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Gleason Period 4/5

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The Photosynthesis Race

Introduction

Photosynthesis is the conversion of light energy from sun to chemical energy stored in sugars. Plants conduct photosynthesis better in an environment with red light than green because plants absorb red and reflect green. The purpose of this experiment was to determine which color (red or green) makes disks rise faster. The following hypothesis was made: if red light shines on spinach disks, then the disks will rise faster than with the green or white lights because plants absorb red light and reflect green. The independent variable would be the different light colors, and the dependant variable would be how fast the disks rose.

Procedure

Materials were gathered, and 10 disks were punched out of a spinach leaf. The leaf disks were then placed in a syringe barrel. The plunger was then put in the barrel and pushed down gently until it was touching the disks, but not squishing them. Then, 5 cubic centimeters of the bicarbonate solution was drawn up through the syringe. The plunger was pushed in slightly to release any air in the tip, and a finger was placed over the edge of the syringe. The plunger was pulled back, but not completely out. This was repeated 3 or more times until the disks sank to the bottom of the syringe. The light source was turned on and timing was started to keep track of when the disks rose to the surface. Data was written accordingly.

Results

The disks without cellophane serving was a light rose faster than disks with red or green cellophane. The disks under green didn’t rise at all. None of the disks experienced any effects such as a change in appearance throughout the experiment.

Data

Control light

|  |  |
| --- | --- |
| Start time: 0 minutes | Disks floating: 0 |
| 00:09:07 | 3 |
| 00:09:25 | 4 |
| 00:12:43 | 5 |

Red Light

|  |  |
| --- | --- |
| Start time: 0 minutes | Disks floating: 0 |
| 00:16:50 | 1 |
| 00:30:15 | 2 |

Conclusion

In this experiment, 3 trials were conducted, one for each color of cellophane representing a different color of light. The disks with no cellophane light color rose faster than red or green light. 3 disks had risen to the surface by 9 minutes and 7 seconds, 4 disks rose by 9 minutes and 25 seconds, and 5 disks rose by 12 minutes and 43 seconds. Under the red light, 1 disk rose by 16 minutes and 50 seconds, and 2 disks had risen by 30 minutes and 15 seconds. No disks rose under the green light at all. The constants in this experiment were the amount of light shone on the disks and the amount of disks tested per trial.

The hypothesis for this experiment was if red light shines on spinach disks, then the disks will rise faster than with the green or white lights because plants absorb red light and reflect green. This hypothesis was incorrect. The disks under the control light (white light) rose faster and in a higher total quantity than the red or green light. Although red light is absorbed better by plants, the experiment was conducted with a white light and cellophane over the syringe, which could be the reason why the disks didn’t rise as fast as the syringe with no cellophane rose. As expected, the green light trial didn’t have any rising disks.

A source of error in this experiment could be how the syringes were placed for heating. The syringes were accidentally knocked over a few times during timing, which could affect how fast the disks rose. Also, there was no exact measurement of how far away each syringe was placed from the heat source. A syringe closer to the heat could have caused specific disks to rise faster than a syringe placed farther away from the heat source.