

Sc1 Investigation: Biology

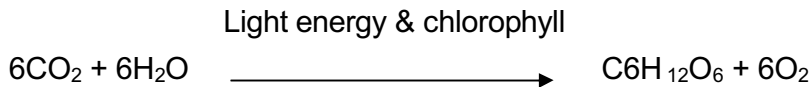
Aim:

To investigate the affects that different concentrations of sodium hydrogen carbonate on the rate of photosynthesis.

Plan:

Background Research

Photosynthesis Equation:



Factors

The resistance of a wire depends on certain factors. Some of these variables are listed below:

- Light Wavelength
- Carbon Dioxide (sodium hydrogen carbonated)
- Temperature
- Water

All these factors will have to be kept constant except the concentration of sodium hydrogen carbonate to make sure that the investigation is a fair test. I have decided to investigate how the concentration of sodium hydrogen carbonate affects photosynthesis because other factors such as temperature and wavelength are hard to control or vary. I will weaken the concentration by half each time and will start at 5% and make my way down to 0.08 %.

Prediction

I Prediction: I predict that decreasing the conc entration will decrease the rate of photosynthesis at a proportional rate until it stops completely. This is because when you take away CO₂, you are reducing the amount of resources the plant has to work with so there should be less oxygen being produced.

Fair Test

To make sure that my test is fair I will make sure to keep all the factors mentioned above the same apart from the concentration of sodium hydrogen carbonate. I will make sure they stay the same by checking them before each

test. I will also do each test three times and make a mean average. I must also thoroughly wash all equipment, after every test.

Apparatus

- Funnel
- Pond weed
- Beaker
- Water
- Measuring cylinder
- Stopwatch
- Sodium hydrogen carbonate (NaHCO_3)

Risk Assessment and Safety Precautions

There are not many safety precautions that need to be taken into consideration, in this experiment. The main two I can think of are stated below:

- Do not get any chemicals on skin or in your mouth as this could be harmful
- Make sure to keep any electrical wires from the lamp away from water, thus preventing an electrical shock

Method

- Collect the apparatus.
- Measure 7cm of pond weed; make sure there is a clean cut for the oxygen to come out.

- Put the pondweed in the boiling tube, when the boiling tube is in the rack.
- Get the solution of 5% Sodium Hydrogen Carbonate (NaHCO_3). Put this in the boiling tube
- Put the lamp on and shine it at the boiling tube.
- Time it for one minute, to let the pondweed start to photosynthesise.
- Then count the number of bubbles of oxygen, for one minute.
- Do this three times to get an average.
- Clean the boiling tube and mix up a solution of 2.5% NaHCO_3 .
- Do from step 4 but with 2.5% NaHCO_3 then with 1.25%, 0.63%, 0.31%, 0.16% and 0.08% (all to 2 d.p).

Results

Results Table

Here is my results table

Concentration of NaHCO_3	Tests (no. Oxygen bubbles)			
	1	2	3	Average (to 2 d.p)
% To 2 d.p				
5.00	47	100	53	66.67
2.50	5	29	18	17.33
1.25	16	13	8	12.33
0.63	10	4	6	6.67
0.31	3	5	4	4.00
0.16	2	1	3	2.00
0.08	1	0	1	0.67

Conclusion

My graph shows me that as the concentration of the Sodium Hydrogen Carbonate increases so does the amount of Oxygen given off. This is because there is more Carbon Dioxide so the pondweed has more resources to use for photosynthesis.

Evaluation

I do not think that my investigation was very fair because all of the bubbles were different sizes. This made our results inaccurate because we could not measure how much Oxygen there was. The only anomalous result on my graph is the result for 5 % concentration, which is higher than all of the other results. I think this can be explained because the NaHCO_3 is twice as big as the next result, which means it should be correct to stand out. My results support my prediction of the number of bubbles getting smaller as the concentration goes down. To further investigate, I could use more concentrations of NaHCO_3 going even as high as 100%.