**Elodea Photosynthesis Lab Marcus Stevens February 1, 2016**

1. Introduction

In this lab, the aquatic plant, elodea, was tested for its photosynthetic rates when exposed to varying colors of light. The color of light may affect the rate of photosynthesis because different wavelengths have different amounts of energy. There were six different lights (blue, red, green, yellow, white, and a growth bulb). Since elodea performs photosynthesis under water, it was placed in a test tube completely filled with water. These reactions were measured by the amount of displaced water, which represents the amount of oxygen produced. If the quantity of displaced water is higher when exposed to a particular light, then the better the rate of photosynthesis. Paper chromatography of a spinach leaf was also used in this experiment. This reflected the visible and invisible wavelengths present in the leaf according to their available pigments. Therefore, if there were only two visible colors on the chromatography paper, there were only two pigments within the plant.

**Purpose:** The purpose behind this experiment is to discover which color of light is able to create the greatest rate of photosynthesis in an elodea plant.

**Hypothesis:** When the aquatic plant, elodea, is exposed to varying colors of light, the lights will have no effect on the elodea’s rate of photosynthesis.

1. Materials and Methods (Procedure)

**Materials:** Two large test tubes, elodea, spinach, chromatography paper, extra -long tweezers, water, pipet, one end plug for the test tubes, ruler, coin, growth bulb, white light, green light, blue light, red light, yellow light, tub of water, alcohol, and a graduated cylinder.

**Procedure #1:**

1. Spinach was rubbed thoroughly with a coin onto the Chromatography paper approximately one inch away from the bottom of the paper.
2. The paper was then placed into the graduated cylinder filled with about one centimeter of chromatography fluid (alcohol). Make sure that the fluid did not exceed the level of spinach line on the chromatography paper.
3. After a certain period of time, the paper was taken out of the graduated cylinder and examined for the different colors created. Then a photo was taken of it for further examination.

**Procedure #2:**

1. The elodea was placed with the large tweezers in a large test tube.
2. Then the test tube was filled with water to its full capacity.
3. The plug was then held by hand at the opening of the test tube to keep the water in.
4. The tube was then placed into the tub of water upside down. Once the opening of the tube was completely submerged, the plug was let go.
5. Repeat the first four steps one more time.
6. Once the two test tubes were in the tub of water, different colors of light were exposed to each group’s elodea for a period of time.
7. The quantity of displaced water was then measured and recorded.
8. Results

This graph will help when deciphering which light creates the best rate of photosynthesis when applied to elodea.

**Chromatography:** The results with the chromatography paper were not accurate, although it will be needed to completely interpret the results.

1. Conclusion

**Data Evaluation:**

It was hypothesized that when the aquatic plant, elodea, is exposed to varying colors of light, the lights will have no effect on the elodea’s rate of photosynthesis. This can easily be disregarded as the data clearly shows. All six colors were significant in terms of their effect on the photosynthetic rate. If the null hypothesis was true, the quantity of displaced water would have been consistent for each light.

The three lights that were exposed to the elodea that induced the greatest amount of displaced water were the growth bulb, red light, and blue light. The growth bulb came in first with 20 ml’s of displaced water, the blue light with 18.8 ml’s, and the red light with 15 ml’s. Because those lights created the largest amount of displaced water (and produced the most oxygen), they created the highest photosynthetic rate. It makes sense that the green light promoted photosynthesis at an extremely low degree (3.89ml’s) because the pigment, chlorophyll, reflects that wavelength. That is why we generally see plants as green. However, the chlorophyll absorbs the red and blue wavelengths and utilizes them to accomplish photosynthesis at a much higher rate. This is why we rarely see plants with an abundance of chlorophyll as blue and red.

The chromatography paper reflected that spinach only has the pigments chlorophyll a and chlorophyll b. It did not show any other colors on the paper and it did not correspond with the elodea experimental data, most likely because it was not elodea. Therefore, both of these can be classified experimental limitations. Another limitation was in the first procedure. The third step of that procedure did not give the exact amount of time that you let the paper sit in the graduated cylinder.