# Chemistry and diet

# Did you know?

## More about fat

Every fat or oil molecule has three chains of hydrogen and carbon atoms. When the molecule is broken up during digestion these three chains form new molecules called fatty acids or glycerides. The three fatty acids in a fat or oil molecule do not have to be the same. For example, in olive oil, there are at least four different fatty acid chains. This means that not all the molecules of olive oil are identical! Olive oil contains the four different fatty acids in varying amounts, as shown in the information table. The letter 'C' followed by a number shows how many carbon atoms are in the fatty acid chain. The systematic (real) chemical names of fatty acids are very complicated, so food chemists use the ones shown in the table.

Adding iodine to the fat or oil helps food chemists identify which fatty acids are present. Those which are unsaturated will react quickly with iodine. Iodine has a dark colour. This disappears when it reacts. With fatty acids, iodine atoms add to any carbon-carbon double bonds, so the colour disappears. Fats or oils with more saturated fatty acids react much more slowly with iodine, or not at all, because there are no available bonds for the iodine atoms to add on to.

Food chemists can calculate accurately how much iodine reacts with the different fatty acids. This gives each one an 'iodine number'. Polyunsaturated fatty acids have numbers of around 120–150.

Eating fats and oils with high amounts of unsaturated fatty acid chains is supposed to be better for our bodies. These molecules are more easily digested and are thought to help stop people getting heart disease.

### Questions

1. Which fats and oils in the table are high in (a) saturated and (b) unsaturated fatty acids?

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2. Which fats and oils are supposed to be 'good for you'?

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### Information table

| | Saturated fatty acids | | | Unsaturated fatty acids | | | |
|---|---|---|---|---|---|---|---|
| **Fat or oil** | **Myristic acid C-14 %** | **Palmitic acid C-16 %** | **Stearic acid C-18 %** | **Oleic acid C-18 %** | **Linoleic acid %** | **Other poly-unsaturated acids C-18 and bigger %** | **Other poly-unsaturated C-14 and C-16 %** |
| Beef fat (dripping) | 6 | 27 | 14 | 50 | 3 | - | - |
| Cocoa butter (vegetable fat) | - | 24 | 35 | 38 | 32 | - | - |
| Fish oil (sardine) | 5 | 15 | 3 | - | - | 50 | 27 |
| Cod liver oil | 6 | 8 | 1 | 29 | - | 35 | 20 |
| Corn oil | 1 | 10 | 3 | 50 | - | 34 | 2 |
| Olive oil | - | 7 | 3 | 85 | 5 | - | - |
| Peanut oil | - | 8 | 3 | 56 | - | 33 | - |
| Soya oil | - | 10 | 2 | 29 | - | 58 | - |
| Sunflower oil | - | 6 | 2 | 25 | - | 67 | - |