



CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY

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<b>Project Title</b> Got Biodiesel? Transesterification of Plant Oils into Fatty Acid Methyl Ester	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> In this project I set out to make biodiesel from plant oil. I wanted to see which plant oil would produce the most biodiesel using only a single cup of plant oil. I chose red palm oil and soybean oil. Based on my research, palm oil and soybean oil are among the top three most sustainable oils for the production of biodiesel. My hypothesis was that palm oil would yield the most biodiesel and that it would burn the hottest.</p> <p><b>Methods/Materials</b> Through the process of transesterification, I made biodiesel. I was able to use my catalyst (potassium hydroxide) and methanol to separate my glycerin molecule from my triglycerides. With this, the vegetable oil breaks down creating biodiesel. Using the "Dr. Pepper Method" I washed the biodiesel in a 2-liter soda bottle at least 5 times. Lastly, I compared the heat output of my biodiesel to petroleum diesel to test efficiency. I did this using an alcohol burner with a wick, and measured the heat output of oil using a laser thermometer.</p> <p><b>Results</b> On average the palm oil yielded more oil. The average amount of biodiesel made for the soybean oil was 230ml while the palm oil was 245ml. Palm oil also had a higher heat output than both soybean and petroleum diesel. At their highest temperatures, red palm oil was 502°F, soybean was 388°F and petroleum diesel was 404°F</p> <p><b>Conclusions/Discussion</b> Saturated plant oils yield more biodiesel and have a higher flashpoint making them ideal for the production of biodiesel, proving my hypothesis correct. Red palm oil is a saturated fat that contains many triglyceride molecules. This makes red palm oil ideal in the production of biodiesel.</p>	
<b>Summary Statement</b> The transesterification of plant oils into fatty acid methyl-ester.	
<b>Help Received</b> Under supervision of my mum.	