**Specific Safe Method of Use Procedure for NZ Schools**

**Starch test on leaves using Meths & Iodine**

**Investigating photosynthesis – starch and chlorophyll**

Photosynthesis can be investigated to show the production of starch and the importance of chlorophyll.

**Danger: Very Hazardous, seek advice from experienced staff members, handle with caution, read instructions carefully.**

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| **Significant Hazards** | **Meths/Ethanol** is a flammable liquid with flammable vapour.  It is toxic if swallowed. It is an eye irritant.  **Iodine Solution** is a skin and eye irritant. |
| **SDS Sheets** | *Specify location or link* |
| **Safety Controls** | Do not do this experiment for the first time without seeking practical advice from a more experienced colleague.  Inform all persons present of the procedure, significant hazards and safety controls.  Wear safety glasses and lab coat.  Avoid inhaling vapour.  Do not have naked flames within 4 m of this experiment  Wear gloves to avoid iodine solution staining skin.  or  Wash hands and skin immediately on contact with chemicals.  Wash hands after procedure. |
| **Emergency Procedures** | **General Spill:** Personnel with chemical knowledge may neutralise and clear up using appropriate methods.  **Minor Spill of Meths/Ethanol < 250ml:** Ensure adequate ventilation. Turn off all sources of ignition. Absorb onto suitable absorbent and remove outside or to fumehood.  **Major Spill of Meths/Ethanol > 250ml:** Ensure adequate ventilation. Turn off all sources of ignition. Evacuate and call emergency services.  **Eye and Skin contact:** Wash thoroughly with water for 15 minutes. Seek immediate medical attention.  **Inhalation:** Remove to fresh air. Seek medical attention.  **Swallowed:** Rinse mouth with water, do not swallow. Do not induce vomiting. Seek immediate medical advice.  **Fire:** If small handle appropriately otherwise evacuate and call  Emergency services.  **Burns:** Immediately cool the affected area for up to 20minutes using cool running water from a tapor shower. Seek medical attention. |
| **Disposal** | **Meths/Ethanol:** dilute 1:20 with water then pour down the sink with plenty of water.  **Iodine:** Add 0.1 molL-1 Sodium thiosulfate solution to small amounts of Iodine solution until it is decolourised. Then dispose of this aqueous solution by diluting 1:20 and pouring down the sink with plenty of water. |

**Equipment**

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| Meths/Ethanol  Boiling tube  250ml beaker  Hot water  Tile  Hot plate  Iodine solution  Tongs/tweezers |  |

**Method**

**Starch testing**

Iodine solution is used to test leaves for the presence of starch. You need to:

1. heat a plant leaf in boiling water for 30 seconds (this stops its chemical reactions)
2. heat it in boiling meths/ethanol for a few minutes (this removes most of its colour)
3. wash with water and spread onto a white tile
4. add iodine solution from a dropping pipette

After a few minutes, the parts of the leaf that contain starch turn blue-black.

Note that meths/ethanol is heated using a hot water bath. Meths/Ethanol boils at 78°C, so a tube of it boils when placed in a beaker of hot water. This is safer than using a Bunsen burner because meths/ethanol is flammable.

**Variegated leaves** have green parts (where the cells contain chlorophyll) and white parts (where there is no chlorophyll). Only the parts that were green become blue-black with iodine solution, showing the importance of chlorophyll in photosynthesis.

A plant can be ‘de-starched’ by leaving it in the dark for a few hours. Parts of its leaves are covered with dark paper, and the plant is left in the light for a few hours. Only the uncovered parts become blue-black with iodine solution, showing the importance of light in photosynthesis.

This Experiment is Authorised for use by:\_\_\_\_\_\_\_\_\_\_\_\_\_ Position \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_