

Making Biodiesel

Testing Biodiesel for Chemical Properties

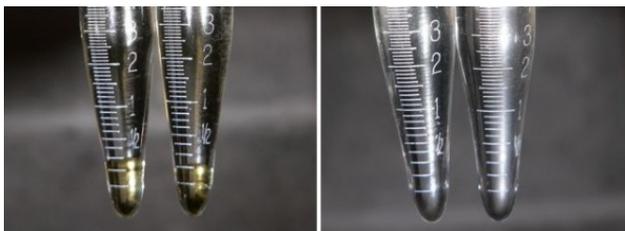
Materials

thermometer
test tube rack
scale
methanol
parafilm
ice bath
test tubes
ependorf tubes
salt

Procedure

3-27 Conversion Test

1. Measure the temperature of the Biodiesel and Methanol and ensure that they are both between 20°C to 22°C. (**IMPORTANT: Temperature is extremely critical in this test. If either the Biodiesel or Methanol isn't the correct temperature, heat or cool them until they are.**)
2. Add 27 mL of Methanol to a large test tube
3. Add 3 mL of Biodiesel to the test tube.
4. Seal the test tube with parafilm and lightly shake test tube.
5. Let sample sit in test tube rack for 10 minutes.
6. Tip the vial at a 45 degree angle for 10-15 seconds and record if any fallout is present. If fallout is detected, it indicates that some of the oil didn't fully react into biodiesel. If no fallout is seen, then the reaction went well.
7. Repeat steps 1-6 with other sample.



pH

1. Determine using traditional methods of pH paper, universal indicator, or a pH probe.
2. Record pH level in data table.

Density

1. Weigh an eppendorf tube and record weight.
2. Then add 1 mL of biodiesel to eppendorf tube and re-weigh sample. Subtract the weight of the empty eppendorf tube. This will give the mass of 1 mL of biodiesel.
3. Divide mass of the biodiesel (g) by volume of biodiesel (1mL) to calculate density of the biodiesel (g/mL).

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Cloud Point

Cloud point represents the temperature at which a liquid becomes turbid or cloudy. Because biodiesels are a mixture of a variety of esters, it is extremely difficult to clearly defined freezing point. The cloud point is an indication of the temperature when solid fractions appear in the solution. This is important because fuels must remain liquid to pass through fuel filters and to function in a diesel engine even at cold winter temperatures.

Procedure

1. Prepare an ice bath (using salt in the bath will allow lower temperatures to be tested).
2. Add approximately 5 mL biodiesel each to 2 large test tubes.
3. Place a thermometer in 1 of the test tubes and place tube in the ice bath.
4. Remove the test tube from the bath every few seconds to check the solution for cloudiness using the second test tube as a reference sample.
5. Since the temperatures may be cold enough to cause condensation on the surface of the test tube, check for cloudiness immediately after removing the tube from the ice bath.
6. Continue this process until the biodiesel becomes cloudy.
7. Record the temperature of the biodiesel. Warm the sample back to room temperature and repeat step 4 a minimum of 3 times.