Contents

- 1 Structure of Lipids
  - 1.1 Saturated versus Unsaturated fats
- 2 Testing for Lipids

Structure of Lipids

**Lipids** are the class of macromolecules that mostly serve as long-term energy storage. Additionally, they serve as signaling molecules, water sealant, structure and insulation. Lipids are insoluble in polar solvents such as water, and are soluble in nonpolar solvents such as ether and acetone.

Fats or triglycerides are made of glycerol and three fatty acid chains. They form through 3 dehydration synthesis reactions between a hydroxyl of the glycerol and the carboxyl group of the fatty acid.

Saturated versus Unsaturated fats

A saturated fatty acid. The molecule takes up little space in three dimensions. Many molecules can stack upon each other. Saturated fats are solid at room temperature.

A polyunsaturated fatty acid. A kink from the double bond increases the amount of three dimensional space that the molecule fills. Unsaturated fats tend to be liquid at room temperature.

A trans fatty acid. Despite an unsaturated bond, the molecule fills as much space as a saturated fatty acid and is solid at room temperature. Trans fats usually arise from artificial saturation techniques.
Butterfat is almost completely saturated. Notice how molecules can stack very closely.

Because butterfat can stack together very closely, it is dense and found as a solid at room temperature. *Credit: Steve Karg (CC BY 2.5)*

## Testing for Lipids

Tests for lipids are based on a lipid’s ability to selectively absorb pigments in fat-soluble dyes such as Oil Red O or Sudan IV.