

BIOLOGY LAB: CATALASE

Observing an Enzyme

INTRODUCTION:

What would happen to your cells if they made a poisonous chemical? You might think that they would die. In fact, your cells are always making poisonous chemicals. They do not die because your cells use enzymes to break down these poisonous chemicals into harmless substances. **Enzymes** are proteins that speed up the rate of reactions that would otherwise happen more slowly. The enzyme is not altered by the reaction. You have hundreds of different enzymes in each of your cells. Each of these enzymes is responsible for one particular reaction that occurs in the cell.

In this lab, you will study an enzyme that is found in the cells of many living tissues. The name of the enzyme is catalase (KAT-uh-LAYSS); it speeds up a reaction which breaks down **hydrogen peroxide**, a toxic chemical, into 2 harmless substances--**water and oxygen**. The reaction is as follows:



This reaction is important to cells because hydrogen peroxide (H_2O_2) is produced as a byproduct of many normal cellular reactions. If the cells did not break down the hydrogen peroxide, toxic levels would accumulate and destroy the cell.

In this lab, you will study the catalase found in beef or chicken liver cells. Even though catalase is an enzyme found in many cells, it is found in high levels in liver cells because the liver often functions to break down toxins present in the blood. It might seem strange to use dead cells to study the function of enzymes. This is possible because when a cell dies, the enzymes remain intact and active for several weeks, as long as the tissue is kept refrigerated.

PRELAB REVIEW:

Recall that the substrate is the molecule that the enzyme acts on, the products are the molecules produced by the reaction and enzymes are "reusable."

Under certain conditions enzymes are **denatured**. An enzyme is denatured when the protein molecule loses its proper 3-dimensional shape and can no longer function. Some things that can denature an enzyme are high temperatures, extremes of pH, heavy metals, and alcohol.

MATERIALS:

- *8 Test tubes
- *10-ml Graduated cylinder
- *Fresh liver, chicken meat, and Potato
- *3% Hydrogen peroxide solution
- *Distilled water
- *Stirring rod

- *Test Tube rack
- *Tweezers
- *Waste cup
- *1 Beaker (to hold test tubes)
- *Petri dish

FOR THE CLASS:

- *Thermometers
- *Ice water bath (0°C)
- *water bath #1 (36°C)
- *water bath #2 (80°C)
- *Boiling water bath (100°C)

PROCEDURE:

****You are responsible for cleaning your group's lab supplies, lab table, and sink. Liquids may be poured down the sink, but solids (ex: potato cells, apple cells, paper towels) must be thrown away in the trash!!!****

Part I

Setting up the control.

NOTE: Be sure to clean your stirring rod (and test tubes) between steps.

1. Place 1 dropper full of liquid liver into a clean test tube.
2. Place **2 ml** of the 3% hydrogen peroxide solution into a graduated cylinder.
3. Add the hydrogen peroxide to the test tube and carefully observe the rate of reaction (how rapidly the solution bubbles/ its speed).
4. Throughout this investigation you will estimate the rate of the reaction (how rapidly the solution bubbles) on a scale of 0-5 (0=no reaction/no bubbles, 1=slow, ..., 5= very fast). **Assume that the reaction in step 3 proceeded at a rate of "4."**

Lab Manual For Biology Enzyme Catalase Activity

Clinton F. Schonberger



Lab Manual For Biology Enzyme Catalase Activity:

The book delves into Lab Manual For Biology Enzyme Catalase Activity. Lab Manual For Biology Enzyme Catalase Activity is a vital topic that must be grasped by everyone, from students and scholars to the general public. This book will furnish comprehensive and in-depth insights into Lab Manual For Biology Enzyme Catalase Activity, encompassing both the fundamentals and more intricate discussions.

1. This book is structured into several chapters, namely:
 - Chapter 1: Introduction to Lab Manual For Biology Enzyme Catalase Activity
 - Chapter 2: Essential Elements of Lab Manual For Biology Enzyme Catalase Activity
 - Chapter 3: Lab Manual For Biology Enzyme Catalase Activity in Everyday Life
 - Chapter 4: Lab Manual For Biology Enzyme Catalase Activity in Specific Contexts
 - Chapter 5: Conclusion
 2. In chapter 1, the author will provide an overview of Lab Manual For Biology Enzyme Catalase Activity. This chapter will explore what Lab Manual For Biology Enzyme Catalase Activity is, why Lab Manual For Biology Enzyme Catalase Activity is vital, and how to effectively learn about Lab Manual For Biology Enzyme Catalase Activity.
 3. In chapter 2, this book will delve into the foundational concepts of Lab Manual For Biology Enzyme Catalase Activity. This chapter will elucidate the essential principles that need to be understood to grasp Lab Manual For Biology Enzyme Catalase Activity in its entirety.
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 5. In chapter 4, the author will scrutinize the relevance of Lab Manual For Biology Enzyme Catalase Activity in specific contexts. The fourth chapter will explore how Lab Manual For Biology Enzyme Catalase Activity is applied in specialized fields, such as education, business, and technology.
 6. In chapter 5, this book will draw a conclusion about Lab Manual For Biology Enzyme Catalase Activity. This chapter will summarize the key points that have been discussed throughout the book.
- The book is crafted in an easy-to-understand language and is complemented by engaging illustrations. This book is highly recommended for anyone seeking to gain a comprehensive understanding of Lab Manual For Biology Enzyme Catalase Activity.

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Table of Contents Lab Manual For Biology Enzyme Catalase Activity

1. Understanding the eBook Lab Manual For Biology Enzyme Catalase Activity
 - The Rise of Digital Reading Lab Manual For Biology Enzyme Catalase Activity
 - Advantages of eBooks Over Traditional Books
2. Identifying Lab Manual For Biology Enzyme Catalase Activity
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Lab Manual For Biology Enzyme Catalase Activity
 - User-Friendly Interface
4. Exploring eBook Recommendations from Lab Manual For Biology Enzyme Catalase Activity
 - Personalized Recommendations
 - Lab Manual For Biology Enzyme Catalase Activity User Reviews and Ratings
 - Lab Manual For Biology Enzyme Catalase Activity and Bestseller Lists
5. Accessing Lab Manual For Biology Enzyme Catalase Activity Free and Paid eBooks
 - Lab Manual For Biology Enzyme Catalase Activity Public Domain eBooks
 - Lab Manual For Biology Enzyme Catalase Activity eBook Subscription Services
 - Lab Manual For Biology Enzyme Catalase Activity Budget-Friendly Options
6. Navigating Lab Manual For Biology Enzyme Catalase Activity eBook Formats
 - ePub, PDF, MOBI, and More
 - Lab Manual For Biology Enzyme Catalase Activity Compatibility with Devices
 - Lab Manual For Biology Enzyme Catalase Activity Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Lab Manual For Biology Enzyme Catalase Activity
 - Highlighting and Note-Taking Lab Manual For Biology Enzyme Catalase Activity
 - Interactive Elements Lab Manual For Biology Enzyme Catalase Activity

8. Staying Engaged with Lab Manual For Biology Enzyme Catalase Activity
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Lab Manual For Biology Enzyme Catalase Activity
9. Balancing eBooks and Physical Books Lab Manual For Biology Enzyme Catalase Activity
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Lab Manual For Biology Enzyme Catalase Activity
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Lab Manual For Biology Enzyme Catalase Activity
 - Setting Reading Goals Lab Manual For Biology Enzyme Catalase Activity
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Lab Manual For Biology Enzyme Catalase Activity
 - Fact-Checking eBook Content of Lab Manual For Biology Enzyme Catalase Activity
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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