

## Experiment

# 3

## Separation of food dyes using paper chromatography

### Background

In the separation of substances using chromatography, the sample to be separated, liquid or gas, is passed over an inert substance. In this experiment paper chromatography is used to separate food dyes. In this technique the components which are least soluble in water and those which adhere most strongly to the paper will move more slowly than those which are more soluble in water or adhere less strongly to the paper.

### Equipment required

Test tubes (five large)

Capillary tube

Beaker (100 mL)

Sodium chloride solution [NaCl] 1% solution (20 mL)

Assorted food colourings—especially black, green, blue, yellow, red (1–2 drops) or assorted ‘Smarties’, including black and brown (one of each colour)

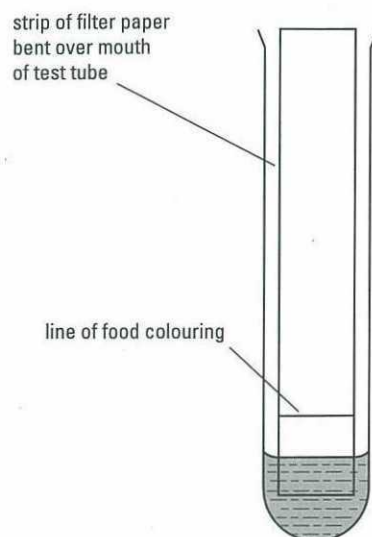
Strips of chromatography or filter paper to fit into the large test tubes (five)

Distilled water

### Procedure

- #1 If Smarties are being used, place each Smartie in turn into a small beaker, add about five drops of water and swirl the contents until the colour dissolves. Avoid dissolving any underlying sugar.
- #2 With a capillary tube containing one of the food colourings or Smartie dyes draw a fine line across a strip of filter paper about 2 cm from one end.
- #3 Similarly prepare four more filter paper strips with four other food colourings or dyes.
- #4 Prepare five large test tubes containing 1% NaCl solution to a depth of about 1 cm.
- #5 Place the paper strips into the test tubes but ensure that the level of the liquid is below the line on the paper and that the paper strip does not cling to the sides of the test tube. Bend the top of the paper strip over the mouth of the test tube to keep it in position.
- #6 Allow the chromatograms to develop.
- #7 When the liquid gets towards the top of the paper strip remove the strip from the test tube and record your observations.

**Fig. 3.1**



### Processing of results, and questions

- 1 Identify those food colourings or dyes which consisted of a single component, and those which contained more than one component.
- 2 What property of the food colourings enables them to be separated in this way?