

Colours in Leaves Experiment

Introduction

Photosynthesis is the process by which plants and trees synthesise triose phosphates (G3P) and ultimately starch, glucose and other products from sunlight, carbon dioxide and water.



Triose phosphates can be used by the plant/tree as an immediate food source, or combined and arranged to form monosaccharide sugars, such as glucose, which can be transported to other cells, or packaged for storage as insoluble polysaccharides such as starch.

Chlorophyll is vital for photosynthesis. It is a very large molecule that is attached to chloroplasts in leaves. Chlorophyll selectively absorbs red/blue light, and reflects green. This is the reason why the vast majority of leaves appear green in spring/summer time.

The colours in the leaves are pigments. These are coloured molecules that are insoluble in the liquid in the leaf (though they may be soluble in other liquids). Carotene is a large molecule found in chloroplasts that absorb blue-green and blue light. The light reflected appears to be yellow. Anthocyanin is a molecule that absorbs blue, blue-green and green light, appearing to be red/brown in colour.

In this experiment you will extract chlorophyll from the leaves, along with other pigments found in that leaf.

Practical

You will need leaves from two different deciduous (colour changing) trees.

1. Tear 2-4 different leaves into small pieces and place in a labelled container
2. Pour warm ethanol into each container until you can cover the leaves
3. Stretch parafilm/clingfilm over the opening of each of the containers. Pierce a small hole in the parafilm/clingfilm using a pencil.
4. Leave the containers to cool for 5-10 minutes.
5. With a pencil, label the tree name at the top of the filter paper.
6. Remove the parafilm/clingfilm and place the correct filter paper into each container.
7. Leave for at least 10 minutes. Then remove the filter paper and observe what has happened.

Questions

What are the products of Photosynthesis? What factors could affect the rate of photosynthesis?

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What is the definition of a pigment? Why are carotene and anthocyanin classed as a pigment even though they are soluble in water?

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Write a general equation for the Photosynthesis process:

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What is a photoautotroph? Why are they different to chemoautotrophs?

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Explain in detail the two stages of photosynthesis?

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