OCR (B) Biology GCSE

PAG 05: Photosynthesis

Practical notes

Photosynthesis

Aim

Investigate the effect of light intensity on the rate of photosynthesis of pondweed (e.g: *Elodea, Cabomba)*.

Equipment

- a boiling tube
- freshly cut 10 cm piece of pondweed
- a light source
- a ruler
- a test tube rack
- a stopwatch
- 0.2% solution sodium hydrogen carbonate
- a glass rod

Method

1. Place a test tube rack containing a boiling tube 10 cm away from the light source, measured using the ruler.
2. Fill the boiling tube with a fixed volume of sodium hydrogen carbonate solution
3. Place the cut pondweed into the boiling tube with the cut end at the top. Gently push the pondweed down with the glass rod.
4. Leave the boiling tube to rest for 5 minutes.
5. Start the stopwatch and count the number of bubbles produced in one minute.
6. For each light intensity/distance, repeat the count twice more and take a mean.
7. Record in a table as seen below.
8. Repeat steps 1-7 for 3 more distances (20, 30, 40 cm) of the boiling tube from the light source.
9. Plot a graph of the rate of photosynthesis (given by the no. of bubbles) against light intensity (using the inverse square law, light intensity = 1/distance^2 between pondweed and light source). [1]

Distance between pondweed and light source in cm	Number of bubbles per minute			
	1	2	3	Mean

Sources of error

Temperature may also be a factor affecting the rate of photosynthesis that is not accounted for. Bubbles may form too quickly to be counted.

Controlled variables

- Carbon dioxide concentration

[1] AQA Practical Handbook

- Species of pondweed
- Temperature
- Time allowed for gas formation

Extension

Other factors that can be tested include:

- Temperature: by immersing the set-up in a range of thermostatically-controlled water baths
- Carbon dioxide concentration: changing the concentration of sodium hydrogen carbonate solution used
- Different species of pondweed could be tested.

Potential Hazards

There is a potential allergy risk from the pondweed.
Lamp may get hot.
Be careful to keep water away from electrical power outlets and wiring.