

Dissolution of paracetamol tablets

Teacher and technician sheet

Health and safety note

Make sure that students wear eye protection. 5 mol dm⁻³ hydrochloric acid is an irritant.

Equipment and materials

Each student or pair of students will require:

For the dissolution

- 1 dm³ beaker
- 1 cm³ pipette (or plastic syringe)
- 1 dm³ measuring cylinder
- Paddle stirrer
- 500 mg paracetamol tablet – Harmful
- Stopwatch
- For extension work (optional):
 - paracetamol capsule – Harmful
 - dispersible paracetamol – Harmful
 - various buffer solutions to mimic pH found in different regions of the gastrointestinal tract
 -

For the colorimetric analysis

- Calibration graph for the colorimetric determination of paracetamol (see *Colorimetric analysis of paracetamol*)
- Colorimeter and suitable filter
- 5 cm³ pipettes*
- 100 cm³ volumetric flasks*
- 0.02 mol dm⁻³ iron(III) chloride solution
- 0.002 mol dm⁻³ potassium hexacyanoferrate(III) solution
- 5 mol dm⁻³ hydrochloric acid – Irritant

* eleven volumetric flasks and pipettes are needed, but one of each may be used if they are thoroughly washed out between analyses

** measuring cylinders could be used; they are less accurate than volumetric flasks, but perfectly fine for comparing, for example, a tablet with a capsule (where the rate of dissolution is quite different)

Describe or demonstrate 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 dm³ volumetric flask x 2
- Concentrated hydrochloric acid – Corrosive
- Potassium chloride
- Iron(III) chloride-6-water – Harmful
- Potassium hexacyanoferrate(III)

0.02 mol dm⁻³ iron(III) chloride solution Weigh out 5.44 g iron(III) chloride-6-water and transfer quantitatively to a 1 dm³ volumetric flask. Add about 100 cm³ deionised water and swirl the flask to dissolve the solid. Now add 3 cm³ 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 mol dm⁻³ potassium hexacyanoferrate(III) solution Weigh out 0.66 g potassium hexacyanoferrate(III) and transfer quantitatively to a 1 dm³ volumetric flask. Add about 100 cm³ deionised water and swirl the flask to dissolve the solid. Make up to the mark with deionised water.