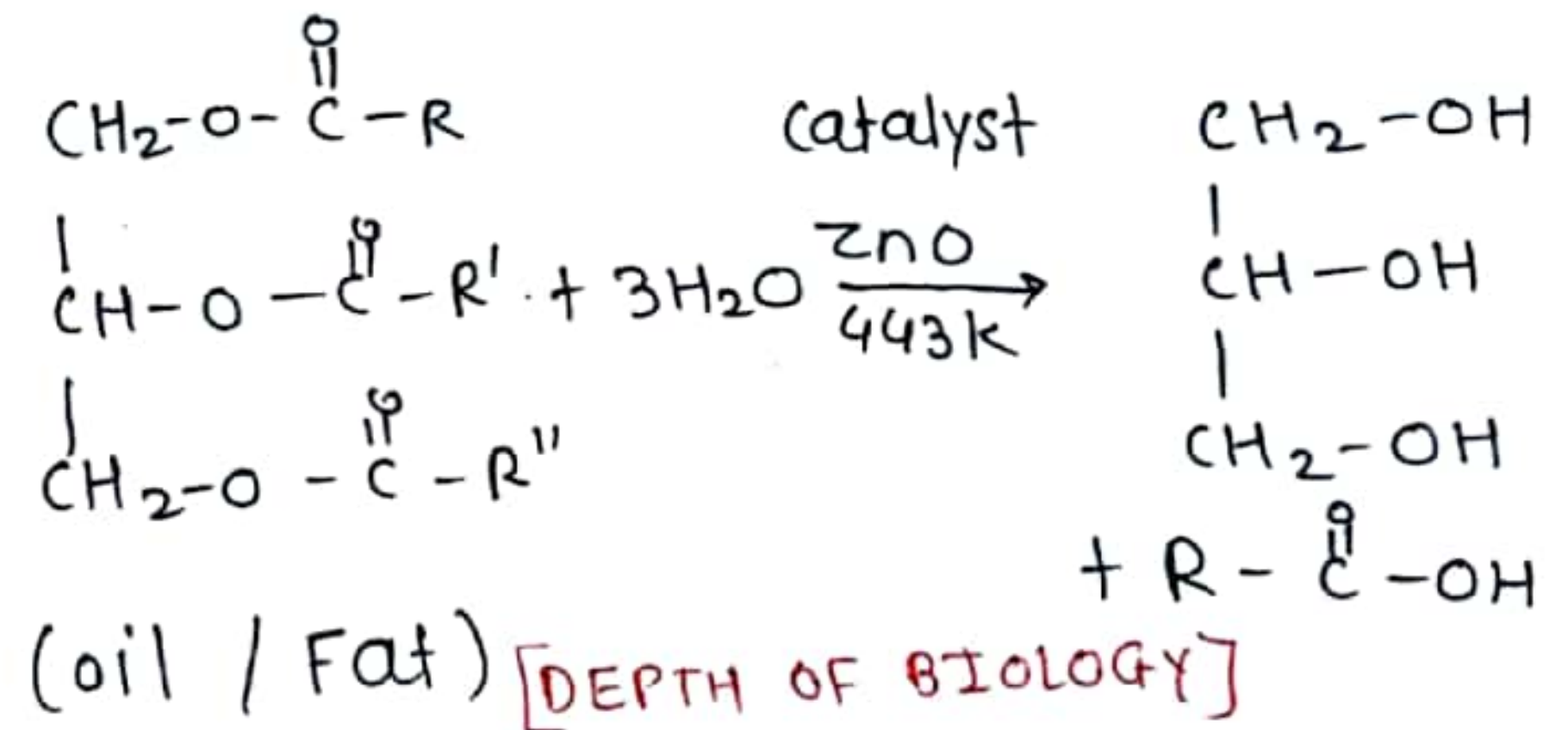
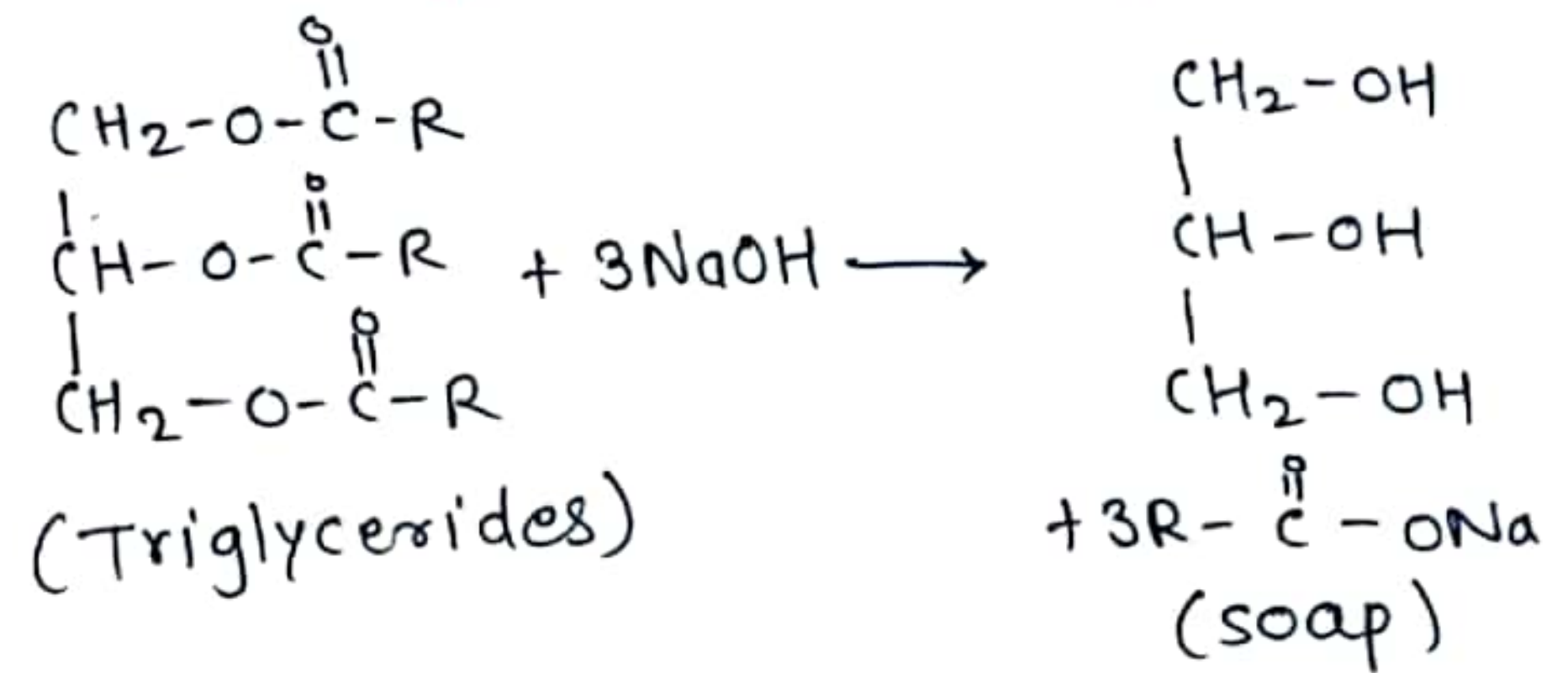
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① Hydrolysis / saponification:

