



CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

Name(s) Christopher J. Paghasian	Project Number 36127
Project Title Does Silica Depletion Affect the Growth and Domoic Acid Production of Pseudo-nitzschia australis?	
Abstract Objectives/Goals Since 1991 the Monterey Bay has experienced eight algal blooms, one of the largest occurring during the summer of 2015. Many of the phytoplankton in these blooms produce domoic acid, which greatly deteriorates the neurological pathways of many marine predators and humans. During the latter half of an algal bloom, phytoplankton will have exhausted the majority of silica in its environment. This project investigates how silica depletion affects the growth and domoic acid production of Pseudo-nitzschia australis. Methods/Materials Nine flasks were prepared, with sets of three undergoing different conditions: control (autoclaved seawater), all nutrients (Guillard's F/2), and silica depletion (Guillard's F/2 without silica). Each sample underwent two tests: a cDA test, which calculated the amount of domoic acid in the sample's total biomass, and a tDA test, which calculated the amount of domoic acid in one mL of the culture. An ELISA test allowed for the amount of domoic acid per cell to be calculated through a spectrophotometer. Results The results showed that in Pseudo-nitzschia australis, domoic acid production increases under silica depletion but cell growth significantly decreases. Conclusions/Discussion Even when silica has been exhausted from the environment, Pseudo-nitzschia australis can still pose a threat to marine predators and humans. Further research might investigate how many different environmental factors (copper exposure, the addition of phosphorus and nitrogen, temperature changes, or fluctuations of pH) affect the growth and domoic acid production of Pseudo-nitzschia australis.	
Summary Statement I investigated the effects of silica depletion on the domoic acid production and cell growth of Pseudo-nitzschia australis to simulate environmental conditions toward the end of an algal bloom.	
Help Received Moss Landing Marine Laboratories provided laboratory space and equipment. Mr. Jason Smith opened up his laboratory, and Ms. April Woods mentored me in the use of laboratory equipment and was a primary source for information on Pseudo-nitzschia.	