Enzyme Lab Report

By

Alex Aitken, Sarah Aitken, Paula Aitken, Tony Aitken

Dyersburg State Community College

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**Fundamental Question**

How can catalase be manipulated?

**Testable Questions**

1. How does enzyme concentration affect catalase reaction rate?

The independent variable (i.v.) is the percentage of enzyme concentration.

The dependent variable (d.v.) is the reaction rate.

The control variable was 0% enzyme concentration.

1. How does substrate concentration affect catalase reaction rate?

The i.v. is the percentage of catalase concentration.

The dependent variable (d.v.) is the reaction rate.

The control variable was 0% substrate concentration.

1. How does pH affect catalase reaction rate?

The i.v. is …

The d.v. is ….

The control was ….

**Background** The emphasis on this report was to discover how an enzyme (catalase) can be manipulated by various factors (*i.e.* pH, temperature, enzyme and substrate concentration). An enzyme is a protein that speeds up chemical reactions (Hoefngales, 2012). Enzymes speed up chemical reactions by lowering activation energy (Aitken *et al. 2018).* Activation energy is …. (Aitken & Ball, 1998).

**Hypothesis:**

If catalase can be affected, then temperature, pH, enzyme and catalase concentrations will be a factor in the reaction rate.

**Protocol:**

*Enzyme Concentration*

Ten milliliter of hydrogen peroxide was pipetted into each solution (see Table A)

Table A: Preparation of Catalase Concentrations.

|  |  |  |
| --- | --- | --- |
| **Catalase Concentration Percentage** | **Amt. of Catalase to add (mL)** | **Amt. of Diluted Buffer to add (mL)** |
| 0 | 0 | 4 |
| 25 | 1 | 3 |
| 50 | 2 | 2 |
| 75 | 3 | 1 |
| 100 | 4 | 0 |

Showcasing how catalase concentrations were derived.

**Data:**

At a 0% enzyme concentration, no reaction was recorded. At a 25% concentration, the reaction rate was recorded at x seconds (see Table 1)

Table 1: Temperature effect on Catalase

|  |  |  |
| --- | --- | --- |
| Temperature | Time (seconds) | Reaction Rate |
| 15°C | 9.0 |  |
| 20°C | 9.85 |  |
| 25°C | 8.74 |  |
| 30°C | 9.25 |  |
| 35°C | 18.14 |  |

The effect of temperature on catalase as 5° intervals.

**Analysis:**

At 0% enzyme concentration, the reaction never occurred after 3 minutes. This concentration served as the control to test for contamination and in addition was expected not to react. If this concentration reacted, then contamination of the substrate was evident (continue onward with analysis section). The reaction occurred faster at 100% enzyme concentration (2.32 seconds) because of more enzyme molecules present to interact with the substrate.

A few possible sources of error include the following: (1) disposable pipettes are not well calibrated (2) ….

**Conclusion:**

Restate you hypothesis and whether it was rejected or failed to be rejected and tell me why (use evidence from data). Provide two more questions or two more suggestions to make this experiment better.

References

Aitken, A. (2018). Enzymes, enzymes everywhere. *Science* 126:14-17.Retrieved fromwww.aaitken.weebly.com.

Author, A. A., & Author, B. B. (Date of publication). Title of article. Title of Online Periodical, volume number(issue number if available). Retrieved from   
 http://www.someaddress.com/full/url/

Harlow, H. F. (1983). Fundamentals for preparing psychology journal articles. Journal of Comparative and Physiological Psychology, 55, 893-896.

Hoef­­­­­nagels, M. (2012). Biology Concepts and Investigations. New York, New York.