- Fats & oils are heated with Acid (or) Alkalies (or) super heated steam.
- When boiled with NaOH (or) KOH
- The products are 'Na' (or) 'K' salts of long chain fatty acids, known as Soap. & rean is known as saponification.

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② Hydrogenation:

- Addition of Hydrogen
- vegetable oil are Triglycerides of unsaturated fatty acid like Linoleic acid & oleic acid.
- on catalytic hydrogenation at low press. Hydrogen add across the C-C double bond of fatty acids.

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This result in formation of saturated Glycerides.



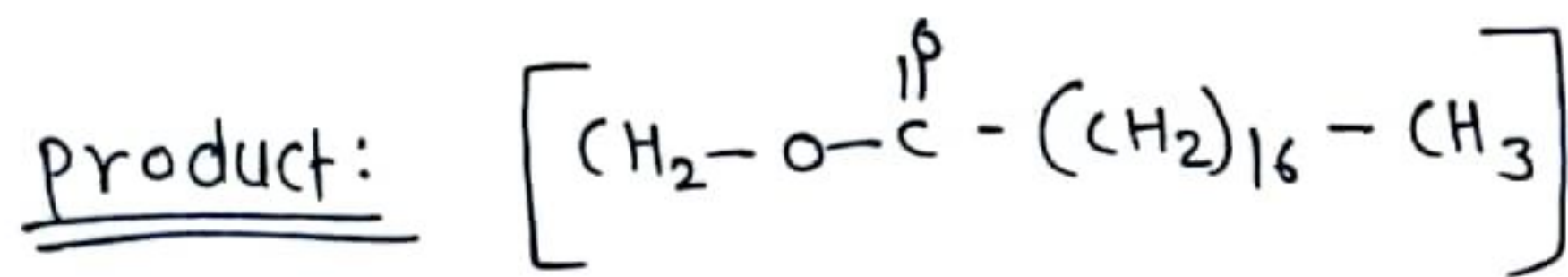
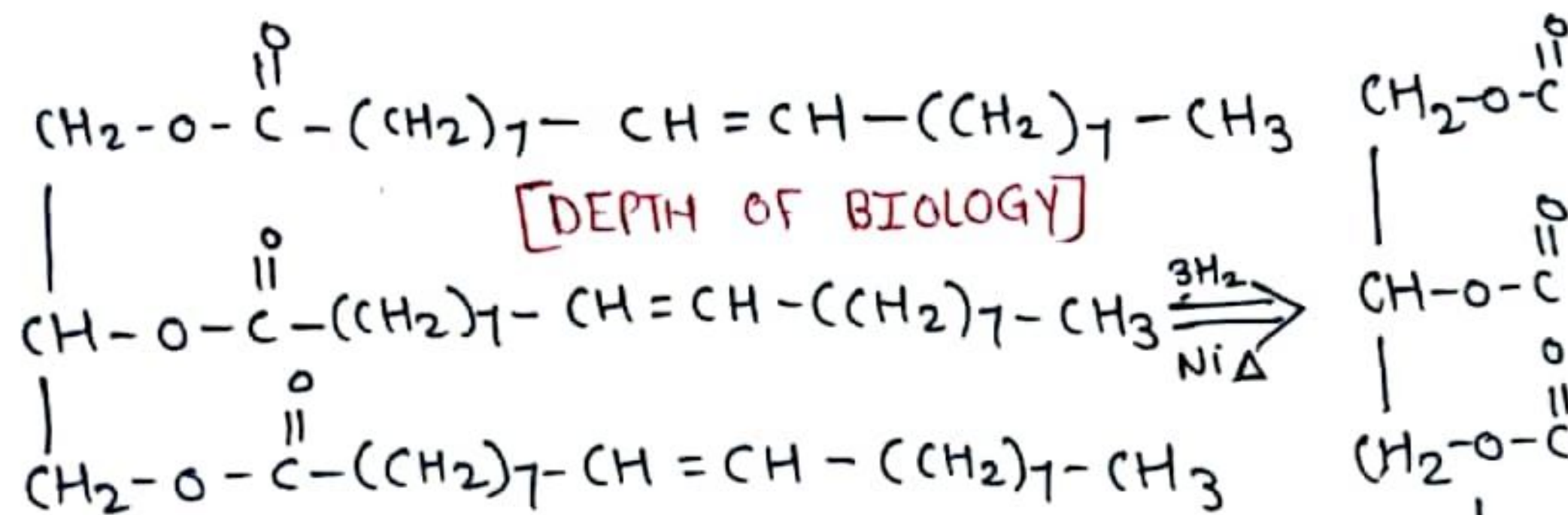
Now when unsat. → saturated.



Here, solid fat forms at room temp.



also known as Hardening.



Rxn site



pdt. side

Glycerol trioleate
(MP = -17°C)

(A Liq. veg. oil)

Glycerol Triester
(MP = 55°C)

(A solid fat).

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Partial Hydrogenation of veg. oil Gives Vegetable Ghee (Daldi)

