

## Fat — as a macro nutrient

### Key Words

**Fat:** a macro nutrient supplying the body with a concentrated energy source

**Oils:** Fats liquid at room temperature e.g. sunflower oil

**Solid fats:** Fats solid at room temperature e.g. butter + lard

**Visible fat:** Fat in food seen easily e.g. fat on bacon

**Invisible fat:** Fat in food that cannot easily be seen e.g. butter in cooked pastry, oils in fried foods i.e. doughnuts and crisps

**Fatty acid:** part of a fat molecule

**Triglyceride:** fat molecule made up of 1 part glycerol + 3 fatty acids

### What is it and

**what is it made of?** - a macronutrient found in animal and plant foods. Fat is solid at room (ambient) temperature/oil is liquid. Exactly the same energy value: 9kcal/37kJ per gram

### Functions in the body. (what it does in the body):

- Provides an energy store (in the adipose tissue under the skin)
- Insulates to keep the body warm
- Protects bones and kidneys from damage providing a cushion layer
- Provide fat soluble vitamins A, D, E and K.

### Similarities and differences between a fat and an oil

• **Similarities:** – Both: are made of triglyceride molecules: 3 fatty acids + 1 glycerol. Have exactly the same energy value: 9kcal/37kJ per gram. Are made of a mixture of fatty acids.

• **Differences:** Fat is solid at room (ambient) temperature/oil is liquid. Fats can be spread (they are plastic), creamed, rubbed in/oils are poured. Fats contain a lot of saturated fatty acids/oils contain a lot of monounsaturated and polyunsaturated fatty acids.

### What are fatty acids?

**Monounsaturated fatty acids:** fatty acid found mainly in solid fats and liquid oils

**Saturated fatty acids:** fatty acids found mainly in solid fats e.g. butter, lard, suet, block margarine, ghee, fat on meat, palm oil, coconut and chocolate

**Unsaturated fatty acids:** fatty acids found mainly in liquid plant oils e.g. olive, rapeseed, sunflower, + corn; oily fish, avocado pears, nuts, seeds + some veg. fat spreads

**Essential fatty acids:** when we eat food, our body breaks up (digests) the fat molecules they contain to make new fatty acids and fat molecules for our body to use. The two essential fatty acids needed by adults and children that cannot be made by the body and have to be eaten in the form of food are found in oily fish, plant and seed oils, eggs and fresh meat.

### Effects of deficiency

- If carbohydrate intake is also reduced, body weight will be lost because the body uses its energy store from its fat cells + it will not be replaced
- The body will chill quickly because there is not enough fat to insulate
- The body will easily bruise as there is not a thick enough cushion of fat for protection
- Body will not receive enough vitamins A, D, E and K as these are found in foods containing fat

**Effects of excess:** Fat is energy dense – 9kcal per gram. Eating too much can lead to weight gain. Could contribute to developing cardiovascular disease (CVD) and coronary heart disease (CHD)

### Chemical structure of fats:



**Sources of solid animal fats:** Visible fat in meat, cheese, butter, lard, suet  
 Invisible: cheese; butter in cakes, pastries and desserts.  
 Meat products e.g. sausages + burgers. Marbling in meat. Processed meals and take away.

**Sources of solid plant fats:** Visible: white vegetable fats, veg. fat spreads, (margarines), coconut cream, cocoa butter  
 Invisible: Processed foods. Chocolate + pastries, cakes, biscuits, doughnuts and breads made with hydrogenated white veg. spreads. oils in tuna, block vegetable fat, ghee, plant oils e.g. palm, olive and sunflower

**Sources of liquid animal oils:** Visible: animal oils, cod liver oil, oily fish, e.g. mackerel + sardines  
 Invisible: milk, cream, egg yolk, oily fish

**Sources of liquid plant oils:** Visible: plant oils, nuts and seed oils (e.g. sunflower, sesame, rapeseed, corn, olive, almond)  
 Invisible: many processed foods, ready meals + take away foods

### Amount needed for different life stages

The amount needed is calculated as a percentage of our total daily energy intake. The recommended healthy adult amount is:

Type of fat	% of food energy every day
<b>Total fat of which:</b>	<b>No more than 35%</b>
Saturated fatty acids	11%
Monounsaturated fatty acids	13%
Polyunsaturated fatty acids	6.5%
Trans fatty acids	No more than 2%

