

Effects of temperature on enzyme amylase



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Introduction

Enzymatic reactions are very paramount in the body and in nature too as they ensure that any reactions including Biological processes are hastened in order to achieve the results within the shortest time possible. In the body, there are many enzymes and enzyme amylase is one of the most significant as it aids in degradation of complex carbohydrates into glucose molecules which are absorbable. Apart from natural salivary amylase, there are also industrial amylases which catalyze processes at different ecological environment varying from the body environments. However, whether natural or synthetic amylase, their catalysis is affected by temperatures and they only yield maximally at optimal temperature. The following report will discuss effects of different range of temperatures on synthetic reactions.

Aims

The aims of this practical were to investigate the effects of temperature on reaction of enzyme amylase. In addition, the practical investigated the possibility of industrial enzyme amylase to function at higher temperatures.

Materials

The materials and apparatus used included Spotting tile, water bath, test tube, starch solution amylase, iodine, and test tube rack.

Procedure

Two drops of iodine into each well put test tube. 2ml starch placed over water bath that was set at three different temperatures 40, 60, 80 degrees was allowed to remain there for 5 minutes. First tube contained 2ml of starch, second tube 4ml of amylase, and then they were mixed together.

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Finally, was introduced into few drops of the mixture into the well already containing iodine

Results

The results obtained indicated that industrial amylase functioned well at 40 degree Celsius. Starch was degraded into glucose hence the color of Iodine changed to blue-black when the test tube containing amylase at 40 degree Celsius. However, the color of iodine remained brown after introduction of amylase enzymes heated at 60 and 80 degree respectively.

Discussion

Amylase whether natural or industrial is proteins in nature. They are responsible for the breakdown of carbohydrates into its smallest units called glucose. However, temperature has a very significant role in the reactions involving these enzymes . Lower temperatures deactivate the reaction of enzymes while higher temperatures above optimal temperatures destroy the enzymes by denaturing them hence reducing their reactions and eventually bring it into a halt .

In this practical, the industrial amylase was found to function better at 40 degree which is optimal. This therefore did not denature the enzymes nor did this temperature deactivate them. The reactions here were constant and rapid. The enzyme amylase was able to work on starch solution in the well whereby it reduced the starch into glucose. Eventually, the color of resulting iodine remained brown. This indicated that there was no starch present in the solution. Iodine is the reagent that is commonly used to test the

presence of starch in a food sample. Presence of starch is portrayed by the change of Iodine color from brown to blue-black

Consequently, the amylase heated at 60 and introduced in other wells containing starch did not catalyze any reaction. This is because the high temperatures had already denatured the enzymes and completely destroying them. This led to changes in the color of iodine from brown to blue-black since the solutions contained starch. On the other hand, the reaction at 80 degree too did not show signify degradation of starch by enzyme amylase. Therefore, the color of iodine changed to blue-black from brown as it was evident in previous reaction at 60 degree. This therefore confirmed the denaturation of enzymes by high temperatures hence acted as a confirmatory test. Industrial amylase can withstand higher temperature hence optimal temperature was beyond the 37 degree which is the maximum optimal temperature in the human body where natural amylase if found .

Conclusion

In conclusion, the practical found that enzyme amylase is capable of degrading starch at optimal temperature. Enzymes are very important in many Biological reactions which are important in the production of important and helpful products. Knowledge about the optimal requirements is paramount in enzymatic reactions since it's only at necessary environment that an enzyme is able to catalyze a reaction.