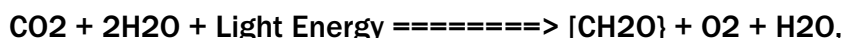


An Analysis and Evaluation of Data from Photosynthesis Experiments

Graph analysis

This is my analysis for the investigation in to the affect of light intensity on the rate of photosynthesis to the Canadian pondweed, elodea. In the results the pattern is that when the light intensity is higher the readings are generally higher. On the graph the less the light intensity the lower the gradient of the curve. the equation for the photosynthesis process is;



This shows that when the light intensity is increased the rate of reaction will be more quicker he only anomalous result there was, is the one in the 100 watt result the reading after 5 minutes is anomalous because it does not follow the predicted pattern of increasing in the production of gas because it is lower

I know from my own knowledge of photosynthesise that when the light intensity is increased the rate of reaction will be more quicker because many plants and trees photosynthesise quicker in stronger light and photosynthesise slower in dimly lit places. The chlorophyll absorbs light energy and enables it to be used by the plant for building up sugar. The overall effect is that energy is transferred from sunlight to sugar molecules. The energy inside molecules is called chemical energy, so light energy is converted into chemical energy by the chlorophyll.

I believe that the results are reliable enough to support the hypothesis, because the graph of results proves the hypothesis because the gradient of the curve increases with the increase of the light intensity. I think that the method used is reliable enough to support the prediction. Overall, both graphs and my results support my predictions fully. My idea that the rate of photosynthesis would increase with light intensity was comprehensively backed up by my results.

Evaluation

I think that the method used in the experiment is not very accurate because the way we measure the amount of gas produced is not very precise, the measuring tube is not the most accurate because it is possible that a little gas could have been let through the measuring cylinder, I think a more accurate way to measure would be to use a gas syringe. Improvements to the method would be to use a smaller time scale and instead of measuring every five minutes I would measure every two minutes, another way of increasing the reliability of my results would be to take more repeat readings and find an average. One problem, though a small one, is in the time keeping. The main problem here was in when to begin the minute. If for one reading, the minute was started just after one bubble had been produced, and in another reading it was just before, this could have had a negative effect on the accuracy of my results. One flaw or inaccuracy of the experiment would be the heat

generated by the lamp affecting the plant and making the rate of photosynthesis quicker. This is because heat has a considerable affect on the process of photosynthesis. Up to a certain point, the higher the temperature, and the faster a plant will photosynthesise. Normally a rise of 10°C doubles the rate, raising the temperature up to around 40°C increase the rate of photosynthesis if it gets any higher, photosynthesis slows down and will soon stop altogether. This is because the heat destroys the enzymes, which are responsible for the chemical reactions. A way to stop heat affecting the result would be to stand a block of Perspex in between the lamp and the elodea which would stop most of the heat and still allow light to go through. Another problem of the experiment is the amount of carbon dioxide in the water, to make the experiment a fair test all plants must have equal amounts of carbon dioxide and enough for the whole experiment, a way to do this would be to take equal amounts of potassium hydrogen carbonate and put it with the elodea.

I believe that the anomalous result I identified in the analysis was cause by an accident in reading and not caused by any of the flaws in the method, I belive this because the next result follows the right pattern. overall I belive that the results are reliable because it follows the hypothesis and everything went as I predicted, but the results could just be a bit more accurate. I can now conclude that increase in light intensity does increase the rate of photosynthesis.

If I were to carry my own experiment in to photosynthesis and light, it would be interesting to see the affect of different lights such as halogen and neon on the rate of photosynthesis and see if they change the rate.

Average Results of Volume of Gas Collected at Different Light Intensities(ml)

| <u>Time (mins)</u> | <u>light intensities</u> | | | | |
|--------------------|--------------------------|----------------|----------------|----------------|-----------------|
| | Dark | 20 watt | 40 watt | 60 watt | 100 watt |
| 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | |
|-----------|-----|------|------|------|------|
| 5 | 1.8 | 2.7 | 2.8 | 3.0 | 2.7 |
| 10 | 2.3 | 4.3 | 4.6 | 4.8 | 5.0 |
| 15 | 2.8 | 5.8 | 6.3 | 6.8 | 7.0 |
| 20 | 4.0 | 7.5 | 8.2 | 8.8 | 9.3 |
| 25 | 4.5 | 9.0 | 9.6 | 10.0 | 10.2 |
| 30 | 4.5 | 10.5 | 11.5 | 11.7 | 12.0 |
| 35 | 4.8 | 12.0 | 13.0 | 13.5 | 14.0 |
| 40 | 5.0 | 14.2 | 15.0 | 16.0 | 16.0 |
| 45 | 5.3 | 15.8 | 16.7 | 16.7 | 17.3 |
| 50 | 6.0 | 17.7 | 18.8 | 18.0 | 18.8 |
| 55 | 6.0 | 20.1 | 20.7 | 21.7 | 21.8 |
| 60 | 6.0 | 22.1 | 22.2 | 23.5 | 24.2 |