

PHYSIOLOGICAL IMPORTANCE OF SATURATED AND UNSATURATED FATTY ACID

Saturated fat

These are fats that have single bonds between their molecules and are "saturated" with hydrogen molecules. They tend to be solids at room temperature, such as butter.

Food sources rich in saturated fat include meat and dairy products, such as:

Cheese, butter, ice-cream, high-fat cuts of meat, coconut oil, palm oil

Research has found that medium-chain triglycerides (MCTs) are the most healthful type of saturated fat. Coconut, for example, is rich in MCTs.

Unsaturated fat

Unsaturated fats contain one or more double or triple bonds between the molecules. As oils, these fats are liquids at room temperature. They are also found in solid foods.

This group is further classified into two categories called monounsaturated fats and polyunsaturated fats.

Dietary sources of unsaturated fats include:

avocados and avocado oil, olives and olive oil, peanut butter and peanut oil

vegetable oils, such as sunflower, corn, or canola fatty fish, such as salmon and mackerel, nuts and seeds, such as almonds, peanuts, cashews, and sesame seeds.

Q. Distinguish between saturated and unsaturated fatty acids.

Features	Saturated fatty acid	Unsaturated fatty acid
Status	Saturated fatty acids contain single chain of carbon atoms with no double bond.	Unsaturated fatty acids contain carbon chains with one or more double bond.
Physical appearance	Solid at room temperature.	Liquid at room temperature.
Sources	Animal fats, palm oil, coconut oil.	Plant and vegetable oil, avocado, sunflower oil, walnuts, flax, canola oil and fish oil.
Solubility	Soluble in vitamins.	Insoluble in vitamins.
Effect in human	Increased blood cholesterol, deposited in the inner wall of an artery and are harmful to health.	Lowers the blood cholesterol and are associated with health benefits.

Q. What is the physiological importance of saturated fatty acid?

The predominant saturated fatty acid in most diets is palmitic acid (C16:0); it is cholesterol-raising when compared with cis-monounsaturated fatty acids, specifically oleic acid (C18:cis1 n-9), which is considered to be 'neutral' with respect to serum cholesterol concentrations. In other words, oleic acid is considered by most investigators to have no effect on serum cholesterol or lipoproteins. Another saturated fatty acid, myristic acid (C14:0), apparently raises LDL cholesterol concentrations somewhat more than does palmitic acid, whereas other saturates – lauric (C12:0), caproic (C10:0), and caprylic (C8:0) acids – have a somewhat lesser cholesterol-raising effect. On average, for every 1% of total energy consumed as cholesterol-raising saturated, fatty acids, compared with oleic acid, the serum LDL cholesterol level is raised about 2 mg dL⁻¹ (0.025 mmol l⁻¹).

i) One saturated fatty acid, stearic acid (C18:0), does not raise serum LDL cholesterol concentrations. The main sources of this fatty acid are beef tallow and cocoa butter. The reason for its failure to raise LDL cholesterol concentrations is uncertain, but may be the result of its rapid conversion into oleic acid in the body.

ii) Saturated fatty acids are **important to nutrition because of their ability to elevate blood lipid** levels in humans.

iii) Saturated fatty acids are the fatty acids with the greatest blood lipid elevating effect in humans. Current dietary recommendations suggest that saturated fatty acid intake should account for less than 10% of total caloric intake (Institute of Medicine, 2005).

iv) Polyunsaturated fatty acids have desirable blood lipid-lowering effects.