



# “Home- brewing”

People, Pieces, and Pothers

# Maria Aloverd aka “Girl Mark”



- Author of “Biodiesel Homebrew Guide”  
available for \$15 at  
<http://www.localb100.com/>
- Puts on classes across the US
- Expert on making biodiesel
- “Folk Hero” in the movement
- Major proponent of open-source biodiesel technology
- Backs the “Appleseed” system

# Joshua Tickell



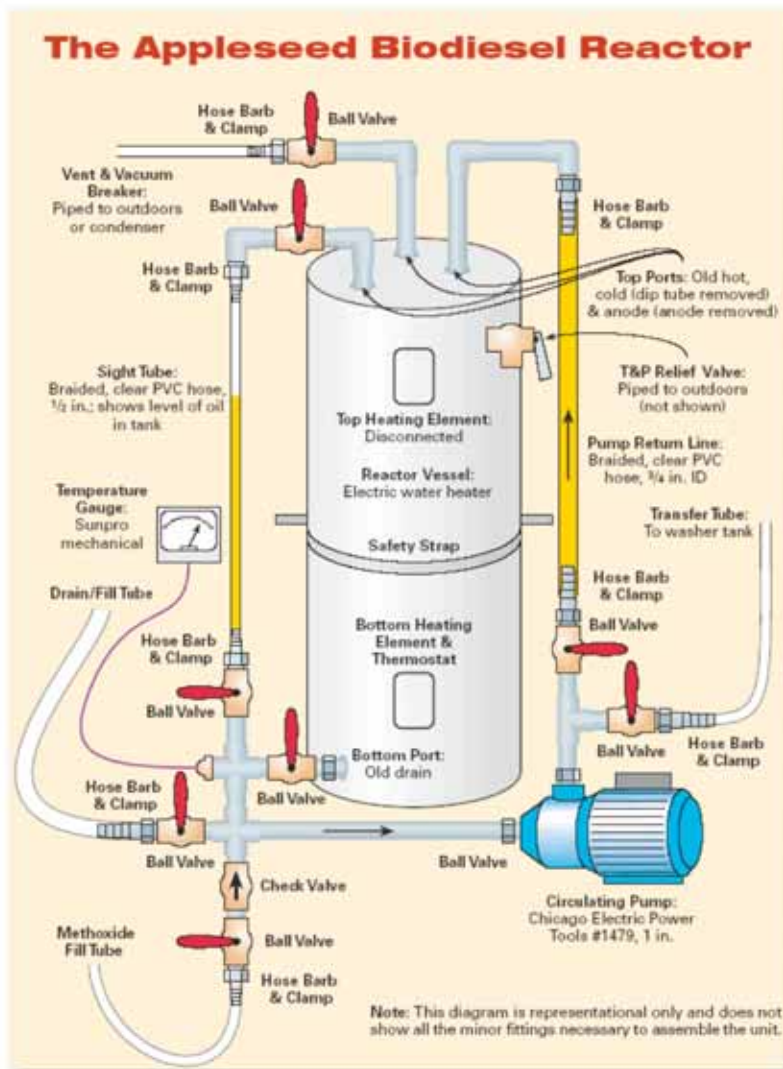
- Author of *“From the Fryer to the Fuel Tank ”*  
(note much homebrew information out-of-date)
- New book due soon
- VeggieVan founder
- Working on movie  
“Fields of Fuel” about  
biodiesel
- Endorses FuelMeister  
system
- Biodiesel America –  
100,000 school buses  
on biodiesel by 2010
- “Salesman” in the  
movement

# Other players

- **Mike Briggs** – UNH, algae, <http://biodieselnow.com>
- **Jon Van Gerpen** – ISU, co-author “The Biodiesel Handbook”  
<http://www.me.iastate.edu/biodiesel/>
- **Rachel Burton** and **Lyle Estill** – Piedmont Biofuels



# Appleseed Biodiesel Processor



- “open-source” design – improved upon by community
- Build-it yourself, \$200-\$500
- Kits:
  - <http://www.biodieselwarehouse.com/>
  - <http://www.b100supply.com/kits.html>
  - <http://utahbiodieselsupply.com/>
 Range from \$200 for hardware less tank/vents, \$700 w/tank, \$2000 built on-site.

# Appleseed cont'd



- Built around hot water tank, no-weld plumbing, single pump.



# Fuelmeister Biodiesel Processor



- Commercial product from Biodiesel Solutions.  
<http://www.biodieselsolutions.com/>
- Price \$3000. \$4000 with wash tank.
- Available from several outlets.



