



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

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| <b>Name(s)</b><br>Ryan A. Nock  | <b>Project Number</b><br><b>S0912</b> |
| <b>Project Title</b><br><b>The Algae Weapon: Combatting Global Warming with Oil-Producing Algae</b>   |                                       |
| <b>Abstract</b><br><b>Objectives/Goals</b><br>Algae, when fertilized with iron, can combat global warming by photosynthesizing rapidly and consuming CO <sub>2</sub> . Iron fertilization, however, can cause harmful algal blooms. My objective was to find a substance that, in conjunction with iron, could promote algal photosynthesis without causing an algal bloom. I hypothesized that adding Talc or oil-absorbing pads to an oil-producing algae would remove oil and redirect the algae to use its energy to produce more oil rather than to grow.<br><b>Methods/Materials</b><br>Nannochloropsis, an oil-producing marine algae, was added to seawater medium in three petri dishes. Iron was added to one dish, iron plus Talc to another, and iron plus oil-absorbing pads to a third. Twice a day for 10 days the samples were tested for photosynthesis (using pH strips) and for growth (using a color chart).<br><b>Results</b><br>Talc (plus iron) was effective at limiting the algae's growth while increasing its photosynthesis. Specifically, algae with Talc (plus iron) photosynthesized 1.5 times more than algae with iron only, but grew 0.33 times less than algae with iron only. Oil-absorbing pads had no effect on the algae's growth or photosynthesis, since the results for algae with oil-absorbing pads (plus iron) were identical to those for algae with iron only.<br><b>Conclusions/Discussion</b><br>Talc and iron can be added to oil-producing marine algae to increase the algae's photosynthesis without causing an algal bloom. This suggests that oil-producing algae can be a useful natural weapon in the world's fight against global warming, if substances such as Talc are used to prevent or mitigate harmful side-effects like algal blooms. |                                       |
| <b>Summary Statement</b><br>My project tested whether Talc or oil-absorbing pads, in conjunction with iron, could be added to oil-producing marine algae to increase the algae's photosynthesis without causing an algal bloom.   |                                       |
| <b>Help Received</b><br>A hazardous waste expert provided the oil-absorbing pads. Professor Ralph Lewin at U.C.S.D. sent me a scholarly article discussing several varieties of oil-producing algae, i.e. diatoms.  |                                       |