

The effect of Substrate Temperature on Enzyme Activity

Background Information:

The enzyme catalase is found in the cells of living organisms. Catalase breaks poisonous hydrogen peroxide into harmless water and oxygen gas. Catalase is readily available in blood. A good source of this is fresh liver.

Problem: Does substrate temperature affect the relative activity of the enzyme catalase?

Hypothesis: _____

Aim: To observe how substrate temperature affects the relative activity of the enzyme catalase.

Materials: 7 test tubes, hydrogen peroxide solution (6%), hot plate, beaker, ice, liver tissue, scalpels, thermometer, safety glasses, gloves, marker pen.

Method:

1. Set up five experimental test tubes as outlined below.
2. Use ice cubes to set the temperature of the hydrogen peroxide in test tube A before adding the liver.
3. Use a water bath to set the temperature of the hydrogen peroxide in test tubes C, D and E, before the liver is added.
4. Determine the enzyme activity by measuring the height of the oxygen bubbles in each test tube.
5. Record your results in a table.
6. Plot your results on a graph.

Test Tube A 5°C	Test Tube B 20°C (air temperature)	Test Tube C 35°C	Test Tube D 50°C	Test Tube E 65°C
2ml hydrogen peroxide + liver	2ml hydrogen peroxide + liver	2ml hydrogen peroxide + liver	2ml hydrogen peroxide + liver	2ml hydrogen peroxide + liver

7. Transfer the liver tissue from test tube A (5°C) and test tube E (65°C) into fresh hydrogen peroxide.
8. Write an observation of what happens.