

## What is fat?

The body needs fats every day. In a healthy diet between twenty and forty % of the daily calories are obtained from fat. Fats are an important source of the vitamins A, D and E and essential fatty acids. But not all fats are the same. This fact sheet contains information about the different types of fats and their health aspects. The applicability of the various fats in the production of foodstuffs is dealt with in the fact sheet 'Functions of fats'.

### THE FOLLOWING HAVE ALSO BEEN PUBLISHED IN THIS SERIES:

- Functions of fats in food
- Consumer knowledge about fats
- Claims about fats
- The role of fats in the composition of taste

### Types of fatty acids

A fat consists of triglycerides. One fat molecule, a triglyceride, is an ester that is formed from a molecule of glycerol coupled with three fatty acids. There are two types of these fatty acids: saturated and unsaturated fatty acids. Unsaturated fatty acids can be divided into the monounsaturated fatty acids (MUFA) and polyunsaturated fatty acids (PUFA). Mono refers to the presence of just one double bond in the chemical structure of the fat, while poly means that more than one such bond is present. Unsaturated fatty acids can occur as the cis-variant and the trans-variant, although in practice when unsaturated fatty acids are referred to only the cis-variants are meant. Trans-unsaturated fatty acids are usually referred to just as trans fatty acids.

Essential fatty acids are polyunsaturated fatty acids that cannot be made by our body. These fatty acids must, therefore, form part of our daily diet. Essential fatty acids are vital parts of the production of hormones in the body. At the present time these fatty acids are attracting a great deal of attention, particularly the omega-3 fatty acids. These include alpha-linolenic acid (ALA) from vegetable oils and the fatty acids EPA and DHA from fish. (ALA can be converted into EPA and DHA in the body, but this only takes place to a limited extent.) As well as the omega-3 fatty acids there are also omega-6 fatty acids. The most well known of this is the essential acid linoleic acid from vegetable oils.



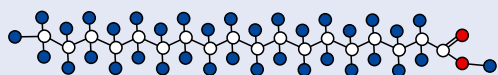
Triglycerides that are liquid at room temperature (in the country of origin) are called oils. Oils contain large amounts of unsaturated fatty acids. These have a low melting point so that they are liquid at room temperature. Saturated fatty acids and trans fatty acids in contrast have a high melting point and are, therefore, solid at room temperature. The functional properties of a triglyceride are determined by the chemical properties (such as chain length, the number of double bonds and the position of the double bond in the chain of carbon atoms) and physical properties (such as the melting point) of the particular fatty acids. The fatty acids that form the greatest proportion of the fat or oil determine the chemical and physical properties of the actual fat or oil. For example, if a fat contains mainly saturated fatty acids or trans fatty acids then these fatty acids determine the chemical and physical properties of the fat and it will be a solid at room temperature.

### Health aspects of fats

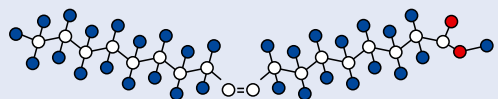
Fats are a source of fuel for your body (1 gram of fat supplies 9 kcal), they ensure the uptake of vitamins A, D and E in the body and they supply essential fatty acids. Fat are a main part of the structure of cell membranes and are the precursors from which many hormones are made. Therefore, you need fats to build cells and for the immune system. Furthermore, the subcutaneous adipose tissue acts like a good blanket and prevents heat loss. Nutrition experts recommend a level of fat intake of a minimum of 20 percent and a maximum of 40 percent of the total energy intake.

The largest part of the fat intake must preferably consist of monounsaturated and polyunsaturated fatty acids, because these fatty acids lower the cholesterol level. A low cholesterol level

Saturated fatty acid



Unsaturated fatty acid -cis



Unsaturated fatty acid -trans



○ = C   ● = O   ● = H

The objective of the Product Board for Margarine, Fats and Oils (MVO) as knowledge centre is to disseminate reliable and balanced information about the role of fats in a healthy diet. This information complies with the policy of the Dutch government and the Dietary Guidelines (in Dutch: Richtlijnen Goede Voeding) from the Netherlands Health Council. It is also the objective of the Product Board to stimulate an improvement in the fatty acid composition of food.

