

The Perfect Lab Report

This handout is meant to provide an example of a good quality lab report, showing what type of things should be covered in each section, and an appropriate writing style for lab reports. Check with your instructor or in your lab manual to make sure you are using the correct format for your class.

This report was written for a very simple experiment, with few variables and results. As such, the Results and Discussion sections are shorter than they might be for a real lab report. Remember to include all of the data from your experiment and cover all sections of the experiment in your discussion.

The Learning Centre has several other handouts to help you write your lab reports, including ones for chemistry and physics with specific hints for each experiment you will do. Please ask the tutor if you need help finding them.



Factors Controlling Sunflower Growth

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Abstract

An experiment was performed to investigate the relationship between the amount of light that sunflower plants are exposed to and the amount of growth over a four-week period.

Commercial sunflower seeds were planted in identical pots, and were watered twice a week.

The plants received either 4, 6, 8, 10 or 20 hours of light from 200W grow-lights every day. The plants were measured at the end of the four-week period. The results supported my hypothesis that sunflower plants will grow best when they are exposed to the more light, except for the 20h condition, where they will be stunted by excessive light.

Introduction

Purpose

The purpose of this lab is to investigate the effect that varying amounts of light will have on sunflower plant growth.

Background

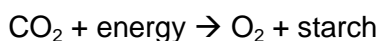
Sunflowers are seed plants. They are dichotic angiosperms; therefore they have flowers and seeds, which are carried in the flower. The seeds, or fruit, of the sunflower are the basis of its reproduction. When planted, these seeds will grow to form another sunflower. Sunflowers have composite flowers, actually composed of many smaller florets. For example, each “petal” in a sunflower is actually a separate floret.



Figure 1: A sunflower.
(Edupics.com, January 16, 2007, electronic communication)

Sunflowers are native to North and South America, and have been cultivated since about 3000 BC (National Sunflower Association, April 16, 2007, electronic communication). Today, sunflowers are grown chiefly for their oil, which is extracted from the seeds and used for cooking and in soaps (Masfield et al., 1969). Sunflowers get their name from the unopened flower's ability to turn and face the sun as it travels through the sky over the course of a day. This turning serves to increase the number of hours of daylight that sunflower plants receive.

Like all plants, sunflowers photosynthesize to gain food and energy from the sun and carbon dioxide in the atmosphere. The reaction



uses carbon dioxide and energy from ultraviolet radiation to create carbohydrates, which are used by the plant to grow. Oxygen is released to the atmosphere as a waste product of the reaction. Since there is abundant carbon dioxide in the atmosphere, the amount of light that a plant receives could be the factor that limits its growth.

However, increasing the amount of light that a plant receives will not increase its growth forever. At excessive levels of light, the leaves of the plant will wilt and shrivel, causing the plant distress (Squire, 1993). Thus, most plants will show an increase in their rate of growth with increasing light, but their growth will abruptly decrease past a certain threshold.

Hypothesis

If sunflower plants are provided with 4, 6, 8 or 10 hours of ultra violet light a day, then they will grow tallest in the 10 hours a day condition because the extra hours of light will allow the plants to photosynthesize more carbohydrate; therefore, they will be able to grow the tallest. If sunflowers are provided with too much light, such as in the 20 hours per week sample, then they will grow shorter than the other plants, because too much light is damaging.

Materials and Method

As given in the Biology 100/101 Lab Book (Einstein et al., 2002), pages 102-106.

Please note that our class used sunflower instead of carrot seeds, and that our experimental conditions were 4, 6, 8, 10, and 20 hours of light per day, rather than 2, 4, 6 and 8.

Results

Table 1: Seedling Heights

Hours of Light Per Day	Week 1 (cm)	Week 2 (cm)	Week 3 (cm)	Week 4 (cm)
4	1	3	6	7
6	0	4	7	11
8	2	4	7	10
10	0	3	9	14
20	1	4	5	6

Table 2: Average Seedling Heights for the Class

Hours of Light Per Day	Week 1 (cm)	Week 2 (cm)	Week 3 (cm)	Week 4 (cm)
4	1	2	6	8
6	1	3	8	10
8	1	2	9	12
10	2	4	10	15
20	2	3	5	7

As the amount of light per day increased, both the class average and my plants' growth increased, with the exception of the 20 hours per day, which had less growth.

Figure 2: Class Data for Week 4 Plant Height

Please see attached graph.

As exposure to light increased from 4 to 10 hours per day, the plant height increased. At 20 hours of light per day, the plant height was the smallest.

Discussion

The lab results for 4-10 hours of light per day supported my hypothesis that plant growth will increase with more light. In the lowest light condition, the plants received only four hours of light each day. As shown in Tables 1 and 2, the average plant height was 8cm while my plant grew only 7 cm. Plants that received six and eight hours of light were taller, with average heights of 10 and 12 cm respectively. The tallest plants were those receiving ten hours of ultraviolet light per day. My plant grew 14 cm in a month, and the class average growth was 15 cm. Thus, both my results and the class average results support the hypothesis that plant growth increases with amount of light.

However, plants exposed to 20 hours of light per day were the shortest of all, with a class average height of 7 cm (My plant was 6 cm tall). These plants also had a yellowish color to their leaves rather than the bright green of the plants exposed to less light, suggesting that the extra light damaged their leaves, preventing the plants from thriving. This agrees with the known behavior for plants exposed to excess light (Squire, 1993). Figure 2 shows the relationship between hours of light per day and plant height, showing that plants grow taller from 4-10 hours of light per day, but are the shortest at 20 hours of light per day.

There was some variation between my results and the class average. While the class average shows a steady increase from the lowest light conditions to 10 hours of light, my plant receiving 8 hours of light a day grew less than the plant receiving 6 hours of light (10 cm vs. 11 cm). I believe that the class average results are more accurate than my results since they include more plants. My 8 hour plant may have grown less because it was only watered half as much as the rest of the plants on the first day due to an error reading the lab manual, or possibly because of impurities in the soil or a less robust seed.

An extension of this experiment could be to repeat the procedure with different types of seeds to test the effects of light on different types of plants. It is possible that sunflowers are more or less sensitive to light than other plants, and including different types of plants (such as beans or grass) in the experiment would answer that question.

Conclusion

Plants exposed to 4-10 hours of sunlight per day grew taller with increased light. Plants exposed to excess light, such as those that received 20 hours of light per day, grew the least of all. This agrees with the hypothesis that increasing exposure to light will encourage plant growth, but that there is a maximum amount after which increasing the light exposure damages the plants.

Works Cited

Einstein, A., Newton, I., and Hawking, S. 2006. *Biology 083 Lab Manual*. Vancouver Community College, Vancouver, BC.

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Masefield, G.B., Nicholson, B.E., Harrison, S.G., Wallis, M. 1969. *The Oxford Book of Food Plants*. Oxford University Press, London, UK.

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FIGURE 2: SEEDLING HEIGHTS AT WEEK 4

