

A Literature Study of the Use of Electrophoresis to Replace the Electron Transport Chain in Photosynthesis within Aquatic Plants in the Absence of UV Light.

Program of Study: Plant Biology

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Category: Theoretical Proposal

Abstract:

World hunger is a plight that is within our grasp to remedy. This theoretical experiment, if successful in implementation, has the potential to end world hunger. The goal of the experiment is to test the growth of aquatic plants under the influence of electrophoresis in the dark. Essentially, the electron transport chain in photosynthesis will be replaced with an electric current run through aqueous buffer in a gel electrophoresis apparatus. A range of voltages near the ideal voltage will be tested. The ideal voltage will be calculated using the Nernst equation and the pH values from both sides of the thylakoid membrane in the chloroplasts of the species of algae being tested. The algae will be placed in various gel electrophoresis apparatus (without gel) suspended in the water from the natural habitat. The electrophoresis will be run continually at the various voltages in the different apparatus. A cardboard box will be placed over each chamber to exclude all light. A control will be grown near a window so it is exposed to sunlight with no additional voltage. The occurrence of growth will be tested by taking dissolved oxygen readings from each apparatus twice a day (morning and night) for two weeks. If the experiment is successful, large scale electrophoresis apparatus could be built so that substantial quantities of food crops can be grown. Potentially, multi-level underground farms could be built. The increased surface area this design provides allows more crops to be grown per square foot than could ever be on the earth's surface. Increased food supply, if properly distributed, could potentially abolish world hunger permanently.