The Effect of UVA Radiation on the Production of Oxygen in Chlamydomonas and Ankistrodesmus

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Continuous reliance on fossil fuels as a primary power source across the world causes carbon dioxide emissions to increase. Carbon dioxide inhibits the production of ozone, which results in more UV radiation penetrating through the atmosphere and seasonal holes in the ozone layer. It is unknown how increased levels of UVA affect microorganisms like algae, which produce the oxygen for the ozone reaction in the stratosphere. The hypothesis of this experiment was that increased exposures to UVA radiation would cause a decrease in algae's oxygen production. Chlamydomonas and Ankistrodesmus were grown in a four weeks period. Culture media and algae were placed in an Erlenmeyer flask connected to an oxygen pump that was kept for two weeks under a controlled environment radiated with LED light. The base algae was then divided into seventy-two individual test tubes and exposed to one of four light sources: LED, UVB, UVA, and sun-like conditions. After a two weeks incubation period, the seventy-two test samples were then tested for dissolved oxygen content using the Winkler method. Experimentation was repeated. Samples exposed to UVB exhibited the least amount of dissolved oxygen at a 300% less than the control. Likewise, samples exposed to UVA exhibited 50% less oxygen production. The results were evaluated using the formula of variance to check for consistency. A linear regression analysis (y=.0749x-15.529) was conducted to define the coefficient of determination (R=.936), which shows that wavelength and oxygen production are directly correlated. The data indicates that a direct consequence of ozone depletion and subsequent increased UVA and UVB radiation causes less oxygen production in algae. The data analysis supports the hypothesis, and there will be further research.

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