

6.6.1 Biodiesel Analysis Instructions

Density Measurement and Calculation

1. Place the 5 ml graduated cylinder on the scale. Record the mass of the cylinder in grams.
2. Transfer a volume (5ml) of your sample into the graduated cylinder. Record the volume.
3. Weigh the graduated cylinder and sample on the scale. Record the difference in mass.
4. Calculate the density by dividing the mass by the volume: $Density = \frac{Mass}{Volume}$.

Relative Viscosity Measurement

1. Transfer about 6 ml of sample into the 5 ml graduated cylinder.
2. Place the plug in the cylinder.
3. Hold the plug, using an external magnet, so that it is submerged in the sample, and its bottom is even with the 5 ml mark.
4. Ready your timer.
5. Release the plug and time how long it takes for the plug to reach the bottom.
6. Record the time. Repeat the measurement several times to assure consistent readings.

Burn Rate and Flame Temperature Measurement and Calculation

1. Construct a wick by cutting a 4 in. piece of wick material. Fold the wick in half and place it in a paper clip so that the fold barely sticks above the paper clip.
2. Transfer about 8 ml of sample to the glass vial.
3. Place the prepared wick into the vial so that the long end is submerged in the sample.
4. Place the vial **in a stand** on the scale.
5. Light wick and allow flame to stabilize
6. Place end of thermocouple in the flame above the wick. Be careful not to burn the sheathing of the thermocouple. Move it around to get the highest flame temperature reading you can. Record flame temperature.
7. Ready your timer.
8. Start timer and tare the scale.
9. Allow sample to burn for about 60 seconds.
10. Record "Burn Time".
11. Record scale reading as "Mass loss during Burn Time".
12. Calculate burn rate as: $Burn\ Rate = \frac{Mass\ loss\ during\ burn\ time}{Burn\ Time}$.
13. Extinguish the flame.
14. Dispose of wick in soapy water. Pour remaining oil into waste oil container.

