



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> <b>Bowen Jiang</b>	<b>Project Number</b>  36180
<b>Project Title</b> <b>Towards a Novel Method for Combating Harmful Cyanobacteria in Freshwater</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Across the globe, freshwater cyanobacterial harmful algal blooms (HABs) are increasing in frequency, and toxic blooms produced by several common species can pose significant human health risks as well as environmental problems. In contrast to saltwater HABs, however, far less research has been conducted on testing specific, environmentally-friendly treatments to selectively kill freshwater cyanobacteria. In this study, the efficacy of trans-resveratrol, a polyphenol produced in vascular plants, as a selective inhibitor of cyanobacterial photosynthesis, was investigated on <i>Anabaena flos-aquae</i>, a neurotoxin-producing cyanobacterium.</p> <p><b>Methods/Materials</b> Cultures of <i>A. flos-aquae</i> (a non-toxic strain was employed) and <i>Selenastrum</i>, a non-toxic chlorophyte used as a toxicological model, were used in this study. In order to determine the effect of trans-resveratrol on population growth, both algae were grown in tubes with different amounts of trans-resveratrol added to each, and cell concentration was measured daily over the course of seven days. The rate of photosynthesis with and without trans-resveratrol treatment was determined by using a FireSting oxygen meter. Cells were collected and placed in a respiration vial connected to the meter, and photosynthesis and respiration were quantified by the rate of oxygen change in light and in darkness.</p> <p><b>Results</b> Application of resveratrol to cultures of <i>Selenastrum</i> resulted only in marked inhibition of population growth and photosynthesis, suggesting that resveratrol may not be generally inhibitory to higher autotrophs. However, experiments to measure the impact of resveratrol on cultures of <i>A. flos-aquae</i> are still in progress, so it is not possible at this time to determine if resveratrol is specifically inhibitory to cyanobacteria.</p> <p><b>Conclusions/Discussion</b> Application of resveratrol to cultures of <i>Selenastrum</i> resulted only in marked inhibition of population growth and photosynthesis, suggesting that resveratrol may not be generally inhibitory to higher autotrophs. However, experiments to measure the impact of resveratrol on cultures of <i>A. flos-aquae</i> are still in progress, so it is not possible at this time to determine if resveratrol is specifically inhibitory to cyanobacteria.</p>	
<b>Summary Statement</b> In this study, a potential environmentally-friendly cure for toxic freshwater algal blooms was investigated.	
<b>Help Received</b> Professors Gordon V. Wolfe and Emily J. Fleming-Nuester of Department of Biology, California State University, Chico, helped me acquire and learn how to use the oxygen probe, and donated lab space for its use. In addition, Professor Wolfe helped provide chemicals and consumables for culturing <i>A. flos-aquae</i> .	