

Investigation into factors affecting enzyme action

Introduction

Iodine is an indicator that turns blue/black when starch is present, but is otherwise brown. In this investigation a blue/black solution of starch and iodine will change to brown as the enzyme amylase digests/breaks down the starch into sugar. The time taken for this reaction to occur is affected by temperature.

Apparatus

test tube rack and six test tubes
 marker pen
 stopwatch
 25 cm³ measuring cylinder
 10 cm³ measuring cylinder
 beaker of 1 % starch solution
 dropper bottle of iodine solution
 beaker of 10 % amylase solution
 spotting tile
 dropping pipette

Access to:

water bath or alternative method of heating water

Method

1. Measure 10 cm³ of 1 % starch solution into a test tube.
2. Measure 2 cm³ of 10 % amylase solution into a second test tube.
3. Place both tubes into a water bath set at 20 °C for 3 minutes.
4. Place a drop of iodine in six wells of a spotting tile.
5. Remove both test tubes from the water bath. Pour the amylase into the starch/iodine solution and start the stopwatch.
6. Immediately, use the dropping pipette to place one drop of the mixture onto the first drop of iodine. Record the colour of the solution.
7. Repeat step 6 every minute for five minutes.
8. Repeat steps 1-7 at 30 °C, 40 °C, 50 °C, 60 °C.

Analysis

1. Use your observations to reach a conclusion regarding the effect of temperature on enzyme action.
2. Evaluate your method and suggest possible improvements.