



Biodiesel quality testing: Access, Preparation and Why You Should Care

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We don't make the biodiesel. We assure its quality.

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Quality Testing: Outline



- Why?
- Resources- available later
- Shameless plug- Paradigm Sensors i-Spec Q 100
- Access

Why?



“The overall quality of biodiesel has improved over that found in previous studies, but significant lapses in quality still exist.”

-NREL quality survey, 2007

Washington State quality survey:

- 125 samples in 2007 led to concerns for the following:

- Water and sediment
- Blend
- Free & Total Glycerin
- Sulfur total
- Microbial Growth

-Did not test for Acid, Oxidative stability

“An off specification batch can create problems and a bad batch can be devastating (to the industry)”

-Jenna Higgins, NBB

Resources



ASTM D6751:

www.biodiesel.org/pdf_files/fuelfactsheets/BDSpec.pdf

The party line:

www.biodiesel.org/resources/fuelqualityguide/

NREL use and handling guide:

<http://www.nrel.gov/vehiclesandfuels/pdfs/43672.pdf>

Examples of labs:

<http://www.natrib.com/> Bentley Tribology

<http://gorgeanalytical.com/> Gorge Analytical

<http://www.biofuels.coop/industrial/laboratory-services/>

Wisconsin Small Producers Program

http://www.therenewablenetwork.com/biofuel_registration_form.html

Paradigm Sensors i-SPEC™ Q-100 Handheld Biodiesel Analyzer



The i-SPEC can be used throughout the supply chain to test for Percent Blend, Total Glycerin, Acid Number and Methanol.

The i-SPEC™ Q-100 Handheld Analyzer



Results on B100

- Total Glycerin
- Acid Number
- Methanol

Results on Blends >6%

- Blend percent
- TG of starting B100

Results on Blends $\geq 2\%$

- Blend percent

Access

- Traditional Tribology
- Field Testing- Summary article October, 2008
[http://www.paradigmsensors.com/images/Biodiesel%20Magazine%20article%20\(Oct%20issue\).pdf](http://www.paradigmsensors.com/images/Biodiesel%20Magazine%20article%20(Oct%20issue).pdf)
- Partnerships!
 - This may be critical to the small producer. The opportunities afforded by partnering with educational and public institutions as well as other producers may far outweigh the costs in time and effort.

Partnerships

- Technical College/University (examples)

Gateway tech, Kenosha, WI

- Unique partnership with Snap On built the Horizon Center

Fox Valley Technical College

- Seed pressing through batch process biodiesel

Madison Area Technical College

- Diesel training side-by-side with biodiesel production and testing

Penn State- Dr. Perez

CCCC- Andy McMahan

- Wisconsin Small Producers Program

http://www.renewablenetwork.com/biofuel_registration_form.html



Biodiesel Analytics and Fuel Quality

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About CCCC Biofuels Program

- Located in Pittsboro, NC
- Focus on small scale commercial and on-farm fuel production
- Pilot plant under construction
- 2 acre oilseed crop being planted fall 2009
- Talented instructors and local resources
- Comprehensive fuel testing lab

Analytical Training

Specifically designed to teach students skills needed in the biofuels industry



CCCC Lab Capabilities

ASTM Methods

- Flash Point
- Oxidative stability
- Free and Total Glycerin
- Cloud Point
- Kinematic Viscosity
- Copper Corrosion
- Water and Sediment
- Moisture by Karl Fischer
- Sulfated Ash
- Carbon Residue
- Acid Number

Non ASTM Testing

- Soap Content
- Moisture in Methanol
- Percent Blends
- Methanol in Glycerin



How can CCCC and Homebrewers help each other?

We have.....

- ✓ Equipment
- ✓ Students
- ✓ Class Time
- ✓ Foundation Account

You have...

- ✓ Variety of fuels
- ✓ Desire for testing
- ✓ \$25

Any donation made to the biofuels foundation is tax deductible and is used exclusively for biofuels related projects, staff development, and student scholarships.

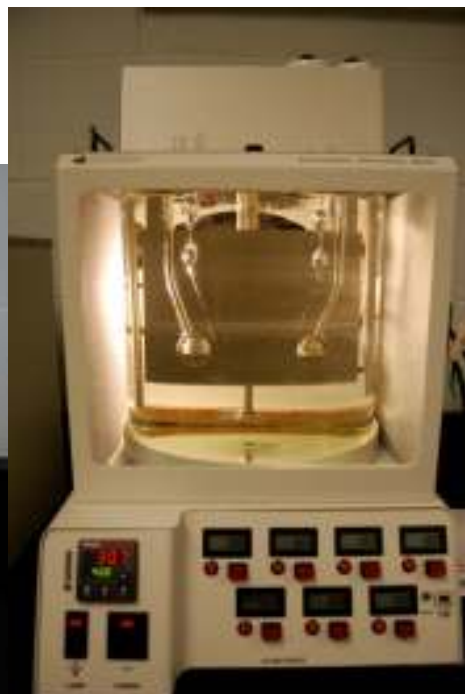
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Reference Standards used in IS Correlation

Blend Concentration (B1 – B100)

Mid Infrared Spectroscopy (ASTM D7371)

Total Glycerin (0.03 - 0.7 %)

Gas Chromatography (ASTM D6584)

SAFTEST

Acid Number

Titration (ASTM D664)

SAFTEST

Methanol

EN14110

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