Biodiesel Investigation Lab

Which biodiesel performs best? (waste vegetable oil or virgin vegetable oil)?

Biodiesel is made through a chemical process called ***transesterification***, whereby the glycerin is separated from the fat or vegetable oil. Biodiesel refers to the pure fuel before blending with diesel fuel. Biodiesel blends are denoted as, "BXX" with "XX" representing the percentage of biodiesel contained in the blend, for example B20 is 20% biodiesel mixed with 80% petroleum diesel. Enough fuel can be produced from this lab to burn in a later activity, although it is not pure enough to actually be used as fuel in a car or truck. The synthesis is a simple chemical reaction that produces biodiesel and glycerol. Cooking oil is mixed with methanol, while potassium hydroxide is added as a catalyst. The products separate into two layers, with the biodiesel on the top. The biodiesel is separated and washed. Then the washed biodiesel is ready for product evaluations.

Background

Define the following terms:

Biodiesel	Transesterification	Hygroscopic	Catalyst
Glycerin	Glycerol	Waste Oil	Virgin Oil

Reactants of Biodiesel

Products of Biodiesel

Safety Precautions:

Hypothesis:

Variables

Independent:

Dependent:

Controls:

Making Biodiesel

Data: (Sample Data Table)

Biodiesel Product Testing

Type of Biodiesel	Density	Cloud Point	pH	Color	Odor	Flame Color & Flame Test	Time to ignite	Smoke Color
Virgin Soybean Oil								
Waste Soybean Oil								

Conclusion: (include REE, PE, PA)

REE: Restate your evidence to support your hypothesis.

Also make sure to include the following:

When producing biodiesel, what are the reactants and what are the products? What was the catalyst? Why is a catalyst necessary for the reaction?

How did the clarity of the solution change as you mixed the sample?

Take a moment to clarify your observations about what happened to your sample overnight. Consider color, layers, apparent viscosity, etc. Why did the two substances separate?

How did the pH of the "soapy" layers change with each subsequent washing? If you saw a change, why would that occur?

PE: Identify possible errors and ways to improve

PA: Practical Application

In the PA section, discuss importance of lab investigation. Consider researching the cost per gallon of biodiesel over time and find the closest location where biodiesel is sold.