



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

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Project Title Algae and Acid Rain	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine whether water that contains a measurable level of acid (with pH level less than 7-simulating acid rain) will affect the cellular structures of the algae Spirogyra, Volvox, and Micrasterias</p> <p>Methods/Materials Cultures of algae are obtained from a school biological and chemical supply company for the following algae: Spirogyra, Volvox, and Micrasterias. Each of these algae will be Subcultured to three glass containers prepared for optimal growth. Subsequently, each specimen will then be divided into 3 conical tubes labeled by pH values 7.0, 6.0, and 4.5, which represents normal algae cultivated in pollution-free water (7.0), low-acid water (6.0), and high-acid water (4.5) solutions. Algae will be removed and examined using a 200x microscope, with observations recorded and interpreted daily for 3 days. The constants for this experiment was light (indirect sunlight) and temperature. The variables were the pH, alga species, and time alga was exposed to an acid water environment.</p> <p>Results The alga cultures Volvox and Micrasterias were somewhat resistant to acid rain, while the cell wall structure of the alga Spirogyra was altered by acid rain. Some alga are resistant to acid rain as was demonstrated in my experiment with Micrasterias and Volvox, while others, like Spirogyra are quite sensitive to an acid rain environment.</p> <p>Conclusions/Discussion In conclusion, my hypothesis was partially correct. In normal water Spirogyra maintained its structural integrity with the chloroplast in a spiral arrangement. However, with low acid water (pH5.5) the cell wall was partially destroyed and the chloroplasts appeared in clumps. Furthermore, with high acid water (pH 4.0), the cell wall was completely destroyed (by day three) exhibiting free chloroplasts in clumps and single arrangements. In contrast to my hypothesis, the Micrasterias appeared resistant to the acid environment. Further research determined that this algae is acidiophilic, preferring an acid environment, and is therefor commonly found in acid marshes! Volvox did not grow well and this alga was difficult to find. Volvox, on observation, appeared to exhibit a phenomenon called inversion, whereby, the colony turns itself inside out. There did not appear to be any significant changes for this alga. The results of my experiment illustrate a variation of response to environmental changes where some species are more susceptible than others.</p>	
Summary Statement The growth and microscopic observation of algae in an acid environment.	
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