

BIOLOGY
Investigative Skills Assignment
Task Sheet

BIO3T/P09/task

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

Casein is a protein found in milk. Trypsin is an enzyme that digests casein. When trypsin is added to a dilute solution of milk powder, the casein is digested and the solution goes clear.

You are now going to find out how temperature affects the rate of the reaction catalysed by trypsin.

Outline method

You are provided with the following.

- 0.5 % trypsin solution
- 3 % solution of milk powder
- pH 7 buffer solution
- water baths or large beakers to use as water baths
- test tubes
- test tube rack
- stop watch
- marker pen
- pipettes or syringes
- thermometer.

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

You are required to find the rate of the reaction at three different temperatures.

You should read these instructions carefully before you start work.

1. Using a marker pen write an 'X' on the glass halfway down one side of each of three test tubes.
2. Add 10 cm³ of the solution of milk powder to each of these three test tubes.
3. Add 2 cm³ of trypsin solution to 2 cm³ of pH 7 buffer in another set of three test tubes.
4. Stand the three test tubes containing the solution of milk powder and the three test tubes containing the trypsin and buffer in a water bath at 60 °C.
5. Leave all six tubes in the water bath for 10 minutes.
6. Add the trypsin and buffer solution from one test tube to the solution of milk powder in another test tube and mix thoroughly.
7. Put the test tube back into the water bath.
8. Repeat steps 6 and 7 using the other test tubes you set up.
9. Time how long it takes for the milk to go clear. Do this by measuring the time taken to first see the 'X' through the solution.
10. Record the time for each of the three experiments.
11. Using the same method, find out how long it takes the trypsin to digest the protein in the solution of milk powder 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 temperatures of the water baths are as reliable as possible
- how you carry out the experiment at room temperature.

ISA BIO3T/P09 Candidate Results Sheet: Stage 1

The effect of temperature on the rate of reaction catalysed by trypsin.

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 BIO3T/P09 Candidate Results Sheet: Stage 2

The effect of temperature on the rate of reaction catalysed by trypsin.

Centre Number

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Candidate number

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Candidate Name

Your teacher will provide you with data for two other temperatures. Hand in this sheet at the end of each practical session.

Use the space below to process your own data and the data provided by your teacher.

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

Hand in this sheet at the end of the session.

