



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Biofuel from Microalgae	
Objectives/Goals The objective of this project is to determine if microalgae from a local pond would be a viable source for producing biofuel using direct transesterification. Also, how would the hexane extraction method compare to the chloroform-methanol method.	
Abstract	
Methods/Materials Materials: Algae from a local pond, n-hexane solution, deionized water, 1:1 solution of chloroform & methanol, 5% solution of sulfuric acid, Bio Flow Chamber, Laboratory blender, centrifuge machine, Vortex mixer, hot bath, separation glass funnel, 10 mL graduated cylinders, 100 mL beakers, 150 mL conical flasks, 45 mL plastic vials with conical bottom, Electron compound microscope, electronic scale, refrigerator, gloves, small forceps, parafilm, labeling tape, sw permanent marker Procedure: Collect 1 liter of algae sample and wash it with deionized water. Make a paste of the algae using a blender. Centrifuge the algae paste at 5,000 rpm for 8 minutes. weigh the algae mass after discarding the supernatant. For the hexane method, add 30 mL of n-hexane solution and mix thoroughly using hand motions and vortex mixer. Pour the contents into a separating funnel and let the funnel stand vertically for 10 minutes. Open the bottom valve of the funnel to collect dark color liquid (mixture of algae oil and hexane). Transfer the liquid into glass tubes and put the tubes in a hot bath at 65°C for 20 minutes. Take the glass tubes out and measure the volume of the liquid. For the chloroform-methanol method, add 30 mL of 1:1 solution of chloroform & methanol and 35 ml of 5% sulfuric acid and follow the same steps.	
Results The hexane method resulted in extracting very small amount of oil out of the wet algae mass; the oil got stuck to the sides of the separating funnel and could not be measured. The chloroform-methanol method resulted in oil mass ranging from 45 to 75% of the wet algae mass.	
Conclusions/Discussion The hexane is not efficient in extracting any oil out of the wet algae mass. The chloroform-methanol method is much more effective in extracting the oil from the wet algae mass. The yield of the oil increased with the increase in the mass of the algae.	
Summary Statement My project is about extraction of oil from microalgae (wet mass) using direct transesterification method and comparison of hexane and chloroform-methanol extraction methods.	
Help Received My father helped me perform and supervise the experiment and my mother helped me finish the board. In addition, Dr. Lauer from CSUB provided guidance in using the lab equipment and methods.	