

Investigation 1.A: Storing Solar Energy in Plants

Question: Do plants need sunlight to make food for themselves through photosynthesis?

Hypothesis

If plants need sunlight to perform photosynthesis and make starch, then the leaves of plants that are exposed to sunlight should show the presence of starch and the leaves of plants that have been denied sunlight should not.

Prediction

Re-read the introduction to this investigation, as well as the whole procedure. In your notebook, record a prediction about the results you would expect to see if the hypothesis is correct.

Materials

- small test tube
- stopper or stirring rod
- water
- 5 g of cornstarch
- 400 mL beaker of boiling water
- 150 mL beaker with 50 mL of hot ethanol in a hot water bath
- Lugol's iodine solution (in a dropper or spray bottle)
- plants with solid green leaves such as geranium (*Pelargonium*) or ivy (*Hedera*)—one plant grown or 4 days exposed to sunlight or under grow lights, and one plant placed in the dark for 4 days
- plants with variegated leaves such as *Coleus*, variegated geranium (*Pelargonium*), or spider plant (*Chlorophytum*)—one plant grown for 4 days exposed to sunlight or under grow lights, and one plant placed in the dark for 4 days
- hot plate
- tweezers (or forceps)
- tongs or oven mitts
- 4 Petri dishes



Safety Precautions

Ethanol ignites easily and iodine stains skin and clothing. Handle all chemicals with great care.

Procedure

1. Confirm the colour change that occurs when iodine solution is applied to starch. Place 10 mL of warm water in a test tube. Add cornstarch to the water until it no longer dissolves. Mix with a stirring rod or stopper and shake the test tube. Now add one drop of iodine solution to the mixture, then mix once again.

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HANDOUT		

3. What is the relationship between the pattern in the variegated leaves and the presence of starch?
4. How accurate were your predictions?
5. How valid was the hypothesis?

Conclusions

6. Write a conclusion about the effect of light on the formation of starch in green leaves.
7. What, if any, other factors could have affected the results of this investigation? Explain how you could minimize these factors or their effects.