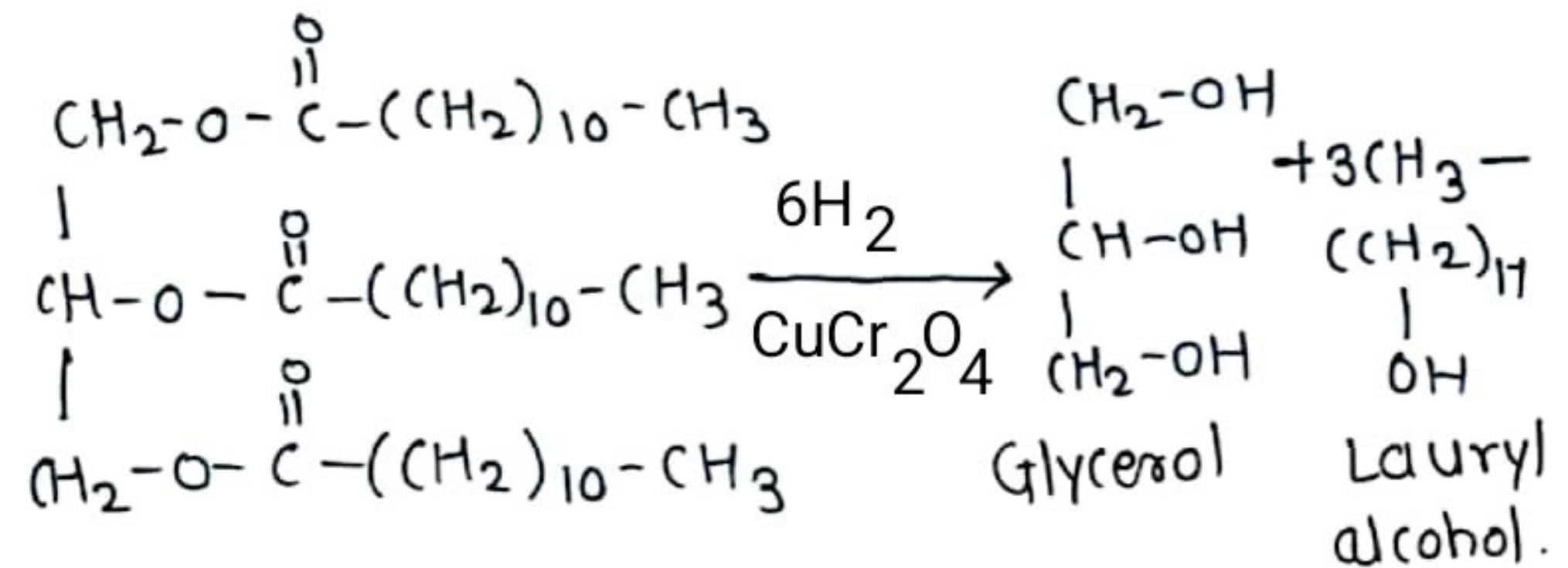
③ Hydrogenolysis:

- Hydrogenation & cleavage.

At high press & temp. the ester group of triglyceride reduces with the help of Cu chromite catalyst

(CuCr₂O₄) [DEPTH OF BIOLOGY]

- This Rxn. gives glycerol & Long chain primary alcohol.



Glycerol
Lauryl alcohol.

Glycerol Tri laurate.

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④ Rancidification:

- On long storage (or) contact with moist air, ~~su~~ & sunlight, oils & fats, undergo decomposition.

↓ are

- Rancidification develops foul smell & sour taste.
- The process is known as a Rancidification & oil & fat is known as Rancid. [DEPTH OF BIOLOGY]
- Rancidification can be caused by following reasons:

① Oxidative Rancidification:

- Involve the oxidation of C-C double bond in fat & oil to produce volatile Carboxylic acid, Aldehyde (or) Ketones formed.
- This occurs in unsaturated Triglycerides. [DEPTH OF BIOLOGY]

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⑥ Hydrolytic Rancid:

Involve the Hydrolysis of one (or) more ester linkage in fat & oil to produce original fatty acid.

③ Enzymatic Hydrolysis:

- Due to presence of Micro-organism fats get hydrolysed by enzyme to produce fatty acid having unpleasant odour & taste.

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eg: Butter gets rancid due to butyric acid production.

⑤ Drying:

- When highly unsaturated oils are exposed to air they undergo oxidation & polymerisation to form thin water-proof film.
- This is known as drying & such oils are known as drying oils.

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- Drying oil are used to make paints
- Linseed oil, tung oil, perilla oil are drying oils, they can used in oil based paints.



Drying oil

- They form a solid elastic film.
- Good drying oil dries in 4-5 hours

eg: Linseed oil rich in Linolenic acid (unsaturated)

Non-drying oil

- These are either saturated (or) few unsaturated.
- When they exposed to Light & air get rancid.

eg: olive oil,
Almond oil.