**Fact on Fats is a initiative of**  
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reduces the risk of cardiovascular diseases. Saturated fatty acids in contrast, and in particular trans fatty acids, increase the cholesterol level. Saturated fatty acids may, therefore, only form a maximum of 1/3 of the fats in the diet, while for trans fatty acids the intake should be under 1% of the total intake of energy.

*It is not only the amount of fat but more particularly the fatty acid composition that determines whether a product is good or bad for health.*

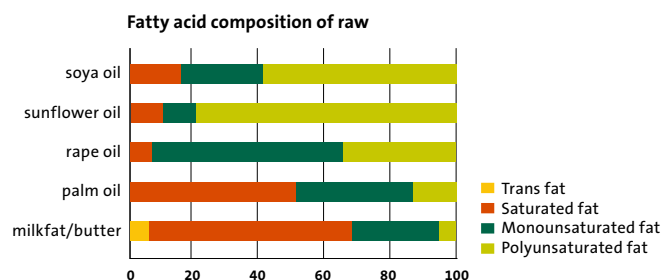
Because every fat consists of a combination of saturated, unsaturated and sometimes also trans fatty acids it is important to consider the ratio in which these occur. Government policy is aimed in particular at reducing the intake of saturated fatty acids, seeing that the intake of these is still well above the recommended level (13% of the calories comes from saturated fat while the recommended amount is 10 energy percent or 22 – 27 grams per day). See the table below for the recommended amounts.

With reference to the polyunsaturated fatty acids it is important to have an intake of both omega-3 and omega-6 fatty acids, namely a minimum of 9-11 grams linoleic acid (omega-6) and 2.2 - 2.5 grams alpha-linolenic acid (omega-3). Linoleic acid is present particularly in vegetable oils such as sunflower oil, and alpha-linolenic acid in among other things walnuts and linseed, soya oil and rape seed oil. Both essential fatty acids are also present in most margarines and liquid cooking and frying products. The intake of linoleic acid is around the recommendation level, but this is not the case for ALA and fish fatty acids. The Health Council of the Netherlands recommends a daily intake of 450 mg for the fish fatty acids EPA and DHA. This recommendation is not achieved by most of the population because most people do not eat enough fish, particularly fatty fish (fish twice a week, of which one should be a fatty fish). Recently, fish fatty acids are now being added to some margarines.

People who are overweight also need a certain amount of fats in their diet, however, the upper limit is lower. The recommended amount of fat for these people is a maximum of 35 energy percent. Overweight is usually a question of an imbalance between food and exercise. In order to restore the balance it is important that the diet contains as much nutrients as possible but provides as little calories as possible.

### Functions of fats in products

About 80% of the world production of oils consists of 4 different types: soya oil, palm oil, rape oil and sunflower oil. These oils differ greatly from each other in their fatty acid composition (Figure 3). In order to apply a particular type of oil it is naturally important to know the differences between the types of oils well. For instance, a type of oil with a high unsaturated fat content is good for health, but polyunsaturated fatty acids are less stable and have a shorter shelf life, therefore.



Fats do not just have an important function in the body; they also fulfil an important role in many products, such as taste and consistency. Innovations in the oils and fats sector make it increasingly easy to produce foodstuffs with healthy fats and yet to still retain the desired taste, texture and shelf life. More about this is given in the fact sheet 'Functions of fats'.

### Nutritional standards for adults and children from the age of 4

Type of fat	Recommended daily amount per day for men	Recommended daily amount per day for women
Total fat	minimum of 55 grams maximum of 110 grams at desired weight and a maximum of 83 - 97 grams when overweight	minimum of 44 grams maximum of 88 grams at desired weight and a maximum of 67 - 78 grams when overweight
Saturated fatty acids	< 27 grams	< 22 grams
Trans fatty acids	< 2,5 grams	< 2,2 grams
Linoleic acid	11 - 22 grams*	9- 18 grams*
Alpha-linolenic acid	2,5 grams	2,2 grams
Fish oil fatty acids EPA plus DHA	450 mgrams	450 mgrams

\* This amount is based on the recommendation of 4-8 en% from the WHO for the prevention of chronic diseases. Reference dietary intake for women 2000 kcal and for men 2500 kcal.

Sources: Dietary Guidelines (IN Dutch: Richtlijnen Goede Voeding), Netherlands Health Council 2006. Dietary reference intakes: energy, proteins, fats and digestible carbohydrates.