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10PLB

Ms O'Reilly

Investigation of what affects the production of starch in plants

Aim

To discover whether light affects the production of starch in a plant.

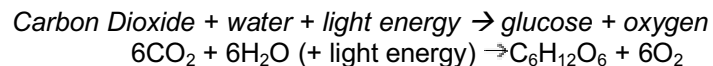
Information

Green plants use energy from light to make carbon dioxide and water into food. This process is called photosynthesis. Green plants also produce oxygen during photosynthesis.

Carbon dioxide (CO₂) is a gas found in the air. During photosynthesis, CO₂ is combined with water (H₂O) to make glucose and oxygen. Glucose is the sugar that plants use for food.

Plants store glucose by converting it into starch. Glucose is soluble and in a high concentration could damage the plant, so the plant converts unused glucose into starch, which is stored in the cytoplasm of the plant. Starch molecules are long strings of glucose.

The Photosynthesis word and chemical equations are as follows:



Apparatus

Plant, -- Soil -- Tin Foil
Water -- Light -- Iodine
Bunsen Burner -- Gauze -- Tripod
Boiling Tube -- Ethanol -- Plant Pot
Tweezers -- Beaker -- Kettle
Pipette -- Tile -- Blue Tac

Method

Take a leaf from the plant(do not remove it from the plant). Cover a small area of the leaf with tin foil. Using blue tac to stick the tin foil to the leaf. Water the plant and ensure it receives lots of light for 7 days.

Once the 7 days have passed set up the apparatus like this.

Take the leaf from the plant and remove the tin foil. Using the tweezers place it into the water and allow it to boil. This is to remove the protecting layer of wax which covers the leaf. After you have removed the wax from the leaf take the boiling tube with ethanol in it, turn off the heat to the beaker and place the Boiling tube in the hot beaker of water, using tweezers place the leaf into the boiling tube of ethanol as in the diagram below.

The reason for this is to remove the chlorophyll from the plant, you will be able to tell when the chlorophyll has gone because the leaf will turn white.

Remove the leaf from the ethanol with the tweezers and place it in the hot water to clean off the ethanol and soften the leaf.

Place the leaf on the white tile and add a few drops of iodine using the pipette, leave it a few minutes and the parts of the leaf with starch would turn black and the part without any starch should stay white.

Before Performing the Experiment I will do a preliminary test on a leaf using the same method, but not covering the plant. This is to test if there is starch in the plant in the first place.

Prediction

I predict that the area of the leaf that was covered in tin foil will remain white, and the area of the leaf that was not covered will turn black. This is because the area not covered in tin foil will be allowed to photosynthesise and produce starch, but the area covered in tin foil will not be able to photosynthesise. This is because the area covered in tin foil will have been denied light, which is a vital part of photosynthesis.

Results

The area of the leaf that had been covered with the tin foil remained white, while the area of the leaf that had been allowed light turned black, indicating starch was present and photosynthesis was taking place. As shown in the diagram below

Conclusion

I conclude that light must be a vital part of respiration in a plant. This is the cause for the area covered in tin foil not turning black and therefore not containing any starch, showing that photosynthesis was not taking place.

Evaluation

The Experiment Went Well Despite some problems – we didn't boil the leaf in the ethanol long enough so the leaf did not turn fully white although the experiment still worked properly so this was not too big a problem, also before the experiment the plant was not watered every day, however it was watered often enough. While these factors could have affected the outcome of the experiment and caused the results to be inaccurate, I do not think they did.

If I had to do the Experiment again I would change the following

- ❖ Ensure the plant was watered every day and make sure that it receives the proper light
- ❖ Make sure the leaf turned fully white in the ethanol before taking it out.

I would also ensure the test was fairer, by regulating the temperature of the plant throughout the seven days. And making sure I was boiling the plant in the same amount of water for both the preliminary test and the real experiment.