

## Colorimetric analysis of paracetamol

### Teacher and technician sheet

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#### Health and safety note

Make sure students wear eye protection.  $5 \text{ mol dm}^{-3}$  hydrochloric acid is irritant.

#### Equipment and materials

Each student or pair of students will require:

- Spectrometer (a solution of the complex displays maximum absorption at about 700 nm) or colorimeter with suitable filter (red)
- $250 \text{ cm}^3$  beaker
- $1 \text{ dm}^3$  volumetric flask
- $50 \text{ cm}^3$  burette x 2
- $50 \text{ cm}^3$  volumetric flask x 7
- $1 \text{ cm}^3$  graduated pipette and pipette filler
- $5 \text{ cm}^3$  graduated pipette
- Mortar and pestle
- Paracetamol – Harmful
- $5 \text{ mol dm}^{-3}$  hydrochloric acid – Irritant
- $0.002 \text{ mol dm}^{-3}$  potassium hexacyanoferrate(III) solution
- $0.02 \text{ mol dm}^{-3}$  iron(III) chloride solution
- Deionised water

Describe to students how the volumetric flasks and the pipette need to be cleaned before being used to measure new solutions.

#### Preparation of solutions

To make up the iron(III) chloride and potassium hexacyanoferrate(III) solutions you will need:

- $1 \text{ dm}^3$  volumetric flask x 2
- Concentrated hydrochloric acid – Irritant
- Potassium chloride
- Iron(III) chloride-6-water – Harmful
- Potassium hexacyanoferrate(III)

**$0.02 \text{ mol dm}^{-3}$  iron(III) chloride solution** Weigh out 5.44 g iron(III) chloride-6-water and transfer quantitatively to a  $1 \text{ dm}^3$  volumetric flask. Add about  $100 \text{ cm}^3$  deionised water and swirl the flask to dissolve the solid. Now add  $3 \text{ cm}^3$  of concentrated hydrochloric acid and 10 g of potassium chloride. Again, swirl the contents of the flask to dissolve the potassium chloride before making up to the mark with deionised water.

**$0.002 \text{ mol dm}^{-3}$  potassium hexacyanoferrate(III) solution** Weigh out 0.66 g potassium hexacyanoferrate(III) and transfer quantitatively to a  $1 \text{ dm}^3$  volumetric flask. Add about  $100 \text{ cm}^3$  and swirl the flask to dissolve the solid. Make up to the mark with deionised water.