Photosynthesis

This is the method used by plants to obtain their food. Plants which use this process only are known as Autotrophic (self feeding) organisms.
Plants produce carbohydrates as a result of Photosynthesis, predominately glucose. If a plant cannot use the glucose immediately it stores it in the form of starch. If the carbohydrates were stored as glucose, this would have a drastic effect on each plant cell. They would absorb water through osmosis, swell up and burst. Starch is osmotically inert.
Photosynthesis takes place in special mini-organs (organelles in plant cells called Chloroplasts). When chloroplasts are carrying out photosynthesis they make temporary stores of starch in their cells, in the form of grains. So the presence of starch grains in leaf tissue is an indication that photosynthesis is occurring or has occurred very recently.

How do we test a leaf to see whether starch is presence in leaf cells? **The iodine test for starch.**

Method- step 1

- Half full a beaker with water and bring to the boil.
- Detach a leaf from a plant and place it into the water.
- Boil the leaf for two minutes.
- Remove the leave from the hot water; keep the hot water for next step.

Step 2

- Place the leaf in a boiling tube, filled with ethanol.
- Put the boiling tube into the hot water kept from the last step.
- Swirl the leaf in the ethanol at least once.
- Continue with this programme until the leaf has turned pale yellow and the ethanol has turned green.

Step 3

- Remove the boiling tube from the hot water.
- Carefully tip the ethanol away (into the beaker) and remove the leaf.

- Drop the leaf back into the hot water, swirl it to remove any ethanol, then place it carefully on a white tile.
- Spread the leaf out gently until it is flat.

Step 4

- Using a dropper, carefully add a few drops of iodine to the leaf surface. Make sure it is covered.
- Observe any changes in colour that can be seen in the leaf tissue.

Reason for steps:

Step 1

To break down cell walls and to stop the action of enzymes within the leaf. Also allows easier penetration by ethanol.

Step 2

To extract the chlorophyll, which would mask observations later. (chlorophyll dissolves in ethanol but not water)

Step 3

To soften the now brittle leaf, and allow penetration by iodine solution.

Step 4

Iodine shows the presence (blue-black) or absence (orange-brown) of starch; colours are shown against the white tile.

Experiment to test leaves for starch:

AIM: to find out if after adding iodine is there starch present.

Equipment:

Beaker
Boiling tube
Ethanol
Water
White tile
Iodine
3 leaves

Method:

Boil a half full beaker of water and place a detached leaf from the plant into the beaker. Boil the leaf for 2 minutes. Afterwards remove the leaf and put it in a boiling tube filled with ethanol. Put the boiling tube in the water from the last step. Remember to swirl the water at least once. Continue doing this until the leaf has turned pale yellow and the ethanol has turned green. Remove the boiling tube and carefully tip the ethanol away. Drop the leaf back into the water to remove any ethanol present. Then place the leaf on a white tile. Using a dropper add a few drops of iodine to the leaf surface, making sure it's covered.

Prediction:

I predict that the leaf, after adding iodine, will turn a black/blue colour showing starch presence.

Results:

After adding the iodine the leaf had turned a black colour showing starch is present. This shows that my prediction is correct.