

Enzymatic digestion of fat by pancreatic lipase

Done by :Sahar AL-Subaie

LIPIDS

Glycerol based

Non-glycerol based

waxes
cerebrosides
steroids
terpenes
syphomyelins

Simple

Compound

Glycolipids

Phospholipids

Fats and Oils

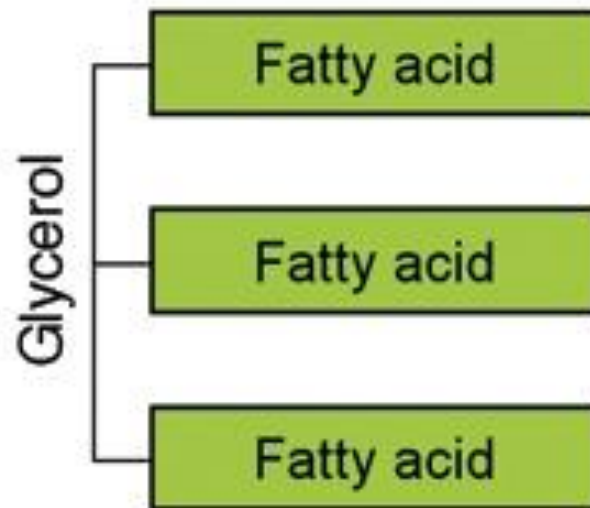
Glucolipids

Galactolipids

Lecithins

Cephalins

STRUCTURE OF A TRIGLYCERIDE



FATTY ACID

```
graph TD; FA[FATTY ACID] --> SAFA[Saturated fatty acid (SAFA)]; FA --> UFA[Unsaturated fatty acid (SAFA)]; UFA --> MUFA[Monounsaturated fatty acid (MUFA)]; UFA --> PUFA[Polyunsaturated fatty acid (PUFA)]; MUFA --> W9[w-9]; PUFA --> W6[w-6]; PUFA --> W3[w-3];
```

The diagram is a hierarchical flowchart showing the classification of fatty acids. At the top is a box labeled 'FATTY ACID' in red. Two arrows point down from this box to 'Saturated fatty acid (SAFA)' and 'Unsaturated fatty acid (SAFA)'. From 'Unsaturated fatty acid (SAFA)', two arrows point down to 'Monounsaturated fatty acid (MUFA)' and 'Polyunsaturated fatty acid (PUFA)'. From 'Monounsaturated fatty acid (MUFA)', an arrow points down to a box labeled 'ω-9' in red. From 'Polyunsaturated fatty acid (PUFA)', two arrows point down to boxes labeled 'ω-6' and 'ω-3' in red.

Saturated fatty acid (SAFA)

Unsaturated fatty acid (SAFA)

Monounsaturated fatty acid (MUFA)

Polyunsaturated fatty acid (PUFA)

