

# Peroxidase Enzyme Activity

## Opportunities for Inquiry

1. Consider the following questions while reflecting upon your knowledge of enzyme structure, reaction rates, and how interactions among proteins as well as biotic and abiotic factors may influence the rate of an enzyme-catalyzed reaction.
  - a. What evidence from the effect of enzyme concentration on the reaction rate supports a dynamic theory for biological reactions?
  - b. Does the substrate concentration influence the rate of the reaction?
  - c. How might a model of enzyme–substrate binding be reflected in the shape of the curve for substrate concentration versus reaction rate?
  - d. Does enzyme activity depend on pH? Is there an optimum pH for the reaction?
  - e. How does the pH profile for an enzymatic reaction demonstrate the acidic and basic properties of proteins and enzymes?
  - f. Do metal ions activate or inhibit the rate of enzyme-catalyzed decomposition of hydrogen peroxide?
  - g. What factors might predict the effect of temperature on the rate of an enzyme-catalyzed reaction?
  - b. Do peroxidase enzymes from different vegetables have similar activity?
2. Plan, discuss, execute, and evaluate an experiment to test a question regarding the rate of an enzyme-catalyzed reaction and the model of enzyme activity.
  - a. Decide upon one question that your group would like to explore.
  - b. Develop a testable hypothesis.
  - c. Discuss and design a controlled experiment to test the hypothesis.
  - d. List any safety concerns and the precautions that will be implemented to keep yourself, your classmates, and your instructor safe during the experiment.
  - e. Determine what and how you will collect and record the data.
  - f. How will you analyze the data to test your hypothesis?
  - g. Review your hypothesis, safety precautions, procedure, data tables, and proposed analysis with your instructor prior to beginning the experiment.
  - b. Once the experiment is complete, analyze the data and evaluate whether the experimental evidence supports, refutes or provides no information concerning the hypothesis.
  - i. Explain the results in terms of the mechanism of enzyme action, structure–function relationships involving proteins, and metabolic control of biological reactions.
  - j. Make suggestions for additional experiments to modify or revise the hypothesis.