



**CALIFORNIA STATE SCIENCE FAIR
2006 PROJECT SUMMARY**

Name(s) Daniel A. Carrion	Project Number J0203
Project Title Comparison of Petroleum Based Diesel Fuel and an Alternative Diesel Fuel	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals I compared petroleum diesel to Diesel Secret Energy (DSE) in fuel consumption, motor oil cleanliness, exhaust emissions, power, and price.</p> <p>Methods/Materials To make DSE, I constructed a pumping and filtering apparatus. I used two engines to test the fuels: a Perkins four-cylinder stationary engine, and a Ford 6610 tractor. I changed the oil in both engines and put two gallons of diesel in both. I ran the Perkins engine at 1500 rpm for one hour. I tested the Ford 6610 by equipping it with a mower and ran it at 1500 rpm in fifth gear for one hour. I drained the remaining fuel and subtracted that amount from two gallons to determine the hourly fuel consumption rate. I did a total of five tests on both engines. I changed the oil on both and kept a sample of the old oil for further comparisons. I then started testing with DSE. I ran the same process for five tests. For the exhaust tests, I set an air conditioner filter about three inches from the stack for thirty seconds. I repeated that five times. I did a similar test where I gave each filter three revs of the engine. I repeated that five times, using both fuels. For the oil tests, I compared the used oil samples from the diesel tests and the DSE tests to new Delo 400.</p> <p>Results On the Ford 6610, DSE use averaged about .4 ounces less consumption than diesel. The Perkins engine on DSE consumed about 22 ounces less on average. DSE was more fuel efficient. After five hours of testing on DSE, the motor oil was still almost clear. After five hours of petroleum diesel testing, the motor oil was like black mud. The oil stayed much cleaner when running on DSE. The emission tests were inconclusive. The filters that came from the DSE idling tests looked a tiny bit darker than the diesel filters. While running on DSE, the exhaust stacks on both engines visually looked much cleaner and the exhaust smelled good. The exhaust that was emitted from the engine while running on diesel was black and nauseating. Both engines' power increased by at least 200 rpm while running on DSE. The price of petroleum diesel is about \$2.87 per gallon. DSE costs about .85 cents per gallon. That is a \$2.02 savings per gallon.</p> <p>Conclusions/Discussion DSE is an all around better fuel. Fuel economy is equal to or better than petroleum diesel, motor oil stays cleaner, power is improved, and it costs less than petroleum diesel. The exhaust looks cleaner and smells better.</p>	
Summary Statement My comparison of DSE to petroleum diesel determined that a soybean oil based fuel can run more efficiently, has more power, operates cleaner, and is approximately 1/3 the cost of petroleum diesel.	
Help Received My dad supervised fuel mixing and monitored engine operation. He also proofread my writing and advised on my display construction.	