



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Trevor J. Fobel	Project Number S1708
Project Title To Grow or (NO)t to Grow: A Study of the Effects of Exogenous (NO) on the Proliferation of Three Marine Algae Species	
Abstract Objectives/Goals The objective of this project is to compare the effects of Nitric oxide (NO) on three different algae species: Spirulina major, Gymnodinium sp. and Dunaliella salina. These three species were selected because they are related to algae species that are used for food, bio-fuel, or produce toxic "Red Tides." The question this experiment is designed to answer is as follows: Can Nitric oxide (NO) be utilized to accelerate the growth of algae used for food or bio-fuel, and hinder the growth of "Red Tide" algae? Methods/Materials Culturing station was assembled. DETA (NONO)ate utilized as (NO) donor. Three algae species (Spirulina major, Gymnodinium sp and Dunaliella salina) were used. Each specimen was divided into one control and four variable groups. Cultures were grown under the same conditions. Distribution of the 0.18 mg sample of DETA (NONO)ate into one liter of polished water, yielded a highly concentrated solution. Dilution of this solution yielded four decreasingly conc. secondary solutions. The solutions were applied to the four test cultures of the three algae species, excluding the control cultures. Photographs of the microscopic algae were taken before and after application of the (NO) solution to document the effects on the growth of each species. Conducted a "point count", or approximate counting of individual algae cells on the Gymnodinium sp. and Dunaliella salina cultures from microscope pictures. A growth% was calculated for each culture and results recorded. Growth changes of the Spirulina cultures were observed by visual inspection. An approximate natural threshold to (NO) concentration of each species was determined. Results Gymnodinium sp. experienced the highest growth rate of the three cultured species. The Dunaliella salina cultures experienced an unpatternized growth. Results with the Spirulina major cultures were inconclusive. Conclusions/Discussion Though a lack of data exists to confirm similar results in Spirulina major, results from the other cultures show that if sufficient (NO) is applied to algae cultures, growth will be affected, with toleration levels to (NO) concentration dictating whether the growth rate will be greatly accelerated or severely inhibited when compared to untreated cultures.	
Summary Statement This project exposes three types of algae (Spirulina major, Gymnodinium sp and Dunaliella salina) to four different concentrations of Nitric Oxide to determine whether growth is inhibited or stimulated by the chemical.	
Help Received Brett Wight helped make DETA (NONO)ate measurement at AFRL. Dad helped build light stand. Mom helped with MS Word/Powerpoint; verified amount of DETA (NONO)ate needed for experiment. Teachers Ms. Debbie Lewis/Mr. Mark Grubb supplied materials and helped finalize idea for experiment.	