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The Galaxy School

**Biology Practical**

**Enzyme immobilization**

Prepare following solutions using distilled water:

50 cm3 of 4% Sodium alginate solution.

50 cm3 of 5% yeast solution.

100 cm3 of 1.4% CaCl2

Proceed as follows:

1. Put 10 cm3 of **CaCl2** into a large test-tube labeled C.

2. Put 5 cm3 of **Sodium alginate** into a small beaker labeled S.

3. Put 3 cm3 of **yeast solution-P** into the same beaker and mix well.

4. Use a 5 cm3 syringe to collect 2 cm3 of the mixture, **Sodium alginate S** and **yeast solution P**.

5. Suspend the 5 cm3 syringe over the large test-tube containing **C** as shown in Fig. 1.1.



6. Gently press down on the plunger of the 5 cm3 syringe with your thumb to release a drop into solution **C**. The drop should form a bead.

7. Repeat step 6 to make the number of beads that you think you will need.

8. Tip the contents of the large test-tube into a Petri dish or shallow container.

**(a) (i)** Decide on the concentrations of hydrogen peroxide you will use in your investigation.

You will need to make up 10 cm3 of each hydrogen peroxide concentration.

Prepare the space below to show

• the concentrations of hydrogen peroxide

• the volumes of hydrogen peroxide

• the volumes of distilled water.

|  |  |  |
| --- | --- | --- |
| Concentration of H2O2  Unit \_\_\_\_\_\_\_\_ | Volume of H2O2  Unit \_\_\_\_\_\_\_\_ | volumes of distilled water  Unit \_\_\_\_\_\_\_\_\_\_\_ |
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9. Put 10 cm3 of H2O2 into a small test-tube labeled H in a test-tube rack.

10. Pick up a bead using blunt forceps.

11. Drop the bead into **H** and immediately start the stop clock, stop watch or note the time on a clock.

12. Record the time taken for the bead to reach the surface.

13. Repeat steps 9 to 12 with each concentration of **H** that you have chosen to use.

(A bead may sink to the bottom of the tube. If it does not rise to the surface after three minutes, stop the experiment and record >3 minutes.)

**(ii)** Prepare the space below to record your results.

**(iii)** Identify **three** significant errors in your investigation.

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**(iv)** Suggest how you would make **three** improvements to this investigation.

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A student investigated the evolution of oxygen during the breakdown of hydrogen peroxide. Immediately the catalase and the hydrogen peroxide were mixed, a stop clock was started and the volume of oxygen released in each minute for five minutes was recorded.

The student’s results are shown in Table 1.1.



Table 1.1

**(b) (i)** Plot a graph of the data shown in Table 1.1in an excel sheet.

**(ii)** Describe and explain the results of the student’s investigation.

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