

HUMAN BIOLOGY
Investigative Skills Assignment
Task Sheet

HBI3T/Q09/task

The effect of temperature on the rate of the reaction catalysed by amylase

INTRODUCTION

Starch is a polysaccharide. It turns black in the presence of iodine solution. Amylase is an enzyme that catalyses the digestion of starch. When amylase is added to a solution of starch, the starch is digested over time, until a sample of the solution no longer gives the black colour when mixed with iodine solution.

You are going to find out how temperature affects the rate of digestion of starch by amylase.

You will measure the rate of reaction at three different temperatures.

Outline method

You are provided with

- amylase solution
- starch solution
- iodine solution
- pH 7 buffer solution
- water baths or large beakers that you can use as water baths
- a thermometer
- spotting tiles
- test tubes
- test tube rack
- timer
- marker pen
- graduated pipettes
- dropping pipettes.

You may ask your teacher for any other apparatus you require.

You should read all these instructions carefully before you start work.

1. Take three test tubes and put 5 cm³ of the amylase solution into each tube.
2. Add 1 cm³ of the buffer solution to each of these tubes.
3. Take three more test tubes and put 5 cm³ of the starch solution into each tube.
4. Stand all six test tubes in a water bath at 60 °C.
5. Leave the test tubes in the water bath for 10 minutes.
6. Meanwhile place one drop of iodine solution into nine wells on a spotting tile.
7. Add the starch solution from one test tube to the amylase solution in another test tube and mix. Start timing immediately.
8. Immediately add one drop of the mixture to a well of iodine solution.
9. Every 30 seconds add one drop of the mixture to a new well containing iodine solution.
10. Continue until the addition of the mixture to a well containing iodine solution shows that the starch has been digested.
11. Record the time taken for all the starch to be digested.
12. Repeat instructions for steps 7 to 11, using the other tubes in the water bath.
13. Use the same method to find out how long it takes for all the starch to be digested at room temperature and at one other temperature which your teacher will tell you.

You will need to decide for yourself

- how you make sure the water baths are as reliable as possible
- whether to use a water bath at room temperature
- what the colour of the solution in the well shows when all the starch has been digested.

ISA HBI3T/Q09 Candidate Results Sheet: Stage 1**The effect of temperature on the rate of reaction catalysed by amylase**Centre Number

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Candidate number

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Candidate Name

Record your data in a table in the space below. Hand in this sheet at the end of each practical session.

ISA HBI3T/Q09 Candidate Results Sheet: Stage 2**The effect of temperature on the rate of the reaction catalysed by amylase**Centre Number

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Candidate number

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Candidate Name

Use the space below to process your data.

Use the graph paper to plot a graph of your processed data.

Hand in this sheet at the end of each practical session.

Hand in this sheet at the end of the practical session

