

Feeding a growing world: Observing the synthesis of starch from reducing sugar

Technician notes

Aim

The aim of this investigation is to observe the synthesis of starch from reducing sugar, catalysed by an enzyme extracted from potato tuber tissue.

Investigation

Planning

This investigation may be carried out at the end of the main investigation, 'Potato reducing-sugar content'. In this case, any surplus extract can be used, or the surplus can be stoppered and refrigerated overnight for use the next day.

Safety

Teacher: Carry out a risk assessment with the students. Ask what hazards they can predict and how to control them.

Students should wear eye protection and take care when using scalpel blades and when handling microscope slides and coverslips.

Demonstrate to students how to safely and properly use a centrifuge, including balancing the tubes.

Technician: Centrifuges should meet CLEAPSS recommendations in Section 9.6 of the CLEAPSS Handbook, or SSERC guidelines in Scotland, and should have a lock or automatically cut off power to the rotor when the lid is raised. If the centrifuge does not have a lock, make sure that a notice is clearly visible warning students not to lift the lid until they hear that the rotor has stopped.

Equipment

For making the extract (per student/pair):

- medium-sized potato tuber
- scalpel
- white tile
- mortar and pestle
- sharp sand
- distilled water

- glass rod
- syringe or 5 mL measuring cylinder
- 4 × 1 mL syringes
- muslin/old tights
- 2 × small/medium beakers
- centrifuge tubes
- centrifuge

For the synthesis (per student/pair):

- test tube and rack
- timer/watch
- 2 × spotting tiles
- dropper pipette
- iodine/KI solution and dropper pipette
- 1% glucose-1-phosphate solution, 10 mL
- distilled water
- eye protection
- marker pen
- microscope and slides

Method

See the student activity sheet for a description of the practical investigation.