

The effect of temperature on the activity of the enzyme catalyst essay sample



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My investigation requires me to investigate how temperature affects the activity of the enzymes in a potato. I will measure the volume of gas produced, catalyse in the potato tissue reacts with the hydrogen peroxide to create water and oxygen. I will change the temperature at which the reaction takes place, but to make the test a fair one I will keep the pH level on the solution, the amount and concentration of the solution, and the area and the volume of the potato the same.

I will have to take into account the concentration of Catalyse in the potato, this cannot be controlled. Catalyse is an enzyme. The purpose of an enzyme is to act as a biological catalyst which speeds up a reaction without being consumed. A catalyst works by reducing the amount of activation energy needed for the reaction to take place. The only variable that I am going to change in this experiment is the temperature of the Hydrogen Peroxide Hi?? Oi??. I will be changing the temperature 6 times.

In order to make it fair I will repeat each experiment and use the average result to analyse the overall experiment. There are many possibilities of variables which I could change in this experiment, For example, the amount of hydrogen peroxide I use, the slices of potatoes and their sizes. To eliminate wastage of substance and to keep cost in mind, I will only be using 10ml of Hydrogen Peroxide, this, I have found out in my preliminary, was adequate for me to get quite good results. The results can be shown in fig 1.

The results shown are suitable and what I would expect from this kind of experiment. For my preliminary work, I was aided by a computer simulator which simulates this experiment so that I could determine what variables I

could change for my experiment so that ultimately, I would have a set of numerical results, that I would be able to compare and analyse. The software I used was very helpful as it helped me decide the number of potatoes that I would use and the time I would allow the enzyme to react.

I also have relative, scientifically accurate preliminary results which signal that my experiment would be quite successful and I was able to determine a hypothesis using my preliminary results and background knowledge. I followed the preliminary experiment with an actual experiment which was also preliminary. In this experiment, I was able to determine the successes of the computer aided simulator by testing out what I have decided to do. Here are the results and my analysis of my preliminary results.

The first variable I investigated was the time to allow the chemical reaction to take place. I used 5 slices of potatoes and tested each at temperatures ranging from 10 Degrees Celsius going up 5 Degrees Celsius respectively until it reached 60 Degrees Celsius. I collected results from the simulator for 1 minute, 5 minutes and 10 minutes. My results can be shown in fig. 1. After analysing my result, I came to the conclusion all three times of collection was adequate for the experiment in question.

Therefore I decided to use 5 minutes, as it is in the middle, and the results that were collected were more evenly spread out. Gases can be measured in 3 ways; mass lost, into a syringe or under water, my practical preliminary saw successes using the gas syringe. Therefore it is what I would use. From my research, I have found out that Enzymes may work faster if the temperature within the cell increases as the molecules travel faster as it

heats up, but if the temperature increases too much, the living cell may die and they may breakdown called denaturation.

The most effective time when an enzyme works is called the optimum temperature which is 36 degrees Celsius, usually, the optimum temperatures for enzymes in living cells are close to the normal cell temperature.

Reactions occur when particles collide with enough energy (activation energy) as the temperature becomes higher the particles move faster around and collide to cause the chemical reaction. Enzymes are protein molecules produced by living cells. Catalyse is an enzyme found within living cells of organisms. It chemically processes the breakdown of hydrogen peroxide into water and oxygen.