# Fuelmeister cont'd



- Built around polyethylene non-pressurized tanks.
- 40 gallons / day
- 150 lbs
- New model in the works





## Appleseed

- + Safer enclosed design able to run at pressure or vacuum
- + Off-the-shelf parts
- + Low cost
- + Community improvements
- + No weld, limited plastic content
- - Many valves to manipulate
- - lower quality, slow non self-priming pump

## vs. Fuelmeister

- + Commercial product with company behind it
- + Marketed well
- - High cost
- - Plastic tanks a problem
- - Community points out issues with timer, heating and end quality

# Other processors / processes

- Small kitchen batch with blender  
<http://www.dangerouslaboratories.org/biodiesel.html>  
<http://www.brevardbiodiesel.com/Mresplan.html>
- Journey to Forever list:  
[http://journeytoforever.org/biodiesel\\_processor.html](http://journeytoforever.org/biodiesel_processor.html)  
ranges from 5 gallon up
- Misc book  
**How to make Biodiesel**  
<http://www.lowimpact.org/booksbiodiesel.htm>

# Piedmont Biofuels Biodiesel Class September, 2004

## Instructors:

- **“Girl Mark”** (Maria Alovert)  
 (“star” of the open source biodiesel movement)
- **Rachel Burton** (Central Carolina Community College instructor)
- Are they:
  - Organic Chemists?
  - Welders?
  - Electricians?
  - Plumbers?
  - Diesel Mechanics?
  - Lecturers?

## Students from

- N.C., Fla., N.Y., Kansas,  
Mississippi, Ohio, Ontario





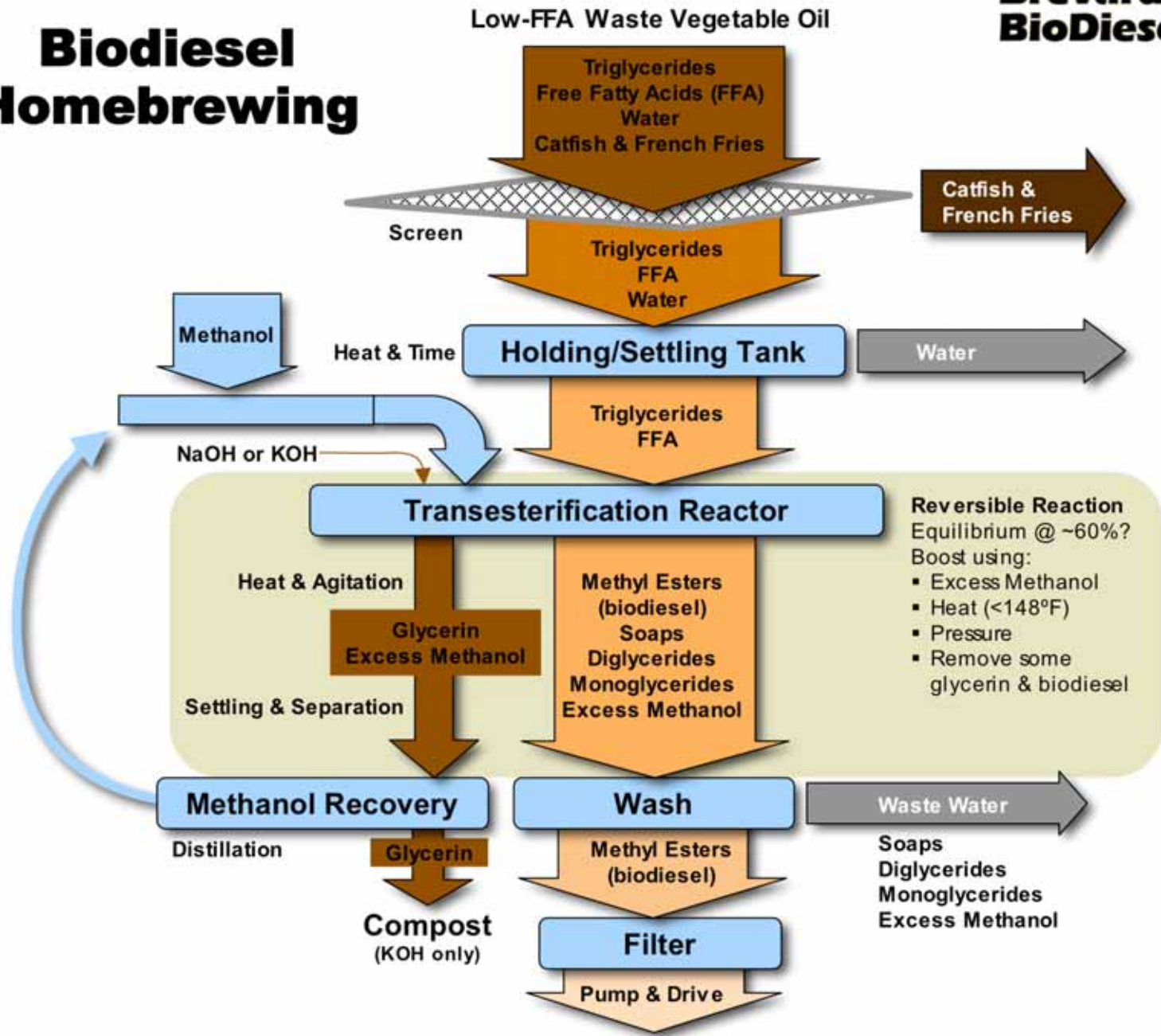
# Piedmont Biofuels Biodiesel Class September, 2004