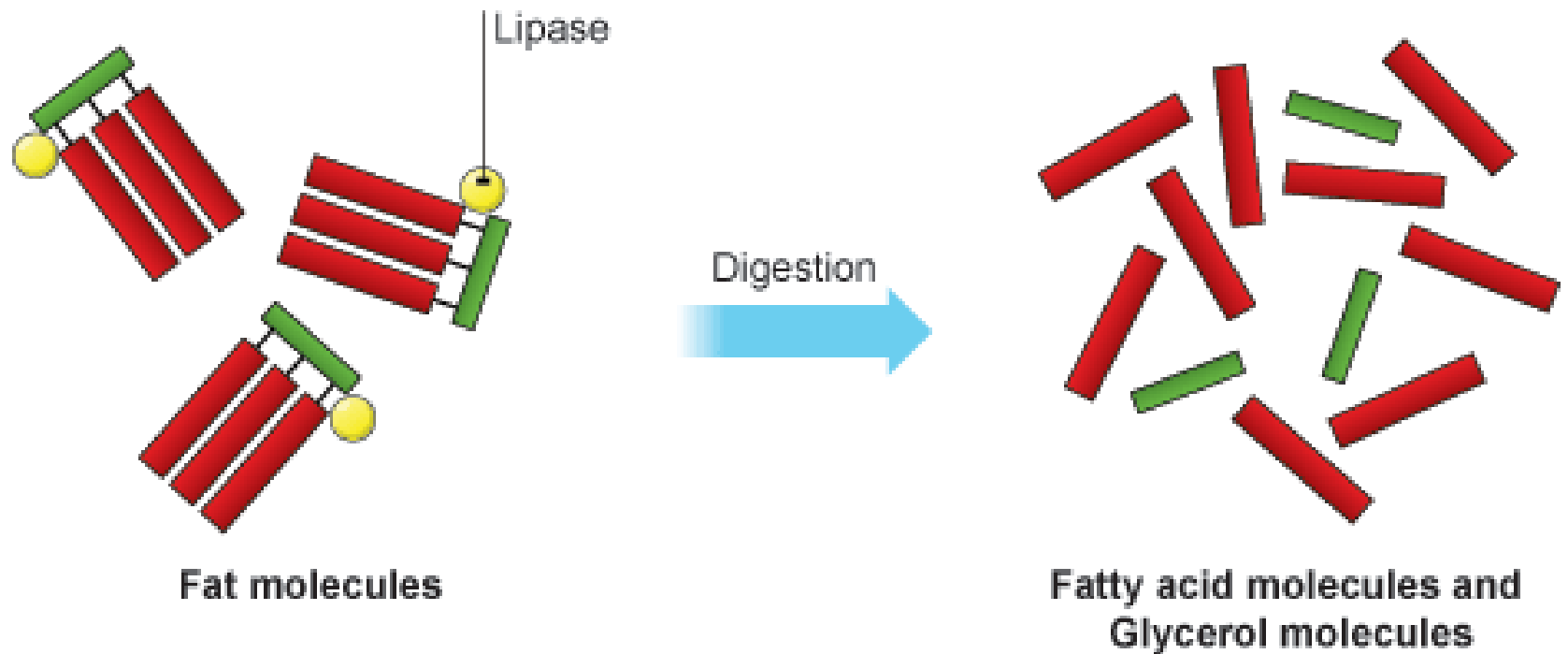
ω -9

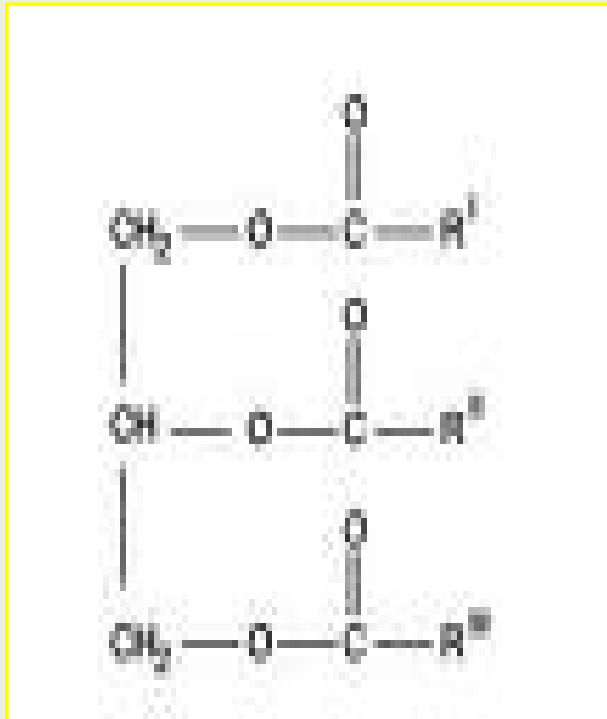
ω -6

ω -3

Principle:

