

Laboratory 5

Enzymes

Student Tip Sheet

Introduction

The introduction in Laboratory 5 discusses using heat to stimulate the Energy of Activation. This is true, but please realize that, in addition to heat, changing the pH or the concentration or the time of exposure to the enzyme will also modify the activity of enzymes, as is proven in the following laboratory exercises.

The enzyme–substrate complex can be illustrated by visualizing a lock and key. A particular key will only fit a certain lock and conversely a certain lock has its own particular key. This is the same with an enzyme, the key, and its substrate, the lock.

Remember that many times enzymes end in the suffix –ase. This ending can help you identify the name of the substrate.

Effect of Temperature, Time and Concentration, and pH on Enzyme Activity

These experiments provide you, the student, with a chance to do hands-on demonstrations of enzyme activity. The key to successful experimentation in the lab is to properly label all glassware and materials and to follow the directions precisely. For example, warm does not mean hot nor does 4 cm mean 6 cm. (Do not forget to read from the bottom of the meniscus when measuring using a graduated cylinder or pipette.) Nor does 30 minutes mean 20 or after lunch! You will be shown how your lab instructor has set up the different experiments. Listen carefully and know exactly what you are assigned to do. Do not guess or hesitate to ask questions at the proper time to make certain that you are proceeding correctly. You may be required to do all of the experiments, or your teacher may plan some sort of division of labor to cover all of the activities in a short time. Listen carefully for the instructions. If you are working with a group, follow the leader's instructions. If you are the leader, make certain that everyone has and understands their assignments so that all will proceed as planned.

After you have finished your experiments make certain that you wash your glassware with minimum soap. Too much soap is difficult to rinse completely and can alter some of the experimental results. Rinse your glassware carefully. Return all materials to their original position.

Renin Experiment

- Read these directions before you begin testing. Several preliminary steps are required to prepare all materials for use. Renin must be warmed, refrigerated, and boiled as instructed. Milk must be warmed. Water bath must be at 37 degrees. Test tubes must be marked.
- Use very fresh 2% milk for this test. The milk does not have to be spoiled to give poor results.
- Make certain that you label tubes, etc., very carefully. Test results are meaningless without proper identification
- What is the control portion of this comparative experiment? The “before” becomes the control and the “after” becomes the experimental.

Urease Experiment

- This experiment also requires careful labeling and particular attention to the instructions.
- Use Tube #1 as the control tube for this experiment. The color of the contents will be the base of comparison for the other tubes.
- The purpose of the directions for Tube # 3 is to see the effect of an increase in the concentration of the enzyme. The increase in concentration is achieved by repeating the directions to add additional drops and mix.

Catalase Experiment

- Also in this experiment, read and follow the instructions carefully, labeling properly.
- Remember to peel the potato before you begin.
- Which is the control tube? If you said Tube 1 you are correct. Always have a base of comparison.