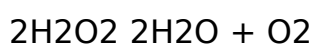


Potato enzyme lab essay sample



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An enzyme is a protein that speeds up or slows down a specific chemical reaction in an organism. A good rule of thumb is to remember that enzyme names end in “-ase”. This will help in identifying enzymes in further readings. Generally enzymes are catalysts. Hydrogen peroxide is a toxic chemical that is produced in many organisms during metabolism. Organisms must get rid of this toxin to survive. One reaction turns the hydrogen peroxide into water and oxygen. The enzyme that helps with this reaction is called catalase. This is found in both plants and animals. In this lab we will use potatoes as our catalase source. The reaction equation is: Catalase



Additional Information that May Help: “ Hydrogen peroxide bubbles when it comes into contact with an enzyme called catalase. Most cells in the body contain catalase, so when the tissue is damaged the enzyme is released and becomes available to react with the peroxide. Catalase allows hydrogen peroxide (H₂O₂) to be broken down into water (H₂O) and oxygen (O₂). The bubbles you see when you pour oxygen on a cut are bubbles of oxygen gas. Blood, cells, and some bacteria (e. g., staphylococcus) contain catalase, but it is not found on the surface of your skin so pouring peroxide on unbroken skin will not cause bubbles to form. Also, because it is so reactive, hydrogen peroxide has a shelf life once it has been opened, so if you don’t see bubbles form when peroxide is applied to an infected wound or bloody cut, there is a chance your peroxide is no longer active.” [http://chemistry. about. com/od/medicalhealth/f/Why-Does-Hydrogen-Peroxide-Bubble-On-A-Wound. htm](http://chemistry.about.com/od/medicalhealth/f/Why-Does-Hydrogen-Peroxide-Bubble-On-A-Wound.htm) Background:

- * What is an enzyme? A catalyst? A chemical reaction? A metabolism?
- * What is hydrogen peroxide?
- * Where is catalase found?
- * When is catalase released?
- * What are the bubbles evidence of? What are the bubbles made of?
- * What can happen to the enzymes when you heat/cook potatoes, plants, animals?

PURPOSE

1. Observe the breakdown of hydrogen peroxide toxin by potato's enzyme catalase. 2. Determine factors that influence how quickly the reaction takes place. 3. Determine factors that influence how well enzymes function. 4. Use graphic analysis (graphing) to analyze our results. (Use points 1-3 above to write your own purpose)

PRELAB QUESTIONS

1. Read the purpose and the procedure. After having read these what is the dependent and independent variable in the experiment? Independent Variable: State of the potato (diced, ground, cooked) Dependent Variable: Reaction time/speed, amount of bubbles.

2. What test tube is the control group? Why?

The test tube with the sand because it is not living and does not contain an enzyme in it. 3. Formulate an If/then hypothesis. Remember if/then

hypothesis always follow the same form of if the _____ (dependent variable) is related to the _____ (independent variable) in _____ way, then given _____ (condition) I predict _____ (outcome). If the

reaction time is related to the state of the potato, the amount of bubbles will be an indicator of the enzyme catalyzing the hydrogen peroxide break down. If the potato is cooked, then there will be no reaction because the enzymes were denatured when the potato was heated. If the potato is diced, then there will be a reaction; it will be slower because there is less surface area and less tissue broken compared to the ground potato. If the potato is ground, then there will be a significant reaction because many tissue cells in the potato were broken and there is greater surface area for the chemical reaction with hydrogen peroxide to break down. 4. What is the point of adding sand to test tube one?

To ensure that hydrogen peroxide doesn't react with the container it is in and doesn't react with non living things. Materials: 4 test tubes, test tube rack, graduated cylinder, hydrogen peroxide, potato (ground, diced, diced and cooked), sand, timer (You can copy this exactly) PROCEDURE (You can copy this exactly- attach your comic strip) 1. Mark test tubes 1-4.

2. Fill each test tube with 5mL hydrogen peroxide.
3. Make initial observations of test tube one.
4. Add a pinch of sand to test tube one.
5. Observe and record observations.
6. Obtain about 1g ground potato. To grind the potato use a mortar and pestle and a pinch of sand. Record the exact mass and add it to test tube 2.
7. Time how long it takes for the reaction to take place. You'll know the reaction is taking place because bubbles are made.
8. Obtain about 1g of diced potato. Record the exact mass and add it to test tube 3.
9. Time how long it takes for the reaction to take place. You'll know the reaction is taking

place because bubbles are made. 10. Obtain about 1g of cooked potato. Record the exact mass and add it to test tube 4. 11. Time how long it takes for the reaction to take place. You'll know the reaction is taking place because bubbles are made. DATA AND OBSERVATIONS (Copy this exact table into the lab)

DATA ANALYSIS

1. Calculate a rate of reaction per gram of potato for each trial. Rate = time/grams 2. Graph the data. Include a title, labels, units, and a key. Type of graph: bar/column graph

Conclusion: use complete sentences. Each of the following answers MUST include the word “ because” This begins the analysis section of the lab report.

1. Summarize and explain the results.

You can use your own data or another groups' data, but explain what is shown in the graph and tables. 2. Did you support or refute your hypothesis? Why? What data leads you to that conclusion? The evidence shows....

The results indicate....

From the data it can be concluded...

3. What did the catalase do? How do you know?

The catalase triggered the chemical reaction and breakdown of hydrogen peroxide into water and oxygen. The bubbles were evidence as well as the products of the chemical reaction.

4. What did grinding the potato up do to the rate? Why did this change the rate? Grinding the potato caused the chemical reaction to begin- the tissue

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of the potato was broken and the enzymes could reach and react with hydrogen peroxide. Grinding the potato also increased the surface area and therefore the rate of the chemical reaction. 5. What did cooking the potato do to the rate? What conclusion can you draw about that result? Cooking the potato slowed down the chemical reaction because the enzyme and other proteins that catalyze this reaction were denatured- or killed, destroyed, broken apart, not viable, don't work as they should.

Potential Errors: (Analysis Section)

Cooked potato not cooked enough

Errors in timing depending on recognizing bubble formation

Started timer only when you saw the first bubbles; started timing when potato was put in and stopped timing when we saw bubbles. Old hydrogen peroxide (already separated into water and oxygen) Potato not ground well- didn't break enough tissue to release enzyme

Conclusion:

* Hypothesis proven or not (1 sentence)

* Future experiments dealing with hydrogen peroxide and catalase in living organisms (plants, animals, bacteria)