

Topic: Lipid; Saturated &
unsaturated fatty acids

B.Sc. Botany Hons. III

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Dr. Sanjeev Kumar Vidyarthi

Department of Botany

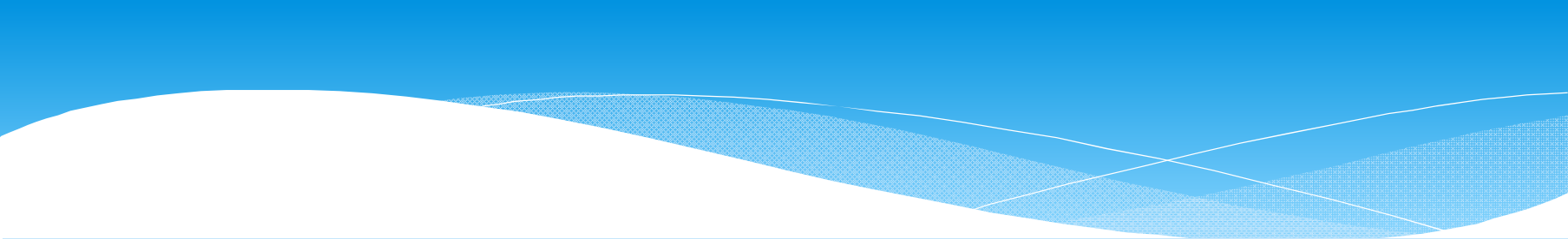
Dr. L.K.V.D. College, Tajpur, Samastipur

L.N. Mithila University, Darbhanga

- Fats and oils, which may be saturated or unsaturated, can be unhealthy but also serve important functions for plants and animals.
- Fats provide energy, insulation, and storage of fatty acids for many organisms.
- Fats may be saturated (having single bonds) or unsaturated (having double bonds).
- Unsaturated fats may be cis (hydrogen in same plane) or trans (hydrogen in two different planes).
- Olive oil, a monounsaturated fat, has a single double bond whereas canola oil, a polyunsaturated fat, has more than one double bond.
- Omega-3 fatty acid and omega-6 fatty acid are essential for human biological processes, but they must be ingested in the diet because they cannot be synthesized.

Saturated and Unsaturated Fatty Acids

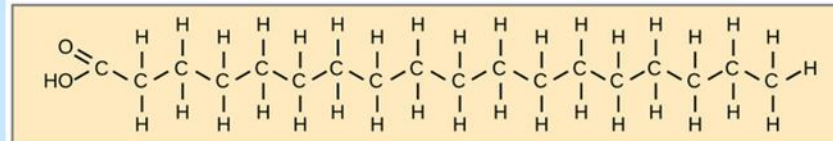
- Fatty acids may be saturated or unsaturated.
- In a fatty acid chain, if there are only single bonds between neighboring carbons in the hydrocarbon chain, the fatty acid is said to be saturated.
- Saturated fatty acids are saturated with hydrogen since single bonds increase the number of hydrogen on each carbon.
- Stearic acid and palmitic acid, which are commonly found in meat, are examples of saturated fats.
- When the hydrocarbon chain contains a double bond, the fatty acid is said to be unsaturated.
- Oleic acid is an example of an unsaturated fatty acid.
- Most unsaturated fats are liquid at room temperature and are called oils.
- If there is only one double bond in the molecule, then it is known as a

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- monounsaturated fat; e.g. olive oil.
 - If there is more than one double bond, then it is known as a polyunsaturated fat; e.g. canola oil.
 - Unsaturated fats help to lower blood cholesterol levels whereas saturated fats contribute to plaque formation in the arteries.
 - Unsaturated fats or oils are usually of plant origin and contain cis unsaturated fatty acids.
 - Cis and trans indicate the configuration of the molecule around the double bond.
 - If hydrogens are present in the same plane, it is referred to as a cis fat; if the hydrogen atoms are on two different planes, it is referred to as a trans fat.

- The cis double bond causes a bend or a “kink” that prevents the fatty acids from packing tightly, keeping them liquid at room temperature.

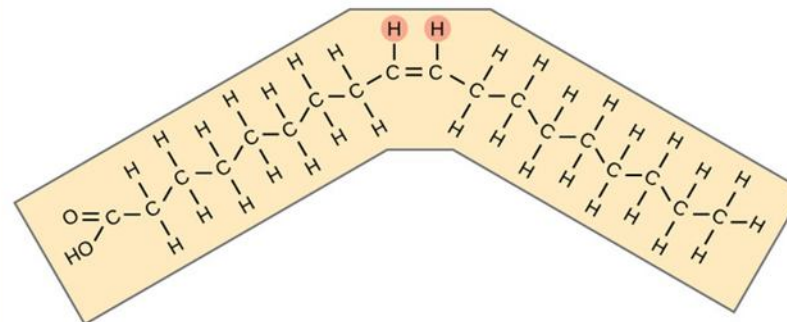
Saturated fatty acid

Stearic acid



Unsaturated fatty acids

Cis oleic acid



Trans oleic acid

