Following the course of an enzyme-catalyzed reaction, using catalase

Safety

**CLASS SET**

The normal safety precautions associated with the use of chemicals apply. Hydrogen peroxide solution can bleach clothing or skin and cause burns. Spillages should be washed off immediately using plenty of water.

Apparatus and materials

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| • 150mL conical flask• Stopper to fit flask, with rubber tube • 2mL syringe• 25mL graduated cylinder• 50mL graduated cylinder | • plastic bucket• stopwatch• 50mL of 2.5M hydrogen peroxide solution• active suspensions of yeast cells (1% and 5%) |

Introduction

In this practical, you will follow the course of the reaction using an active suspension of yeast as a source of catalase. The enzyme catalase breaks down hydrogen peroxide into oxygen and water.

The oxygen produced through the reaction can be collected and measured to provide quantitative data about the reaction.



Procedure

1. Fill a plastic bucket with water. Fill the 50 mL graduated cylinder with water and invert it (Ensure that the gas collection test tube begins full of water.). This graduated cylinder will be the gas collection tube. The gas collection test tube can be steadied by leaning it against the bucket.
2. Place the end of the rubber tube under the opening of the gas collection test tube, as shown in the picture.
3. Using the 25mL measuring cylinder, transfer 20.0mL of hydrogen peroxide solution into the conical flask.
4. Using the 2mL syringe, add 2.0mL of 1% yeast suspension to the flask. **Immediately connect the delivery tube to the gas syringe using the rubber tubing.**
5. Start the stopwatch and record the volume of oxygen collected in the syringe **every 15 seconds for 5 minutes**, using a suitable table.
6. Repeat steps 1–4 using the 5% yeast suspension. Record your results.
7. **Plot a graph of the volume of oxygen collected against time, for both concentrations of yeast suspension, using the same axes for the two curves.**
8. **Describe and explain the shapes of the curves, and the reasons for the differences between them.**