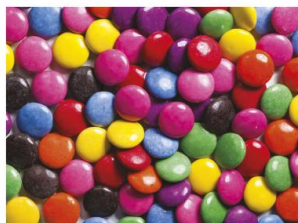


2.6 Chromatography

Learning objectives

After this topic you will be able to:

- explain how chromatography separates mixtures
- analyse chromatograms to identify substances in mixtures.



▲ The coatings of these chocolates contain mixtures of dyes.

Key Words

chromatography, chromatogram

Link

You can learn more about chromatography in C3 3.3 Message in a bottle

Foul Fact

Detectives have used chromatography to look for explosives on the body hair of bomber suspects.

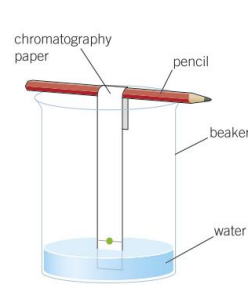
Do you like sugar-coated chocolates? Which is your favourite colour?

The coloured crunchy coatings contain mixtures of dyes. You can use **chromatography** to find out which dyes are in which colours. Chromatography separates substances in a mixture. It works when the substances in a mixture are soluble in the same solvent.

A State what chromatography does.

How does chromatography work?

To find out which dyes are in a green felt-tip pen, sets up the apparatus below. Water moves up the paper. As it passes the green spot, the dyes in the ink dissolve. Water carries the dyes upwards. Some dyes move faster than others, so the dyes separate. This makes a **chromatogram**.



▲ Poppy's apparatus.



▲ Chromatogram of ink from a green felt-tip pen.

In this chromatogram, the blue dye has moved further than the yellow dye. This might be because the blue dye is more soluble. Or it might be because the yellow dye sticks more strongly to the paper.

B State what a chromatogram is.

How is chromatography useful?

Aidan grinds up a spinach leaf in a pestle and mortar. He puts a spot of spinach juice near the bottom of some chromatography paper. He dips the paper in a solvent.

The solvent travels up the paper, taking spinach juice with it. This makes a chromatogram. The chromatogram shows the pigments (colours) in spinach. Each pigment is a different nutrient.



◀ Aidan's chromatogram.

Scientists have used a different sort of chromatography to identify food nutrients. Cassava is an important food in Nigeria. Scientists used chromatography to compare the amounts of vitamin A in different sorts of cassava. Children may go blind if they don't have enough vitamin A in their diet.

The scientists found that dark-green cassava leaves have more vitamin A than light-green leaves. Yellow cassava roots have more vitamin A than white roots. They advise people to eat dark-green leaves and yellow roots.



▲ Yellow cassava roots.



▲ Cassava leaves.

Clever chromatography

Make notes about three uses of chromatography. Organise your notes in a logical order. Then write a few paragraphs describing how chromatography is useful. Ask a partner to check your writing to make sure you have used scientific words correctly.

● C2 Chapter 2: Separation techniques

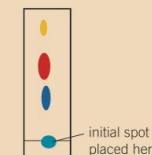
Link

You can learn more about nutrients in B2 1.1 Nutrients

Summary Questions

- Copy and complete the sentences below.
Chromatography separates substances in _____. It works if all the substances in the mixture are soluble in _____. The picture made by chromatography is called _____.
(3 marks)

- Explain why, in chromatography, some substances travel further up the paper than others.
(3 marks)



- Look at the chromatogram above. It was obtained from the leaves of three plants. Write down which plant the unknown sample is from. Explain your choice.
(2 marks)

- A teacher has found a rude note in his classroom. There are three students who might have written it. Write instructions for how he can use chromatography to find out which student wrote the note. Point out possible problems with the method, or in using the results.
(6 marks)