## Topics:

- Chemistry, Safety, Legal & Environmental Issues
- Diesel Engines
- “Tailgate Titration”
- Transesterification
- Washing
- Emulsions
- Quality Control
- Building “Appleseed” Reactors



# Biodiesel Homebrewing



# Piedmont Biofuels Biodiesel Class September, 2004

## Titration

- Determining the quantity of FFAs
- 1ml WVO in 10ml isopropyl alcohol (90-99%)
- 2 drops phenolphthalein or phenol red in WVO/alcohol
- 1g NaOH in 1l distilled water
- Count drops NaOH mixture added till solution turns purple (pH~8)





# Things to think about before you start...

- Safety
- Regulations
- Raw material and byproducts
- WVO Collector Etiquette

# Safety

- Get informed. A few starting places:  
Storage/Material considerations  
<http://www.biodieselcommunity.org/storageconsiderations/>  
Biodiesel Handling and Use Handbook  
<http://www.nrel.gov/vehiclesandfuels/npbf/pdfs/tp36182.pdf>
- Familiarize yourself with MSDSs of materials  
(Biodiesel, glycerol, methanol, ethanol, sodium hydroxide, potassium hydroxide, etc.)  
<http://www.biodiesलगear.com/documentation/>
- Gear – Gloves, Respirator, Safety Glasses – e.g. Methanol and Lye are poisonous.



# Regulations

- Zoning considerations. For example, City of Melbourne incorporates Florida Fire Prevention Code  
[http://www.fldfs.com/sfm/florida\\_fire\\_prevention\\_code\\_2004.htm](http://www.fldfs.com/sfm/florida_fire_prevention_code_2004.htm)
- Limits on storage of material, methanol is one of most concern. Recommend talking to nearest fire station captain before starting to review your plans and configuration.
- Taxes  
Federal excise tax: <http://www.irs.gov/pub/irs-pdf/p510.pdf>  
analysis of excise tax re: biodiesel: <http://www.unclefed.com/Tax-Bulls/2002/rr02-76.pdf>  
FL State excise tax: ???



# Raw Material and Byproducts

- Where/How to get

**Vegetable Oil** – restaurants, Prefilter WVO

<http://www.thecarycompany.com/containers/ez-strainers.html>

Water settles to bottom of waste oil, scoop from top

or press oil from seeds:

[http://journeytoforever.org/biofuel\\_supply.html#Oilpress](http://journeytoforever.org/biofuel_supply.html#Oilpress)

**Methanol/Ethanol** – racing fuel

[http://journeytoforever.org/biofuel\\_supply.html#meths](http://journeytoforever.org/biofuel_supply.html#meths)

Sunoco Racing Alcohol = Methanol

**Sodium/Potassium Hydroxide**

Red Devil Lye = NaOH

KOH \$2-\$3/lb at <http://www.braintan.com/>

- What to do with **Glycerin...**

Making soap:

<http://biodiesel.infopop.cc/eve/ubb.x/a/tpc/f/739605551/m/520604982>

<http://www.utahbiodieselsupply.com/biodieselsoap.php>

Compost? – but probably not if NaOH, only KOH

[http://journeytoforever.org/biodiesel\\_glycerin.html](http://journeytoforever.org/biodiesel_glycerin.html)

# WVO Collector Etiquette

- Get permission from restaurant owner/manager
- Don't be offended or surprised if they say no
- Don't take up restaurant employee's time
- Don't violate recycler's contracts
- Don't make a mess!
- Make it easy for the owners/managers
- Offer to pay for oil (gives incentive to change often)



# Overall cost benefits of homebrew...

- Make your own for ~ \$1/gallon material cost  
OR
- Have ASTM D6751 B100 delivered for \$3.50/gallon
- Homebrew time per 50 gallons ~ 3hours + material movement. System investment \$200-\$2000.  
@\$10/hour = +0.60 cents/gallon.



End

