# Battle of the Diesels: A Comparison of B-10 Diesel vs.B-100 Homemade Biodiesel for Efficiency and Exhaust Analysis

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With a passion for renewable energy and motors, I made my own biodiesel from waste vegetable oil and compared it to conventional petroleum-based diesel. My hypothesis was that biodiesel would run less efficiently, but with fewer pollutants. I obtained an engine, supplies, and recipe for making the biodiesel. I made two batches. The first was for three trials and the second was for bleeding and eliminating any petro-diesel residue in the fuel lines. I used a titration kit to determine how many grams of KOH to use per liter of diesel. I mixed waste vegetable oil with methanol and food grade potassium hydroxide to form biodiesel and glycerin. I then “washed” the biodiesel four times to remove remaining soap from the biodiesel. An aquarium bubbler helped with the drying process. I prepared my engine for testing by cleaning the filter, replacing the lines and changing oil. When running fuel in the one-cylinder engine, I tested multiple times for efficiency. I tested temperature, pH and particulate matter in the exhaust by running the fumes through water using Lab Quest. My data revealed homemade biodiesel was consumed slightly quicker, yet with less particulate matter present in the exhaust. Biodiesel was cheaper per gallon. The only negatives were it was less efficient since biodiesel has less BTU’s and it gels easily. My hypothesis was supported in this experiment. I plan to use homemade biodiesel on my farm in the future. Further testing will include making larger batches and finding a cure for gelling.

**Awards Won:**