



**CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY**

Name(s) Joshua B. Duquette	Project Number S1801
Project Title A Comparison of Conventional Algae Growing Techniques to Photobioreactors	
Abstract	
Objectives/Goals Problem Statement: Is the use of an Algae Bio-reactor a more effective method then using Conventional Techniques when the variable being compared is Algal biomass?	
Methods/Materials Materials: Algae, Ankistrodesmus (Green); This was used instead of microalgae because microalgae is harder to strain and grow, so using an algae with similar characteristics demonstrates accuracy of the idea without having to use the microalgae. Cool White (40 Watts) 15 cm away from all culture tuber (8 hour dark 16 hour light cycle), Glass Jars *12 + Lids, Purified Water, Coffee Filters, Mixing Spoon, Box, Thermometer, Large Pot, Tongs, Towel, Strainer, Test Tube.	
Results Results: The algae grown using the conventional (current) techniques grew the best. The control grew very close to the same amount. The bio-reactor grew the least. The average layer penetration of the bio-reactor was 4.33 but the maximum was 7. The average layer penetration of the Control was 7 and the conventional grown group was 7.5 layers average with 8 being the highest layer penetration in both groups. All jars had a thick ring of algae at the bottom where growth was most concentrated. The jars had an area of dense growth on the side. The average height of this growth was 1.75 cm up the side. The highest was 4.5, however this produced neither the highest layer penetration nor the layer penetration near the highest. This suggests that this result was an outlier. However, this growth models layer penetration accurately in every other case. It should be noted that even with a reduced amount of solution, the control and conventional groups both produced this layer.	
Conclusions/Discussion Conclusion: The bio-reactor produced the least average biomass meaning that is should not be used as a substitute for current algae growing techniques. This may be because the algae is able to grow faster in natural light as opposed to white light or because algae needs more consistent gas exchange with the environment. In future research, modifying the bio-reactor will be necessary to produce a higher algae yield with a more consistent result. Large scale production of algae may have a different result than small scale testing because the volume will help mitigate these affects.	
Summary Statement Comparing the yeild of algae biomass of different algae culturing texhniques.	
Help Received Father ordered materials	