

OCR (A) Biology GCSE

PAG 04: Enzyme-Controlled Reactions Practical Notes



Enzyme-Controlled Reactions

Aim

Investigate the rate of enzyme-controlled reactions using catalase.

Equipment

- Hydrogen peroxide
- Syringe
- Distilled water
- Delivery tube
- Marker
- Trough
- Potato
- Cork borer
- Scalpel
- Stopwatch
- White tile
- Boiling tube rack
- Measuring cylinder
- Conical flask

Method

1. Label 5 boiling tubes: 100%, 80%, 60%, 40%, 20%
2. Make a simple dilution of hydrogen peroxide according to the chart below.
3. Set up the measuring cylinder, trough, delivery tube, and conical flask. Make sure the measuring cylinder is full of water.
4. Using the cork borer, cut out 5 potato cylinders and trim to equal lengths of 50 mm. Make sure that any potato skin is removed.
5. Drop one piece of potato into the conical flask containing 100% hydrogen peroxide. Make sure the apparatus is airtight by fixing the bung firmly in place, and start timing immediately.
6. After 5 minutes, read off the measuring cylinder to record the volume of oxygen released in 5 minutes. Record in a table as seen below.
7. Calculate the rate of reaction using the formula:
$$\text{rate of reaction (cm}^3 \text{ min}^{-1}\text{)} = \text{volume of oxygen released (cm}^3\text{)} / 5 \text{ (min)}$$
8. Rinse out the conical flask and repeat steps 1-7 with the other concentrations of hydrogen peroxide.
9. Plot your results on a graph of 'concentration of hydrogen peroxide' against 'rate of reaction'. Pay attention to the shape of your resulting graph.



Hydrogen peroxide concentration (%)	Volume of water (ml)	Volume of 20 vol. hydrogen peroxide (ml)
100	0.0	10.0
80	2.0	8.0
60	4.0	6.0
40	6.0	4.0
20	8.0	2.0
0	10.0	0.0

Image: ocr.org.uk

Concentration of Hydrogen Peroxide (%)	Volume of oxygen released in 5 minutes (cm ³)	Rate of reaction (cm ³ min ⁻¹)

Controlled variables

- Temperature
- pH
- Time for gas collection
- Length of potato cylinder

Risk Assessment

Hydrogen peroxide is an irritant, wear safety goggles when handling and avoid contact with skin. Take care when handling the sharp cork borer and scalpel.

