Name Date Class

DESIGN YOUR OWN BioLab

Does temperature affect an enzyme reaction?

Chapter 6

PREPARATION

Problem

Does the enzyme peroxidase work in cold temperatures? Does peroxidase work better at higher temperatures? Does peroxidase work after being frozen or boiled?

Hypotheses

Make a hypothesis regarding how you think temperature will affect the rate at which the enzyme peroxidase breaks down hydrogen peroxide. Consider both low and high temperatures.

Objectives

In this BioLab, you will:

- **Observe** the activity of an enzyme.
- **Compare** the activity of the enzyme at various temperatures.

Possible Materials

clock or timer
400-mL beaker
kitchen knife
tongs or large forceps
5-mm thick potato slices
3% hydrogen peroxide
ice
hot plate
waxed paper
thermometer

Safety Precautions

Be sure to wash your hands before and after handling the lab materials. Always wear goggles in the lab.

Skill Handbook

Use the **Skill Handbook** if you need additional help with this lab.

PLAN THE EXPERIMENT

1. Decide on a way to test your group's hypothesis. Keep the available materials in mind.
2. When testing the activity of the enzyme at a certain temperature, consider the length of time it will take for the potato to reach that temperature, and how the temperature will be measured.
3. To test for peroxidase activity, add 1 drop of hydrogen peroxide to the potato slice and observe what happens.
4. When heating a thin potato slice, first place it in a small amount of water in a beaker. Then heat the beaker slowly so that the temperature of the water and the temperature of the slice are always the same. Try to make observations at several temperatures between 10°C and 100°C.

Check the Plan

Discuss the following points with other groups to decide on the final procedure for your experiment.

1. What data will you collect? How will you record them?
2. What factors should be controlled?
3. What temperatures will you test?
4. How will you achieve those temperatures?
5. ***Make sure your teacher has approved your experimental plan before you proceed further.***
6. Carry out your experiment. **CAUTION:** ***Be careful with chemicals and heat. Hydrogen peroxide is a skin and eye irritant. Wash your hands after the lab.***
7. **Cleanup and Disposal** Follow your teacher's insructions.

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Does temperature affect an enzyme reaction?, *continued*

Analyze and Conclude

1. **Identify Effects** Describe your observations of the effects of peroxidase on hydrogen peroxide.

2. **Checking Your Hypothesis** Do your data support or reject your hypothesis? Explain your results.

3. **Analyzing Data** At what temperature did peroxidase work best?

4. **Recognizing Cause and Effect** If you've ever used hydrogen peroxide as an antiseptic to treat a cut or scrape, you know that it foams as soon as it touches an open wound. How can you account for this observation?

5. **Error Analysis** What factors did you need to control in your tests? What might have caused errors in your results?