



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Nicole Kowtko	Project Number J1819
Project Title Fast Food Fuel Frenzy: How Effective Is Biofuel?	
Abstract Objectives/Goals I wanted to determine if biodiesel made from waste vegetable oil (WVO) is a comparable replacement for diesel #2. I hypothesize that they both will burn approximately the same amount of fuel in approximately the same amount of time because they both burn at high temperatures. Methods/Materials A homemade calorimeter composed of a 6 oz tin can containing 5 ml of the test fuel was clamped into a tea kettle holding 1 pound of water. A digital thermometer was placed in the spout. After the wick in the fuel was lit, a timer was started, and there was continual stirring of the water (so the heat was evenly distributed). When the water was raised 1 degree Fahrenheit (meaning the fuel generated 1 British Thermal Unit or BTU), the wick was blown out, and the timer stopped. The amount of fuel burned off and the elapsed time were recorded. This was repeated 10 times per fuel. Results The amount of fuel burned off during each test is the same as the amount of fuel needed to generate 1 BTU. The biodiesel used an average of .25 ml to generate 1 BTU, while diesel #2 only needed .225 ml of fuel to produce the same energy. The amount of time needed to generate 1 BTU is another factor that was used to evaluate the efficiency of the test fuels. Biodiesel used an average of 99.375 seconds to generate 1 BTU, while diesel only needed an average of 67.875 seconds. Interestingly enough, biodiesel required about 50% more time than diesel, so diesel was clearly faster. Conclusions/Discussion The evidence indicates that the diesel burned less fuel and burned quicker than the biodiesel, proving the hypothesis wrong. However, from observations based on the smell and byproduct of the fuels, biodiesel seems to be the overall better choice.	
Summary Statement This project tests if biodiesel made from waste vegetable oil is a comparable replacement for diesel #2 by examining the fuel efficiency.	
Help Received Two neighbors informed me about calorimeters and a way to test the fuels, which I later refined thru trial and error. My science teacher reviewed my ideas. My mother was my test assistant (dealing with the matches and safety measures), taught me how to use Excel graphs, and helped review my work.	