

# **LEARNING GUIDE**

<b>Programs</b>	<u>Environmental Technology</u> <u>Biodiesel Processing</u>
<b>Module</b>	<u>RENEWABLE ENGERGY</u>
<b>Learning Unit</b>	<u>How to Make a Small Batch of Biodiesel</u>

## **Introduction**

The purpose of making a mini batch of biodiesel is to ensure that the calculations of catalyst needed to be used is correct. The mini batch will show very precise results for the separation of clean biodiesel and glycerin. Mini batches of biodiesel can be used to show the results of titration and also give more defined results on if there is more or less catalyst needed.

UPPER CAPE COD REGIONAL  
TECHNICAL HIGH SCHOOL

## **Making a Mini Batch of Biodiesel**

**Performance Objective:** The students will make their own mini batch of biodiesel to determine if the amount of catalyst used was correct on a “mini” scale. This is a quality control measure, which prevents the entire batch from being damaged due to inaccurate measurements.

**Given:** An instruction sheet, conversion book, instructor oversight, all tools and materials

**The Student Will:** make the small batch of biodiesel following the instructions given

**How well:** You must successfully pass a knowledge test and performance test

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Grade: \_\_\_\_\_

# **INSTRUCTION SHEET**

**Making a mini batch of biodiesel** can help to determine the amount of catalyst needed for large-scale production.

## **Follow these Steps**

1. Dissolve .9 KOH into 20 ml of methanol
2. Add 100 ml of vegetable oil to the mixture
3. Mix vigorously for 5-15 minutes
4. Allow to settle for 30 minutes – 2 hours. Did two separate layers occur? If yes, use 9 grams of KOH per liter of vegetable oil. If no, go to step 5.
5. Dissolve 1.0 grams of KOH into 20 ml of methanol
6. Add 100 ml of vegetable oil to the mixture
7. Mix vigorously for 5-15 minutes
8. Allow to settle for 30 minutes – 2 hours. Did two separate layers occur? If yes, use 1.0 grams of KOH per liter a vegetable oil. If no, try again using 1.1 grams of KOH
9. Continue this process by raising the amount of KOH by precisely 0.1 grams until separation occurs. When separation occurs, you have determined the proper amount of KOH to use per liter of vegetable oil for large-scale production.

## **Resources**

(From the Fryer to the Fuel Tank, by Joshua Tickell Tickell Media Productions, Third Edition New Orleans, Louisiana © 2003)

## **Knowledge Test**

1. What are the safety concerns around using potassium hydroxide (KOH)?
2. What is the purpose of processing a “mini-batch” of biodiesel?
3. What will be the main problem with the biodiesel if too much catalyst is used?
4. When the biodiesel “kicks”, what is the darker bottom layer made up of?
5. How much time should be allowed to see if layering occurs?

## **Essay Question**

In essay format, describe how a mini batch of biodiesel is used as a production quality control measure