Examining the Effect of Temperature on the Photosynthetic Rates of Green Algal Species: Year Three of Ongoing Study

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Purpose: Green algae can be used to combat increasing carbon emissions, since they reproduce and photosynthesize rapidly. An alteration in temperature can be stimulated to examine its effect on the rate of algal photosynthesis, as well as infer its feasibility in potential rooftop algal garden systems. Procedure: Four different types of green algae were designated in ten vials each. There were three vials for hot, three for room, and three for cold water temperature treatments. All algae were given five hours to photosynthesize. Afterwards, the dissolved oxygen content was fixed through chemical means. The exact amount of dissolved oxygen was determined by titration methods. Results: Scenedesmus exhibited the most dissolved oxygen content, having the highest net primary productivity of 2.06 parts per million (standard error of 0.64 parts per million). This represents the difference between the total amount of oxygen produced through photosynthesis and the amount of oxygen used up for cellular respiration. Additionally, Scenedesmus used up the least amount of oxygen (average of 0.29 parts per million) for cellular respiration. Conclusions: Due to its high net primary productivity, Scenedesmus would be the best green algae to utilize in rooftop algal gardens. All algae exhibited a higher net primary productivity in hot water treatments compared to cold, suggesting that warmer temperatures stimulates organelles in the algae; further experiments will clarify how the structure of Scenedesmus affects its photosynthetic abilities.

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