

Rate of hydrolysis of aspirin

Teacher and technician sheet

Health and safety note

Make sure that students wear eye protection.

Equipment and materials

Each student or pair of students will require:

- Colorimeter and suitable filter (green/yellow); a solution of the complex displays maximum absorption at 562 nm.
- Thermometer
- Colorimeter cuvette, able to hold 6 cm³
- 5 cm³ and 1 cm³ pipettes or syringes
- 100 cm³ conical flask
- Powdered aspirin (2-ethanoyloxybenzoic acid); do not use a powdered aspirin tablet – Harmful
- 0.025 mol dm⁻³ iron(III) nitrate solution (50 cm³ required for ten samples)
- pH 7.5 buffer solution (100 cm³)
- Magnetic stirrer-hotplate and flea

Preparation of solutions

0.025 mol dm⁻³ iron(III) nitrate solution Weigh out 10.1 g iron(III) nitrate-9-water (Oxidising, Irritant) 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. Each student needs less than 50 cm³ of solution.

Possible extension ideas

The same method may be adapted to investigate the effects of pH and temperature on the rate of hydrolysis.

If the effect of temperature is being investigated, use a hot water bath and be sure the temperature of the deionised water has reached the required temperature and remains constant before adding the powdered aspirin.

If using a buffer, be sure that pH is measured.

The time intervals for sampling will depend on the pH of the aspirin solution and its temperature. Under some conditions the time intervals might be hours over days rather than minutes over hours. Some initial trials may be needed.