Experiment on Testing The Rate of Photosynthesis Under Different Exposure of Light and Distance of Light

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Preface

Firstly, I would like to say thank you to Allah SWT to let me start and finish this experiment successfully, and gave me a life to finish this science report of the experiment observation. Secondly, I would like to say thank you to Miss Dewi Pramesti Kusumaningrum as my science teacher by picking this topic to help me more understand about photosynthesis and effects of it in daily life. Also, she helps me while doing this experiment such as giving advices of what should I do and giving me more than enough explanation about photosynthesis process itself which is a daily activity that each plants do everyday and how it affects the living creatures on Earth. In this case, she helps us to learn photosynthesis by proving it up from the experiment that we do from different distance of light, the intensity of light, and the using of baking soda and baking powder.

Also, I would like to say thank you to my group mate, Rizka Zahra Dwi Anggraini or Chika to be cooperate and we both could create this successful experiment which giving both of us the answer of this experiment. Especially when we have to buy the materials such as 2 kinds of light bulbs and baking powder. Also my friend, even he is not in my group, which is Abyudhaya Wicaksono Padmanegara or Aby. He is the one who provided the baking soda for the class experiment. Firstly, we all got confused if it has to be baking soda or baking powder because we thought those are the same thing, but after doing this experiment, we all knows those are different things even though those are almost the same.

As we all know, all of experiments are not completely the same with the others' result because each experiment at least has its own difference like the amount of water, or the degree of the acid that we used. The result sometimes comes late or maybe automatically shown up. So, the experiment that we are doing might not the same with others' group.

Actually by doing this experiment, we could determine how aquatic plants do the photosynthesis if it is affected by baking soda or baking powder in different intensity of light and the light distance.

CHAPTER I

Purpose

In this term, we are learning about 'Living Creatures' like plants, animals, and humans, but we are focusing on plants and humans. In this plant section, we are talking about photosynthesis and how it affects the Earth.

Since we knew that plants use carbon dioxide (CO_2), water (H_2O), and sunlight to create oxygen (O_2), we want to determine the intensity and distance from light affect the rate of photosynthesis in aquatic plant because the plant itself needs more water to grow. Also we want to know if the rate of water could affect the photosynthesis process.

We are using 2 kinds of light bulbs, which are the 40 watt one and the 60 watt one. For the 60 watt one, we are gonna use baking powder as the acid, and for the 40 watt one, we are gonna use baking soda. We want to know the result of using 2 different acids, 2 different light bulbs, and also the distance.

Introduction

Every living creature needs food to keep alive and also grow. Like human, they find foods by cook it up what food do they found. But for plants, it needs sunlight and water to stay alive. To support this main needing, plants do photosynthesis to produce the nutrient from water, sunlight, and carbon dioxide (CO_2).

Photosynthesis itself is a rapid process of converting the water and sunlight into chemical energy and storing it to the entire plant parts which happens at the noon when the sun bright fully. The carbon dioxides are absorbed by stomata in its stem while the water enters the root and transported to the leaves through a cell named xylem.

These substances are brought to chloroplast in the leaves where there is chlorophyll to combine it and produce sugars. These sugars are used to give the plant energy, so it could grow. Besides sugars, the result of photosynthesis is also formed in a substance, which is oxygen. Oxygen will be transferred out through stomata and released into the open air. This could help the humans and animals being surrounded the plant itself.

For this experiment, we are using waterweed (*Elodea*) to support our experiment because *Elodea* is an aquatic plant that needs water to grow. The reason why we are using baking soda and powder is because those 2 materials are the resulting chemical reaction to produce bubbles of carbon dioxide to expand under temperature. We want to determine if the experiment contains limited water with baking soda or baking powder acid, the photosynthesis process will be affected of not.

CHAPTER II

Hypothesis

Each of plants needs water and sunlight to produce their own foods to keep growing. The higher rate of each ingredient means the more nutrients will it produce. How much the strength of the light, but if the distance is close enough to the plant, it will produce the more nutrients than if the distance is far away from the plant. Also, if the substance surrounds the plant affects the photosynthesis that automatically absorbed.

Materials and Methods

Materials:

- Elodea (waterweed)
- Light bulbs: 40 watt, 60 watt
- Baking soda (sodium bicarbonate): 2 tea spoons
- Water
- Test tube
- Glass tube or breaker
- Glass funnel
- Pinch clamp
- Lamp stand
- Stopwatch

Method:

