

More Writing Guidelines For Biol 201 Lab Papers

Title:

- Use appropriate keywords.
- Be specific, exact, and complete.

The Effects of pH and Temperature on the Activity of Horseradish Peroxidase

Purpose:

Write precisely what the experiment is designed to achieve. For example, in the enzyme paper, the purpose should expand upon the above title, specifying the substrates and the experimental means (colorimetric assay) but without going into protocol details that belong in Methods.

A brief background statement may be included (as typically found in an Introduction), but the scope of the purpose should be more narrow than the scope of the Discussion. Limit the purpose to concrete and measurable goals when possible.

Enzymes are biological catalysts that speed up the rate of a reaction without being consumed in the reaction itself. This experiment demonstrates by colorimetric assay the effects of varying pH and temperature on the activity of the enzyme horseradish peroxidase as it catalyzes the reaction of guaiacol and hydrogen peroxide into tetraguaiacol.

Materials and Methods:

Cite the lab and lab book, and list all changes to the standard procedure. This includes defining which of the variables/experiments your lab group and the class will complete if you (or the class) will not be completing the lab as written.

The procedures of the lab Enzyme Activity (Biology 201 Lab Manual, 1999) were followed with the following changes: our lab group i) measured the activity of the enzyme at standard conditions (pH 6.5, 25 °C), repeating the experiment three times; ii) measured the activity of the enzyme at pH 3.5 (25 °C), repeating the experiment twice. Other lab groups completed the effects of pH by testing pH 4.5 and pH 9.5 at constant temperature (25 °C). The remainder of the class tested the effects of temperature by using 40 °, 60 °, and 90 °C at constant pH (6.5). Note that the class replaced the addition of 0.1 ml of horseradish peroxidase solution with 0.05 ml. We also measured the absorbance at 10 second rather than 20 second intervals.

Tables and Figures

- Captions must stand alone (and are placed properly).
- Units are always used on axis labels.
- One figure per page.
- Use all relevant data (many students left out 25°C value in Enzyme lab).
- Cite figures! An uncited figure will not have context, and may not be seen by a reader.

Results

- Point out general trends. For example:

The turnover number of horseradish peroxidase was greater at 40 °C than at either 25 °C or 60 °C. When temperature was increased to 90 °C, the enzyme showed no activity (Figure 1).

- Cite figures as above. Do not say: The graph shows that the turnover number
- Be accurate and precise. Don't say turnover number decreased with temperature if the enzyme was more active at 40°C than at 25°C.
- Write clearly and concisely. There is no reason to repeat statements with different wording. If there isn't much to say, don't make the Results section longer than it needs to be.
- Rewrite and proofread!

Discussion

The Discussion should address the experiment in a larger context than the Purpose, relying on the trends noted in the Results section to support your statements. Some background information can be useful here, but don't stray too far afield. Once again, writing clearly and concisely is of absolute importance. Be as specific as possible when discussing mechanisms or error. For instance, don't merely state that higher temperatures destroyed the tertiary structure, but mention that at higher temperatures, non-covalent bonds such as hydrogen bonds and hydrophobic interactions are disrupted, leading to loss of tertiary structure. You are expected to understand the processes involved to the degree that your lecture text presents them, and then think on your own. Don't rush the Discussion. Write down what you know at first, read about it, and rewrite later with refreshed and new information. The Discussion is your chance to prove that you are not a robot, but remember this is science, so your thoughts must be logically presented and supported by your data and/or references.