

CU BIODIESEL INITIATIVE

EEF FALL MINI PROPOSAL

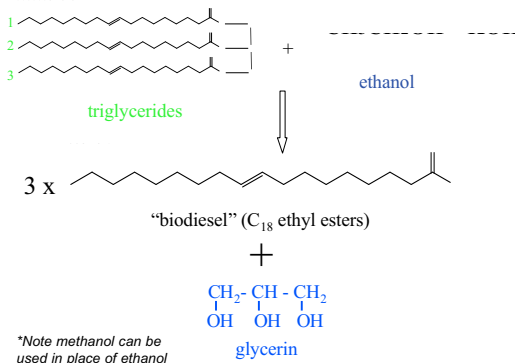
2002

Biodiesel is a promising alternative fuel made from vegetable oil that can be used in any diesel engine without modification.

GOALS

- Design a processor that will make Biodiesel from waste vegetable oil in order to power a Buff Bus
- Prove Biodiesel is a viable alternative to petroleum based diesel fuel for University of Colorado
- Educate both students and community about Biodiesel
- Encourage development of renewable energy technology at University of Colorado School of Engineering

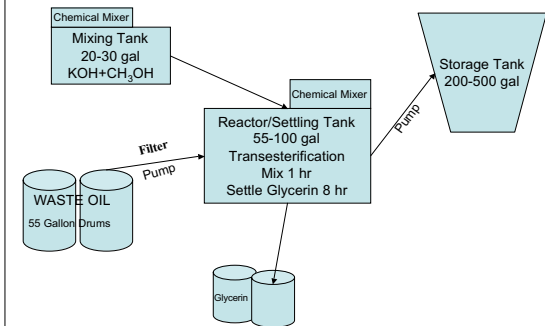
TRANSESTERIFICATION



Why Use Biodiesel?

- **1) National Security**
 - Reduces dependence on foreign oil
 - **2) National Economy**
 - Creates jobs
 - Keeps buying dollars in America
 - Helps farmers
 - **3) Sustainability**
 - Made from vegetable oil (renewable)
 - Over 350 kinds of oleaginous plants can be used
 - Non-toxic and biodegradable
 - **4) Emissions/Environment**
 - 50% reduction in CO emissions*
 - 70% reduction in particulate emissions*
 - 40% reduction in total hydrocarbon emissions*
 - 100% reduction in sulfate emissions.*
 - **5) Engine life**
 - Reduces engine wear by up to 50%*
 - Increases fuel efficiency by up to 13%*
- *EPA

THE PROCESSOR



Estimated Budget

Item	Unit Price	Quantity	Total Cost
• Equipment and Materials:			
• 55-gallon drum	\$20	2	\$40
• 400 gallon storage tank w/stand	\$550	1	\$550
• Chemical mixer	\$130	2	\$260
• Electrical Pump	\$120	2	\$240
• Hand operated pump	\$50	1	\$50
• Piping	\$75	1	\$75
• Miscellaneous Equipment	\$100	1	\$100
• GRAND TOTAL.....			\$1,315

SAFETY

- Gloves , goggles, and respirators will be used at all times
- No methanol will be stored in process facility
- OSHA regulations
- Standard University of Colorado lab safety
- Biodiesel has a high flash point compared to regular diesel (300°F vs. 125 °F)

OUTREACH/EDUCATION

- Biodiesel production classes offered to students and community
- K-12 interactive science program
- Posters of pilot project results to be given to Engineering School
- CU Biodiesel Initiative website

Quality Control

- Emissions results
- Engine wear analysis
- Analytical testing of Biodiesel
 - Specific Gravity
 - Gas Chromatography (GCFID)
 - Cloud Point and Gel Point

Measures of Success

- Transportation Department will continue to use Biodiesel
- Transportation Department will expand the use of Biodiesel
- Expand the use of Biodiesel to city buses
- Establish programs in K-12
- Media coverage
- Future grants

TIMELINE

- 11/02
 - Initial prototype design ready
 - Begin construction
- 12/02
 - Finish construction of processor
 - Analytical testing of fuel
- 1/03
 - Produce 200 gallons/month of Biodiesel to run one Buff Bus
 - Begin outreach education on campus
- 3/03
 - Begin outreach to community
 - Website
- 4/03
 - Analyze emissions and engine wear results
 - Explore Biodiesel expansion options

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