

### A3. Acids and alkalis in food

Pupils make sherbet and look at food labels for presence of acids. (Some of the information on the pupil activity sheet repeats the work done on A1, a science activity)

#### **Making sherbet**

##### *Hints for the teacher*

- Use citric acid and sodium hydrogencarbonate (bicarbonate of soda) suitable for consumption (citric acid suitable for eating can easily be obtained from a pharmacist).
- Pupils may like to have lollipops/liquorice if some of the sherbet is to be eaten straight away.
- It may be desirable to sieve the ingredients together to ensure thorough mixing.

A simple experiment, such as mixing each substance alone with water and then combinations of the substances with water, will show that the icing sugar is not essential to the fizzing reaction whereas the other two ingredients are. The sherbet must be kept in a sealed container until consumed so that it does not react with moisture in the air.

#### **Find the acid**

*Answers to questions on Pupil activity sheet A3*

2. The results will depend on the labels which are used.
3. To impart a characteristic, tart taste (e.g. citric acid for lemons; malic acid for apples).

#### **Do we drink acids?**

See *How much acid is present in fizzy drinks?* Activity A1.

**KS3/4**  
**food technology**

**Timing – 30 minutes.**

*Pupil activity sheet A3 accompanies this activity.*

*Requirements per group*  
*9 teaspoons of icing sugar*  
*2 teaspoons of citric acid*  
*1 teaspoon of sodium hydrogencarbonate*

The reactions between acids and alkalis are very important in everyday life as well as in both food technology and science lessons.

### **Making sherbet**

Sherbet fizzes when it comes into contact with moisture on your tongue. Sherbet can be made from icing sugar, citric acid and sodium hydrogencarbonate (an alkali; it is sometimes called sodium bicarbonate or bicarbonate of soda).

Can each of these chemicals make the fizz on their own? Or is a combination of 2 or all 3 of them needed? Plan a simple experiment to find out.

You can then make your own sherbet by using the following recipe:

9 teaspoons of icing sugar

2 teaspoons of citric acid

1 teaspoon of sodium hydrogencarbonate

Mix all the ingredients very thoroughly. Keep the sherbet in a sealed container until you want to eat it. Why do you think this is important?

### **Find the acid**

1. Find the labels from at least 10 items of food and drink that contain acids.
2. Make a table into which you can put the name of the food or drink and the acid it contains.
3. Why do food manufacturers add acids to foods?

### **Do we drink acids?**

The use of artificial sweeteners in soft drinks has helped to reduce the amount of sugar we eat. This has also reduced the amount of tooth decay. Tooth decay is caused by the production of acids by bacteria in plaque. Tooth decay should not be confused with tooth erosion. The acids found in many of the foods and drinks we consume can cause the loss of tooth enamel. This is known as erosion.

The frequent exposure of teeth to any acidic food or drink may cause this chemical erosion.

Use Universal indicator to find out the pH of a range of drinks. Make sure you test tap water, cola, fizzy lemonade, blackcurrant juice, orange squash, milk and freshly squeezed orange or lemon juice.

Present your results in a suitable way.

If your teeth are in contact with acidic foods, not just fizzy drinks, tooth erosion may occur. Think of any advice you could give to individuals who like to drink acidic drinks so that the effects of the acid are as reduced as is possible.