

Name _____ Date _____ Period _____

Partner(s) _____

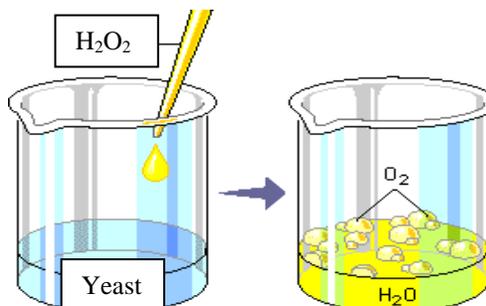
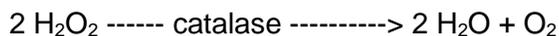
Enzymes in Living Organisms Lab

Problem/Purpose:

Hypothesis:

Background:

Enzymes are very important in living organisms where they control nearly all chemical reactions. Hydrogen peroxide (H_2O_2) is a poisonous byproduct of metabolism that can damage cells if it is not removed. Catalase is an enzyme that speeds up the breakdown of hydrogen peroxide into water (H_2O) and oxygen gas (O_2).



REMEMBER: A CATALYST is a substance that lowers the activation energy required for a chemical reaction, and therefore increases the rate of the reaction without being used up in the process. CATALASE is an enzyme, a biological (organic) catalyst that is found in all cells. Hydrogen peroxide is the substrate for catalase.

Materials:

- Yeast solution
- 4 test tubes
- Graduated cylinder
- 1 bottle of hydrogen peroxide (H_2O_2)
- Hydrochloric acid (HCl)
- Hot water bath
- Ice bath

Safety:

- Wear goggles at all times during lab.
- When heating test tubes in hot water bath, face the open-end of the test tubes away from yourself and others.
- Hydrochloric acid is corrosive. Rinse with water and inform your teacher if your skin comes into contact with the acid.



Procedure:

1. In test tube rack, place 4 test tubes in a row.
2. Measure 5ml of yeast solution and pour into each test tube.
3. Test tube A - no treatment: it is the control.
Test tube B - heat treatment: carefully place test tube into hot water bath for 10 minutes.
Test tube C - cold treatment: carefully place test tube into ice bath for 10 minutes.
Test tube D - acid treatment: carefully pour 2ml of HCl into the test tube and stir gently. Place test tube into rack. Wait at least 10 minutes.
4. After all samples have been treated and returned to the test tube rack then quickly place equal amounts of H_2O_2 (1 full dropper) into each of the test tubes.
5. Compare the chemical reactions of catalase and record on chart.

Data and Observations:

Make a chart that ranks the amount of catalase action in all 4 test tubes. Use a number scale:

0-no reaction to 5-most reaction.

Make observations of reactions.

DATA CHART

Results:

Post-lab Questions: ANSWER ALL QUESTIONS IN COMPLETE SENTENCES.

1. The enzyme catalase will break down which molecule?

2. What happened to indicate a reaction?

3. How does heat affect the enzyme **activity** in the lab? _____

Explain what happens to an enzyme when heated. _____

4. How does acid affect the enzyme **activity** in the lab? _____

Explain what happens to an enzyme when the pH is changed. _____

5. Which test tube showed the most reaction? _____

Why? _____

6. What are the bubbles composed of?

7. Do the results of the reaction indicate a physical or chemical change?

Explain. _____