1) Lipase breaks the ester bounds dawn





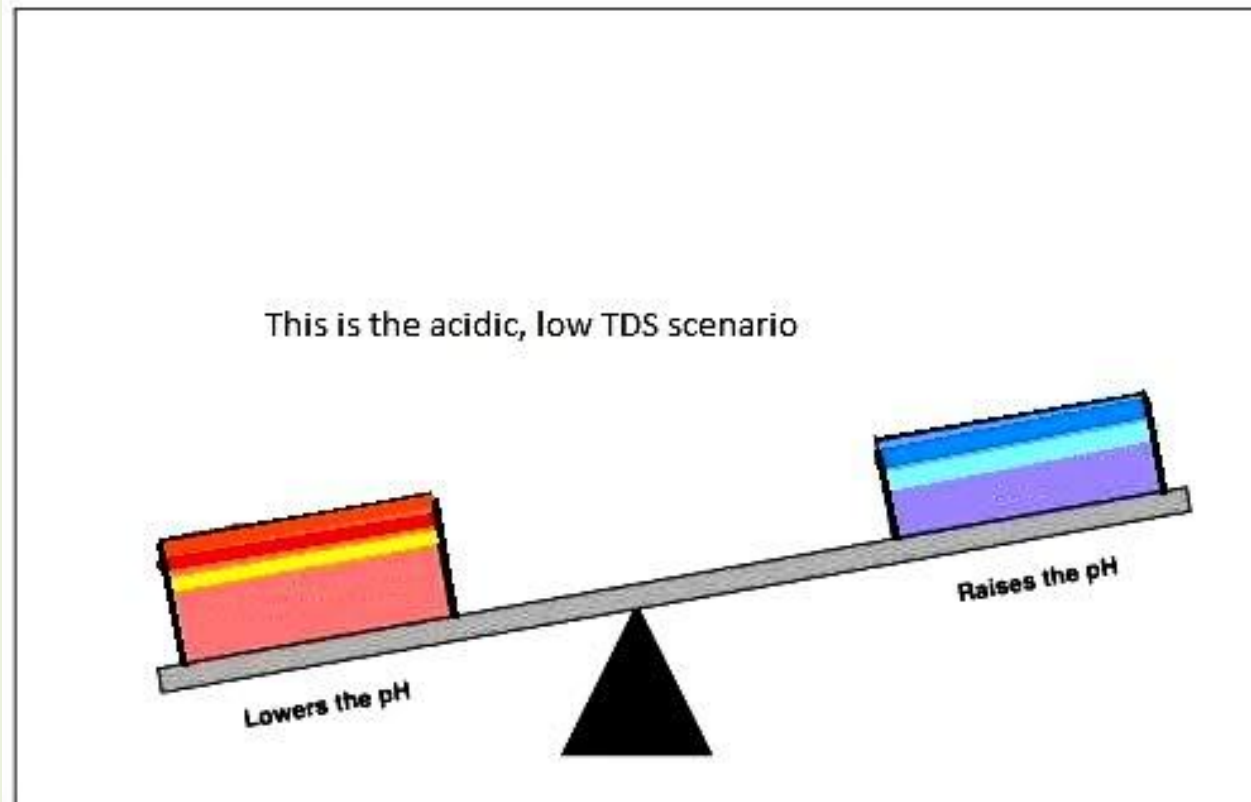
+3H₂O

lipase



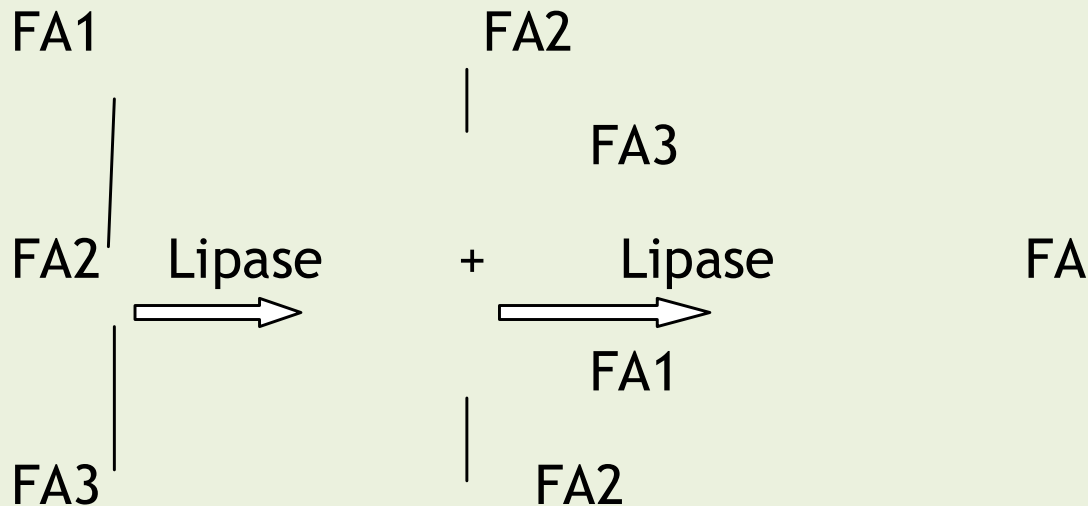
glycerol + f.a

2) The released fatty acids decrease the pH, so the color of the indicator changes.



N.B.

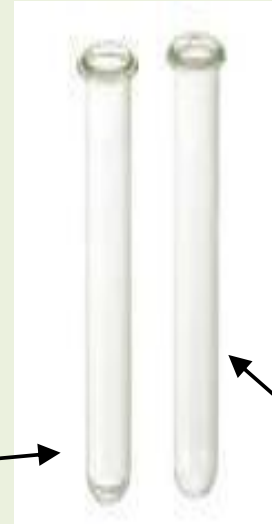
- The hydrolysis process can give all three fatty acids or it can yield one or two F.AS with diglycerides and monoglycerides...



Materials:

- ☐ Fresh whole milk
- ☐ Litmus solution (or litmus paper) as an indicator.
- ☐ Pancreatin solution (boiled, unboiled).
- ☐ 1% Calcium hydroxide solution.

^A ^B Procedure:



4ml milk

+ 10 drops

Litmus + 3 drops Ca(OH)_2

half of A

+ 1ml boiled

Pancreatin solution

+ 1ml unboiled pancreatin solution

In water bath (45°C) for 4-6 hours.

Results:

- ☐ Accumulation of free fatty acids will reduce the PH.
- ☐ Pink colour with indicator.
- ☐ Odour
- ☐ Precipitate due to presence of protein.

Thank
You!

