Hold the Fat Please!

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Ewww… Fat!!

Fat is essential for proper functioning of the body
- Protects neurons in the brain
- Used in cell wall building
- Insulates the body
- Linked to hormone regulation
Fat is present in almost all foods
We are going to learn how to extract fat
First - need to establish some basic facts about fat
Lab Safety

- WEAR YOUR GOGGLES AT ALL TIMES
- No organic solvents down the drain
- No glass in the trash
What Can I Do With This Information?
Capsaicin

* Doesn’t make a whole lot of sense, eh?
Organic Chemistry

Fats and Oils are considered to be “Organic Compounds”
- Made of Carbon (C) and Hydrogen (H) and sometimes Nitrogen (N) and Oxygen (O)
- Not related to how it is produced

What do all of these structures mean?
Methane

🌟 Simplest organic molecule

\[
\text{H--C--H or CH}_4
\]
Ethanol

Let’s introduce another atom

\[ \text{OR} \quad \text{CH}_3\text{CH}_2\text{OH} \]

\[ \text{OR} \quad \text{CH}_3\text{CH}_2\text{OH} \]
How Does This Relate to Fat?!
Triglycerides

Acid functionality

Fatty acid

glycerol
Biodiesel!

Triglyceride

\[
\begin{align*}
\text{H}_2\text{C} & \quad \text{O} \quad \text{C} \quad \text{R} \\
\text{H}_2\text{C} & \quad \text{O} \quad \text{C} \quad \text{R} \\
\text{H}_2\text{C} & \quad \text{O} \quad \text{C} \quad \text{R} 
\end{align*}
\]

Methanol

\[\text{H}_3\text{C} \quad \text{OH}\]

Catalyst

Glycerol

\[
\begin{align*}
\text{H}_2\text{C} & \quad \text{OH} \\
\text{H}_2\text{C} & \quad \text{OH} \\
\text{H}_2\text{C} & \quad \text{OH} 
\end{align*}
\]

Methyl ester

\[
\begin{align*}
\text{H}_3\text{C} & \quad \text{O} \quad \text{C} \quad \text{R} \\
\text{H}_3\text{C} & \quad \text{O} \quad \text{C} \quad \text{R} \\
\text{H}_3\text{C} & \quad \text{O} \quad \text{C} \quad \text{R} 
\end{align*}
\]

Biodiesel
Fatty Acids and Triglycerides

Hydrolysis

http://opbs.okstate.edu/~Blair/Bioch2344/Chapter12/Chapter12.htm
Cis versus Trans

Linolenic Acid is the only essential Fatty Acid