

The Beneficial Effects of Short- and Medium-Chain Fatty Acids

It is commonly thought that all saturated fats are “bad” and unsaturated fats are “good.” However, if we look at the type of saturated or unsaturated fat, we find that there are both beneficial and detrimental fats in each category.

Fats are made up of carbon atoms in a chain with hydrogen atoms attached, and are categorized as saturated or unsaturated depending on how many hydrogens are attached to the carbon chain. If all the carbons in the chain are fully bonded to hydrogen atoms (i.e., *saturated* with hydrogen) this is a *saturated* fatty acid. *Unsaturated* fatty acids have a carbon chain in which some of the carbon atoms are not saturated with hydrogen atoms.

Fats that are predominantly saturated, such as butter or coconut oil, are solid at room temperature, making them more stable than unsaturated fats and thus less vulnerable to rancidity and the formation of harmful free radicals. While saturated fats are not essential in our diet because our body is able to make them, there are certain unsaturated fatty acids that are essential because we are unable to make them. These essential fatty acids, which must be consumed, are discussed more fully in the *Dietary Fats* handout.

Fatty acids can be further divided by the length of the carbon chain they contain (short-, medium-, and long-chain fats). Short-chain fatty acids (SCFAs), such as butyric acid, found in butterfat, contain 4 to 6 carbon atoms. Medium-chain fatty acids (MCFAs), such as coconut oil have a chain between 8 to 12 carbons long. Long-chain fatty acids (LCFAs), with chains of 14 to 18 carbons, are found predominately in animal fat, such as beef.

The varying chain lengths have different effects on our bodies. In general, LCFAs, the most common saturated fats in nature, have negative consequences related to cardiovascular disease. SCFAs and MCFAs, on the other hand, are not very common in foods, but they have some important positive effects. Studies have shown:

- Coconut flakes were found to have a cholesterol-lowering effect in subjects with high cholesterol levels.¹
- A high intake of coconut in Indonesians was not associated with increased risk of cardiovascular disease.²
- When studying heart disease in women, intakes of SCFAs and MCFAs were not significantly associated with the risk of cardiovascular disease.³
- No specific role for coconut oil was found in the causation of cardiovascular disease in a study in India.⁴

MCFAs are more commonly found in food than SCFA. Two major food sources are coconut oil and palm kernel oil extracted from the seed of palm fruits. The MCFAs in these oils help extend the shelf life of processed foods.

In the past, all saturated fats were thought to raise serum cholesterol levels. Therefore, these oils were replaced by “hydrogenated” oils, which also extended the shelf life of processed foods. However, when a healthy unsaturated fat is “partially hydrogenated,” it is chemically altered to make it more like a long-chain saturated fat, reducing its potential for rancidity but also negating its health benefits. This process may cause the formation of *trans* fats, such as those found in shortening and many types of margarine; they have serious negative health effects and should be avoided.

In summary, MCFAs appear to have some beneficial qualities. These fats may be particularly useful in cooking because they can be heated without the risk of creating harmful breakdown products.

References:

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