



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Brian Orser; Dylan Vandenberg</b>	<b>Project Number</b> <b>S0211</b>
<b>Project Title</b> <b>From Grains to Grease, to Gallons of Gas: A Search for Efficient Biofuel</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Our purpose was to discover the most efficient crop to use in the creation of biodiesel. We asked: "Of the various crops commonly used in the manufacturing of biodiesel (corn, soybean, peanut, flax), which yields the most pure biodiesel per acre? In other words, which of these crops is the most efficient for the biodiesel creation process?" We hypothesized that peanut would be more efficient for the production of biodiesel than corn, flax and soy, due to the purity and amount of oil extracted from each plant, the large number of plants per acre, and the existing agricultural infrastructure centered around the growth of peanuts. Peanut plants yield one hundred thirteen gallons per acre, more than twice the amount of the highest yield of the other three.</p> <p><b>Methods/Materials</b> We made four batches of biodiesel from each type of oil, starting with 200 ml of oil for each. This way, we would find how much biodiesel each oil yields relative to the others. We first heated the oil, added methoxide, blended it and poured it into a settling container. The methoxide broke apart the triglycerides, allowing the glycerin to settle out of the mixture. We then siphoned off the biodiesel, leaving the glycerin, and washed it with 100 ml of water which removed any remaining glycerin, water or other contaminants. We then siphoned off the purified biodiesel and measured the yield. We repeated this process four times for each oil, and compared the yields.</p> <p><b>Results</b> The peanut oil coagulated, such that we couldn't test it. The remaining oils; Soy, Flax and Corn; had 89.75, 89.00 and 86.50 percentage yields respectively, meaning the volume of the final Soy biodiesel was 89.75% of the beginning volume of oil, and so on. However, what we were testing was yield per acre. The yields per acre (in gallons) for Soy, Flax and Corn are, respectively, 43.08, 45.39, and 15.57.</p> <p><b>Conclusions/Discussion</b> We can not be certain whether or not our hypothesis was correct, as the peanut oil coagulated to a point at which it was useless. However, we can still discern which of the remaining three crops yields the most biodiesel per acre. We hypothesized that flax would have the second largest yield which turned out to be true. Despite the fact that soy yields more biodiesel per gallon of oil, flax yields enough more oil per acre to offset this, and to allow flax to be the most efficient, followed closely by soy, and then by corn.</p>	
<b>Summary Statement</b> We made biodeisel from several commonly used plant oils to discern which yields the most biodeisel per acre of crop.	
<b>Help Received</b> Father supplied some materials.	