



General Certificate of Education
Advanced Subsidiary Examination
June 2011

Human Biology

HBI3T/P11/TN

Unit 3T AS Investigative Skills Assignment

Teachers' Notes

Confidential

**A copy should be given immediately to the teacher responsible for
GCE Human Biology**

Teachers' Notes**CONFIDENTIAL**

These notes must be read in conjunction with *Instructions for the Administration of the Investigative Skills Assignment* for GCE Human Biology published on the AQA Website.

The effect of amylase concentration on the rate of digestion of starch

Candidates are required to measure the effect of different concentrations of amylase on the rate of digestion of starch in starch agar plates.

Materials

In addition to access to general laboratory equipment, each candidate needs

- 3 starch agar plates, minimum diameter 9 cm, each containing 6 evenly spaced wells
- access to bottles of amylase solutions of 20 g dm^{-3} , 10 g dm^{-3} , 5 g dm^{-3} , 2.5 g dm^{-3} , 1.25 g dm^{-3} , each bottle accompanied by its own Pasteur pipette
- access to a bottle of distilled water accompanied by its own Pasteur pipette
- marker pen or chinagraph pencil
- a ruler marked in mm
- a dropper bottle of iodine in potassium iodide solution
- access to Sellotape.

Technical Information

Make starch agar by stirring 25 g of agar powder and 10 g of soluble starch powder into 1 dm^3 of distilled water. Stir the mixture while heating it to boiling, and allow it to boil for one minute. Once the molten starch agar has cooled to 60°C , pour it into Petri dishes to a depth of approximately 5 mm. If 9 cm diameter Petri dishes are used, 1 dm^3 of starch agar will be sufficient for 30 dishes. When the agar has set, cut 6 equally spaced wells in the agar of each dish using a sterile cork borer with a diameter of 6 to 8 mm. Remove the cylinders of agar from the wells using a sterile mounted needle. Wells should be approximately 1.5 cm in from the edge of the dish. To ensure even spacing, a paper template showing the required positions can be drawn and placed under each plate when cutting the wells. The plates, if prepared under aseptic conditions and stored in a refrigerator, are useable for several days.

Make the amylase solutions by a series of dilutions of an initial solution of 2 g amylase in 100 cm^3 distilled water. As each candidate should require no more than 2 cm^3 of each dilution, the volumes can be scaled accordingly. There is no need to buffer the solution.

Make the iodine in potassium iodide solution by diluting the standard bench solution with an equal volume of distilled water.

To minimise the risk of microbial contamination, lids should remain taped on the Petri dishes except when adding amylase solution or iodine solution. At the end of the investigation, plates should be sterilised, e.g., by autoclaving, before disposal.

Managing the Investigation

Once candidates have added the solutions to the wells, they must leave the plates for a number of hours before they add the iodine solution.

Since the activity of amylase preparations can vary considerably with source and age it may be necessary, in the light of the trial, to adjust the range of concentrations of amylase and the time between adding the amylase and the iodine solutions. In trials using amylase solutions prepared from diastase or fungal amylase, each newly purchased from Philip Harris Ltd, it was found necessary to leave the plates between 1 and 3 hours at room temperature before adding the iodine solution in order to obtain useable results.

The task must be trialled before use.

Candidates **must not** be given information about an ISA assessment until one week before Stage 1.

One week before Stage 1 candidates should be given the following information:

You will investigate the effect of different concentrations of amylase solution on the rate of digestion of starch.

There **must** be no further discussion and candidates **must not** be given any further resources to prepare for the assessment.