

**REPORT GUIDE Report Due:** Mon March 9.

**This will not be a formal report. This report will be done in pairs.**

**For the report:** 1) Complete the form below and **attach** NMR, IR, Calorimetry and Mass Spec data.

Name \_\_\_\_\_ Name \_\_\_\_\_

What oil did you make your biodiesel from? \_\_\_\_\_

1. Write in the reaction equation for this reaction:

2. Analysis of the NMR spectrum-- Analyze the NMR of your Biodiesel with the appropriate interpretation (as you did for the NMR day unknown). You can write this on the spectrum itself.

Comment below if the NMR indicates that you produced biodiesel and if there are any indications of any impurities (such as unreacted starting oil).

3. Analysis of the IR spectrum. List the major absorptions observed and to what functional groups they pertain to. (do not report anything in the finger print region).

Comment below if the IR indicates that you produced biodiesel and if there is any indication of impurities such as unreacted methanol or glycerine.

4. Analysis of the Mass spectrum: On another sheet of paper, list the names and draw the structures of the components in your biodiesel (according to the MS). List only the names of the largest 2-4 peaks.

Compare the components of your biodiesel with those listed on page 1166 of the Bruice text. Given the oil you used, does your data concur with this chart--did you receive similar fatty acid components as the oil on the chart?

5. Calorimetry. Calculate the heat of combustion per gram ( $H_c$ ) of your biodiesel—(See the end of the handout for equations needed to do this). Also convert your heat per gram calculation to Heat per gallon. (Hint: the density of biodiesel is 0.85 g/mL) Show your work for these conversions.

Did your biodiesel give more heat per gram than heptane (a common component of gasoline) and the ethanol you produced in the previous lab?

6. For the conclusion, Briefly surmise all the data and state if you succeeded in synthesizing Biodiesel.

7. Post-laboratory Questions:

1. Why did the two products of this experiment (glycerol and biodiesel) separate?
2. How many molecules of biodiesel are produced for each molecule of oil?
3. One argument for using biodiesel is that the net amount of  $\text{CO}_2$  released into the atmosphere is claimed to be zero (or near zero). How can this be, given that the combustion of biodiesel released  $\text{CO}_2$  (see reaction equation on lab handout)?