

KS3
science and food technology

Timing - 15 - 20 minutes

Three pupil activity sheets I4 accompany this activity.

I4. What can be added to the food you buy?

This is a simple outline for pupils of the main functions of the major classes of food additives. Pupils read the information and answer the questions.

Answers to Pupil activity sheet I4:

1. Any suitable suggestions such as to improve the flavour, improve the texture, to colour the food, to preserve the food.
2. Answers will depend on the foods used.

Food manufacturers often use **food additives**. These substances are added to food we eat to:

- improve flavour or colour
- improve the texture
- **preserve**, that is slow down the speed at which food goes off.

Important groups of additives are **acidulants**, **anti-caking agents**, **antioxidants**, **colours**, **emulsifiers** and **stabilisers**, **flavourings**, **preservatives** and **sweeteners**.

Food manufacturers must:

- test all food additives to show that they are safe to eat
- show that an additive is really needed in a product before the additive is allowed on the list of permitted additives.

Certain additives, like certain foods, can cause a small number of people to react badly to them. Such people need to avoid the food or food additive to which they are sensitive. To do this they must learn how to read the labels on food packages.

Food additives must be named on the food label; they are shown as:

E-numbers, e.g. E440. or they may be shown as their chemical name, e.g. **pectin**, or both, e.g. E440 - pectin.

The label must also say what sort of additive it is, e.g. gelling agent E440 - pectin. You will then know why the additive has been used.

Colours are found in the **E100** series.

Preservatives are found in the **E200** series.

Antioxidants are found in the **E300** series.

Miscellaneous additives such as **emulsifiers**, **gelling agents** and **stabilisers** are found in the **E400** series.

Some products would not exist at all if additives were not used, e.g. processed cheese, low fat products, sugar-free products.

An overview of the main classes of food additives follows.

Acidulants

Many foods we eat are acidic, so they have a sharp, sour taste. Fruit such as lemons contain a lot of citric acid. Cheese and yoghurt contain lactic acid. Acidulants are added to food, such as soft drinks, desserts, jams, sweets, soups and sauces to give a better taste. They also act as a preservative.

Anti-caking agents

These are particularly important in the manufacture of powdered foods. The small particles present in powdered food tend to stick together or cake. This causes problems when manufacturers are trying to put powders into containers such as jars. The powders tend to get stuck in the machinery and the packing process can be delayed. The addition of an anti-caking agent allows powders to flow more easily. Anti-caking agents are also important in vending machines which make tea, coffee, etc. from powdered ingredients.

Another common place to find an anti-caking agent is in table salt. The anti-caking agent prevents the salt from clogging up the salt cellar.

Antioxidants

The oxygen that we breathe is essential for life. However, it can also be destructive, for example, it makes iron rusty! Our food will also react with oxygen and will be very unpleasant to eat if it does so. Substances called **antioxidants** are used to stop our food reacting with oxygen in the air.

Foods that contain **fats** and **oils** are particularly affected by oxygen. When this happens the fats and oils go **rancid**. Rancid foods taste and smell horrible. They can also be harmful.

Colours

We are more likely to eat food which looks good. Some processed foods lose their natural colour as they are being made, so colours are added to make them look appetising again. Some sweets would be colourless if the manufacturer did not add colour.

However, some people do believe colour additives are not needed.

Flavourings

If food does not taste very nice, you will not want to eat it. The substances that give food a recognisable flavour are often a complicated mixture of chemicals. Food manufacturers try to copy the taste of natural flavours so that the food tastes good. If you are making a dish at home you often add substances such as herbs and spices to give the dish a good flavour. Flavours are added to manufactured foods in very small quantities.

Emulsifiers and stabilisers

What happens if you try to add oil (such as cooking oil) to water? You will find that they do not mix together. They form two separate layers.

Some of the foods we eat, like ice cream and margarine, are mixtures of oil and water. However, they are not in two separate layers. Substances called **emulsifiers** are used to make the oil and water in these products mix together evenly.

Stabilisers are also used to give products like yoghurt a smooth, even texture.

Preservatives

The food we eat can also be 'eaten' by tiny organisms (microbes or microorganisms) such as bacteria and fungi. These microbes can make poisons (toxins) which can harm us. You have probably heard of food poisoning caused by a bacterium called salmonella.

Many different sorts of food contain preservatives. Preservatives are used to destroy bacteria and fungi or to slow down their growth. Some preservatives are simple substances such as vinegar (E260 - acetic acid). This is a natural substance. You may add it to chips!

Other preservatives such as nitrates and nitrites (E249 - E252) have a slight chance of causing some people health problems. People may choose not to eat products containing these substances. However, if they were not used, more people would certainly die from food poisoning. The nitrates and nitrites are used in meat products to prevent the growth of very dangerous bacteria.

Sweeteners

We only have 4 tastes. These are sweet (like sugar), sour (like lemons), bitter (like strong coffee or tonic water) and salt. Most of us like to eat sweet tasting foods. Food manufacturers can add different sorts of sugars or sweeteners to their products to make them sweeter. Sugar may be bad for your teeth and if you eat too much your body can change it into fat and you will put on weight.

Scientists have tried to find or make substances which will make your food sweeter but which do not affect teeth or make people fat. These are called artificial sweeteners. A substance like this would also be very useful for foods made for people who have diabetes. Artificial sweeteners can be added to many different products such as chocolate, jam and chewing gum.

Questions

1. Give two reasons why food manufacturers use food additives.
2. Complete the table below using information from food labels. Try to find four different foods. You may need to use a list of E numbers with names.

Name of food	Contains	E number	Chemical name
	a colour		
	a preservative		
	an antioxidant		
	any miscellaneous additive		