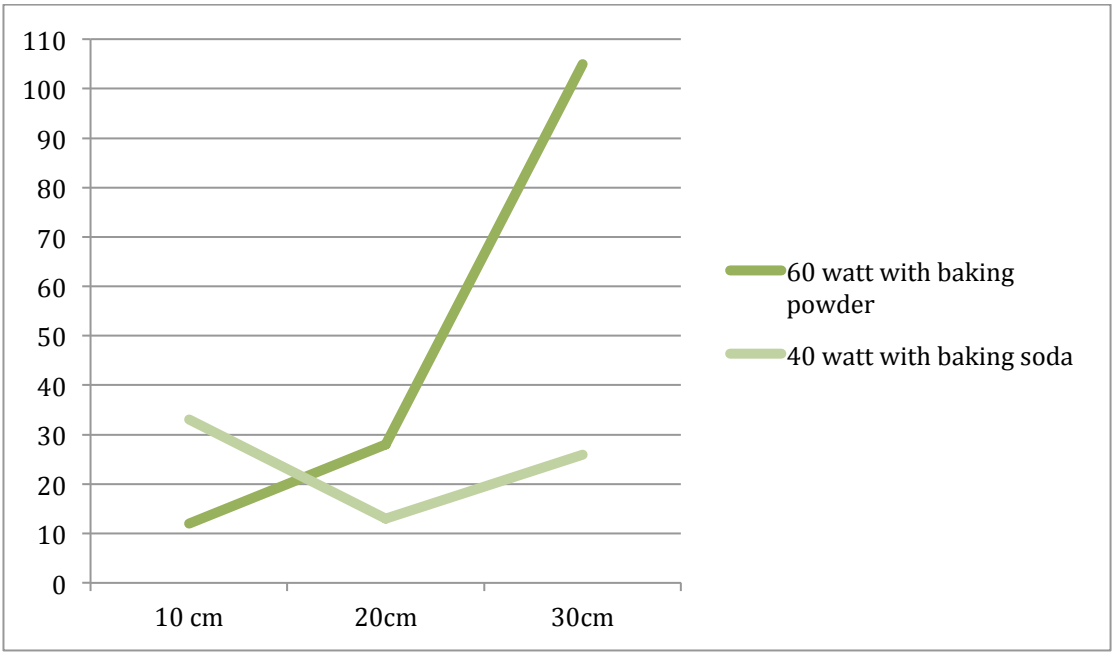
- Fill in the glass tube with 500 ml of water, and then pour 2 tea spoons of baking soda/powder
- Put the *elodea* under the glass funnel, and quickly put it into the glass tube then hold it stay underwater by using test tube pinched with the pinch clamp
- Prepare the lamp and the stopwatch
- Start to observe the plant

This experiment that we did is to test the intensity of light by using different watt of light bulbs, and the distance from the light by placing the light bulbs in different distance to the plant. It will be tested for around 10 minutes or until the plant showed bubbles of oxygen. The rate will be counted per minute by counting the amount of oxygen bubbles produced from the plant.

CHAPTER III

Data

Distance/Time	60 watt with Baking Powder	40 watt with Baking Soda
10 cm/7 mins	12 bubbles	33 bubbles
20 cm/7 mins	28 bubbles	13 bubbles
30 cm/7 mins	105 bubbles	26 bubbles



Result

After doing the experiment, we could determine that the experiment using 60-watt with baking powder is more active and stabile to produce the oxygen, than the 40-watt with baking soda one. The first one, we could see the improvement of the bubbles amount along with the farther light distance. For the second one, the improvement is not stabile like the first one.

While the *Elodea* is processing the photosynthesis, the baking soda or the baking powder is also absorbed into the stem, and it helps adding the carbon dioxide need for the process. This could fasten the photosynthesis process, but at the first time, the Elodea needs time to adapt itself in the acid water. But if the sunlight that it receives is more than 20°F, the photosynthesis will go slowly and it will detains the

oxygen production. The farther light distance it takes, the more oxygen will it produce because *Elodea* only can hold up the temperature until 20°F, or it will get rotten and. So, the *Elodea* that receives less light from the lamp and helped by baking powder produces the more oxygen bubbles than the others.

Conclusion

Each plant has its own limit to receive sunlight to help it grow, so not all of the plants need more sunlight to help it grow faster or more productive. *Elodea* is one of plants type that is not hold on receives lots of sunlight amount, same as green beans. *Elodea*, even if it is living underwater, it is also needs the sunlight, although not much because it is not a type of plant which needs receiving lots of sunlight amount. When it is affected with acid that automatically absorbed from the water for its need, the baking soda helps the plant to produce more oxygen by giving off the carbon dioxide, but it does not mean that the process will be succeed if the plant receives more sunlight than it needs. The impact that will come along is the plant will get rotten by the more evaporation and it takes the water need for the plant itself. That is why the experiment when the plant receives less sunlight amount with baking powder or baking soda has more oxygen bubbles or photosynthesis proof.

As we all know that the global warming has affect us so much from its high degree temperature and causing dozens of problems such as water supply and polluted environment. If the more sunlight will brighten the world, it might cause on dying plants like *Elodea* and green beans, which have limitation on sunlight amount. So keep your Earth like you’re keeping your own children.

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