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Chlorophyll, Photosynthesis and Starch

Photosynthesis is the process by which green plants create organic substances from atmospheric carbon dioxide and water. The process requires both the plant's green pigment chlorophyll and energy from light to be successful.

Organic products from photosynthesis are often temporarily stored in the plant's leaf as sugar and starch before being relocated to other areas of the plant. The presence of starch can be easily confirmed via the blue/black coloration of an iodine test.

The presence of starch in the leaves confirms the action of photosynthesis and the presence of chlorophyll.

Materials:

- Plants with variegated green-white leaves
- Small beakers with water to place the plants in.
- Electric hotplate
- 500mL glass beaker, half filled with tap water
- Forceps, scissors, pencil and paper
- Glass evaporation dish (or equivalent)
- Test tube, half filled with ethanol or methylated spirits
- Iodine/Potassium iodine solution (Our MC26.1 or MC26.2)

Preparation:

On receipt of the plant cuttings, unwrap them and cut a small section off the stem. This will allow water to be taken up. Put the freshly cut stem into a beaker of water so that the cut end extends 1-2cm into the water. Expose the plants to light conditions for several hours, preferably a day, so that photosynthesis can occur.

Procedure:

- Place the 500mL beaker that is half filled with tap water onto the hotplate and bring the water to the boil.
- Select a variegated leaf from the cutting.
- Trace a line around the leaf, then sketch the green area within the leaf.
- Drop the leaf into the boiling water for 5 seconds. Using forceps remove the leaf and place it on the glass dish.
- Remove the beaker from the heat source, placing it on the bench.
- Place the leaf into the test tube containing alcohol and then put the test tube into the beaker containing hot water (create a water bath). As the alcohol boils the green pigment will be removed from the leaf. This can take 10 –15 mins. If necessary the water bath can be put back onto the heat source but care should be taken as the alcohol and alcohol vapour is flammable.
- Once the green colour has gone, using forceps, remove the leaf from the test tube, pass it through the hot water as a rinse and then lay it on the glass dish.
- Cover the leaf with iodine/potassium iodine solution for approximately 1 minute.
- Remove the iodine solution and rinse the leaf with tap water.
- Redraw the leaf notating the blue/black stained area. Compare this sketch to your original drawing.

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