

CREATING BIODIESEL

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PURPOSE:

The purpose of this lab is to produce an alternative form of diesel fuel from the oil of an abundant, renewable source.

INTRODUCTION:

A combination of factors has lead universities and research companies to investigate the use of biodiesel as an alternative to diesel on the fuel market. Increased use of carbon fuels, large harvests of traditional crops, dependence on foreign energy Sources and environmental problems have increased interest in renewable' energy sources. Biodiesel, a diesel fuel substitute. can be processed from vegetable oils or waste grease. Biodiesel is the only alternative fuel that can be used directly in any existing, unmodified diesel engine. The qualities of this fuel, environmentally as well as technically, have pushed it closer to the final stages of commercialization in the United States.

Producing biodiesel is easily done in any laboratory. A catalyst is mixed with alcohol to transesterify the alcohol. The oil is then reacted with the alcohol produce glycerin and ethyl esters (biodiesel). A simplified chemical reaction is as follows:



SAFETY:

Potassium hydroxide is very corrosive, do not ingest or let it come in contact with the skin. If contact occurs, rinse contacted area with soap and water, then consult a doctor. Ethanol is extremely flammable, keep away from heat, sparks and open flame. Do not ingest. In case of skin contact, rinse skin with water. In case of eye contact, flush eye(s) with water for: at least 15 minutes.

The product **Glycerol** is moderately toxic. Do not ingest. In case of skin contact, rinse skin with water. In case of eye contact, flush eye(s) with water for several minutes. **Canola Oil** is non-toxic. It is flammable at high temperatures, keep away from open flame, do not heat to temperatures exceeding 50°C.

MATERIALS:

400ml beaker 250ml Erlenmeyer Flask and Stopper
600ml beaker Heat plate
Stir bar

CHEMICALS:

100% Ethanol Reagent Grade Potassium Hydroxide (KOH)
Canola Oil

PROCEDURE:

1. Tare 250ml Erlenmeyer flask
2. Add 1.43g KOH to flask. Tare again.
3. Add 30g ethanol to KOH in flask
4. Stir mixture using stir bar until the KOH is completely dissolved in the ethanol.
5. Add 100g canola oil to 400ml beaker.
6. Warm oil to 30°C.
7. After KOH is dissolved, slowly add KOH/ethanol to canola oil. If reaction is working; the mixture will become turbid.
8. At room temperature, stir mixture for five minutes, then let it sit for twenty-five minutes
9. The mixture will form two layers, the top layer is biodiesel and the bottom layer is glycerol.
10. Decant mixture to obtain the biodiesel, dispose of glycerol as instructed by your teacher.