

Enzyme function lab essay sample

[Science](#), [Chemistry](#)



Part one

1. a) When hydrogen peroxide was added to manganese, tiny bubbles formed in the solution- intensity of (1).

b)The solution did not change in temperature.

c) The bubbles stopped forming after about 18 minutes.

2. After we added 2 more mL of hydrogen peroxide, the reaction occurred again. Again, small bubbles formed; intensity of (1). The solution did not change in temperature. The reaction lasted about 15 minutes.

3. After adding more manganese dioxide, the reaction occurred again. This time, the bubbles being formed were larger; intensity of (4). The solution got a little warmer, but the difference in temperature was hardly distinguishable by simply touching the test tube. The reaction lasted about 10 minutes.

4. a) The hydrogen peroxide is used up and the manganese dioxide remains unchanged.

Part two

Title: Enzyme Function

Purpose: To observe the role of enzymes in chemical reactions and to determine the kinds of cells that contain more of the enzyme catalase.

Prior Knowledge:

Enzymes are proteins that assist the chemical reactions of a cell by lowering the amount of activation energy needed to start the reactions, thereby enabling the cell to carry out the reactions at a faster rate; enzymes that lower the activation energy are therefore called catalysts. Moreover, the enzyme itself is not destroyed in the process. Hydrogen peroxide is a substrate broken down into oxygen and water by the enzyme catalase. Sand and chalk are nonliving, so they do not have catalysts. Spinach and potatoes have enzymes to help speed up chemosynthesis and create a byproduct of hydrogen peroxide. Ground beef and cooked liver both have a high amount of enzymes because they are found in heterotrophic living organisms.

Hypothesis/predictions

We thought that the level of intensity and heat in the different test tubes would go in this order from greatest to least: raw liver, raw hamburger, boiled liver, potato, spinach leaf, chalk, and finally sand.

We based our hypothesis on the idea that living things have enzymes to speed up chemical reactions. The raw liver and hamburger would have the most since they were the ones that were least altered from a living thing.

The boiled liver was next since heat can distort enzymes, and if too many enzymes had their shapes changed by heat, they would not be able to break down the hydrogen peroxide as efficiently, or not at all. Next came the 2 plants.

We predicted chalk and sand to be the least reactive, since they are nonliving and probably have very few to no enzymes to break down the hydrogen peroxide.

Results:

Intensity (scale of 0-10 with 10 being very intense)

Thermal/ heat give off

Time/ duration

Manganese

Tiny bubbles formed in the solution- intensity of (1).

The solution became 5% warmer.

The bubbles stopped forming after about 18 min.

Spinach leaf

Tiny bubbles formed in the solution- intensity of (2).

The solution did not change in temperature.

The bubbles stopped forming after about 5 min.

Raw liver

The solution started fizzing- intensity of (10).

The solution became 60% warmer.

The solution stopped fizzing after about 1 min.

Cooked liver

Bubbles formed in the solution- intensity of (6).

The solution did not change in temperature.

The bubbles stopped forming after about 2½ min.

Ground Beef

Bubbles formed in the solution- intensity of (4).

The solution did not change in temperature.

The bubbles stopped forming after about 8 min.

Potato

Bubble formed in the solution- intensity of (4).

The solution did not change in temperature.

The bubbles stopped forming after about 5 min.

Chalk

Hardly any bubbles formed in the solution- intensity of (0. 5).

The solution did not change in temperature.

The bubbles stopped forming after about 4 min.

Sand

There was no chemical reaction- intensity of (0).

The solution did not change in temperature.

No chemical reaction was observed.

Conclusion/Discussion

The results for each substance generally supported our hypothesis. Raw liver had the quickest and most intense reaction because of the abundance of catalysts present due to the fact that it came from a living thing. The sand and chalk had no reaction because they are nonliving. There are no enzymes in sand or chalk so no chemical reaction with hydrogen peroxide can take place. The cooked meat did not have as great a reaction as the raw meat because when it's cooked, cellular respiration takes place, producing hydrogen peroxide as a byproduct. A large portion of the chemical reaction had already occurred so when we tried to make the reaction take place again, it was of a much less intensity. The autotrophic substances had a medium sized reaction because they have catalysts in order to complete chemosynthesis. Because hydrogen peroxide is a byproduct of chemosynthesis, they will have a minor reaction to the hydrogen peroxide we introduce to them. The reactions were exergonic, and released energy in the form of heat, thermal energy. When it's cooked, cellular respiration takes place, producing hydrogen peroxide as a byproduct