CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

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Project Number

31639

Project Title

Year 3: An Analysis of 6 Plant Species through Theoretical Capacities for Oxygen Production and Ability to Block Out UV

Abstract

Objectives/Goals

The purpose of this investigation was to analyze the leaves of six distinct species of plant, Plumeria, Jasminum, Hibiscus, S. romanzoffiana, C. limon, and, S. oleracea, through their differing theoretical capacities for oxygen production and compare it to the species ability to effectively block ultraviolet (UV) radiation, further comparing those results to time exposure analysis of day length from year 1700B.C.E. -2100 B.C.E. In this way, information was gathered to analyze the capabilities of these plants through changing environmental conditions. This was then used to provide evidence towards the strength, efficiency and reliability of the species in order to determine the most efficient specimen(s) in oxygenating the atmosphere, blocking out harmful UV radiation from the sun, and having strength to do so through the variable circumstances of the passage of time.

Methods/Materials

The method of a three year analysis is too long to be placed here.
Please refer to the project notebook. Thank you.

Results

By cellular sampling,unit area sampling, and distinct cell sampling, it was determined that S. oleracea, had the most chloroplasts. When counted for the number of chloroplasts, per distinct cell, S. oleracea had an average of 17.2 chloroplasts per cell. When tested, for their ability to block out UV radiation in 2008, all of the specimens, Plumeria, Jasminum, Hibiscus, S. romanzoffiana, and C. limon, blocked 100% of the UV radiation they encountered in the test area. Every specimen tested was equally effective in blocking out UV radiation. The percent deviation of UV strength in mW/m^2 under the leaves for all six species was 000%. The tests in 2010 however gave contradictory results. Though tested at different times over a period of two days, there was a distinct pattern in that live leaves blocked out more UV radiation than dead leaves and that C. limon blocked out the most UV radiation, live or dead, yielding only a 5% penetration rate either way.

Conclusions/Discussion

A genetically enginered combination of characteristics of plants would have the optimal strength, efficiency and reliability of the species and have the efficiency in oxygenating the atmosphere, blocking out harmful UV radiation from the sun, and having strength to do so through the variable circumstances of the passage of time.

Summary Statement

Exploring usefull characteristics of various plant species, through their ability to block out UV radiation, and through their theoretical capacities for oxygen production.

Help Received

This investigation would like to thank Aileen Anderson, Ph.D. and Brian Cummings, Ph.D. for their generous time and effort, in providing a lab environment necessary for the accuracy of this experiment. Their generous giving of time, energy, supplies, and stereoscope, is greatly appreciated.

Preliminary