

Biodiesel

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EGY 105 – Energy in Our World

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What is Biodiesel?

- Liquid fuel that can be burned in diesel engines and electrical generating equipment
- Chemical reaction
 - $\text{Lipids} + \text{Alcohol} \rightarrow \text{Biodiesel} + \text{Glycerin}$
 - Transesterification
- Can be blended with petroleum diesel
 - B5, B10, B100

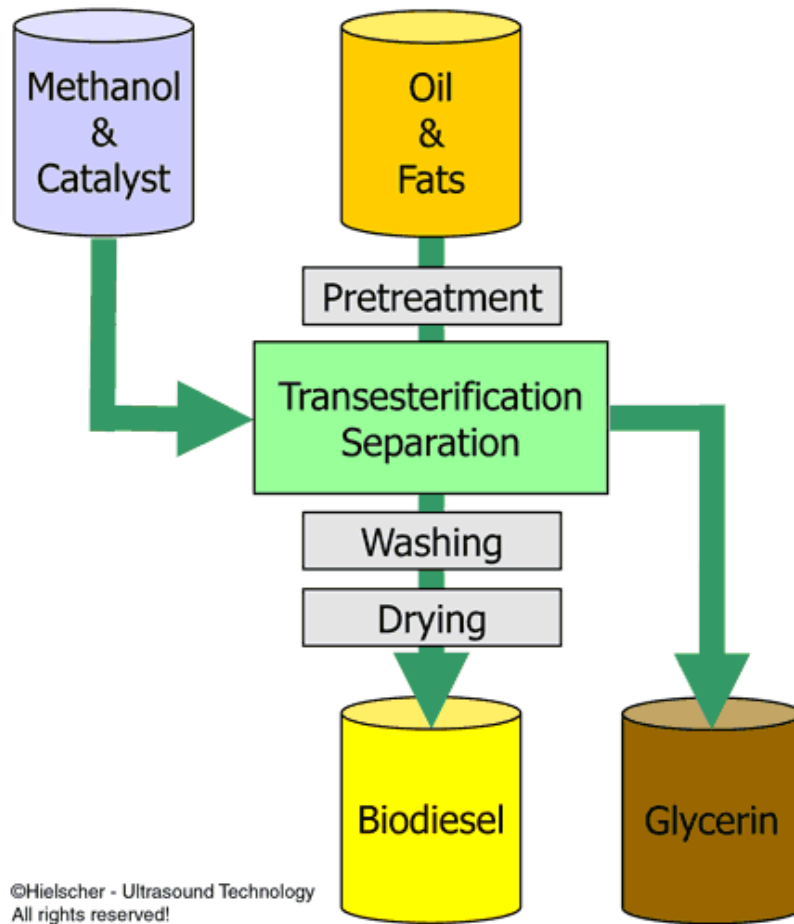
Source material for biodiesel

- Fats of biological origin
 - Plants (mainly seeds)
 - Animal tallow
 - Algae (maybe)
- Can be created by processing food wastes
- How to make



http://blogs.seattleweekly.com/dailyweekly/biodiesel_flowers_websize.jpg

How to make biodiesel

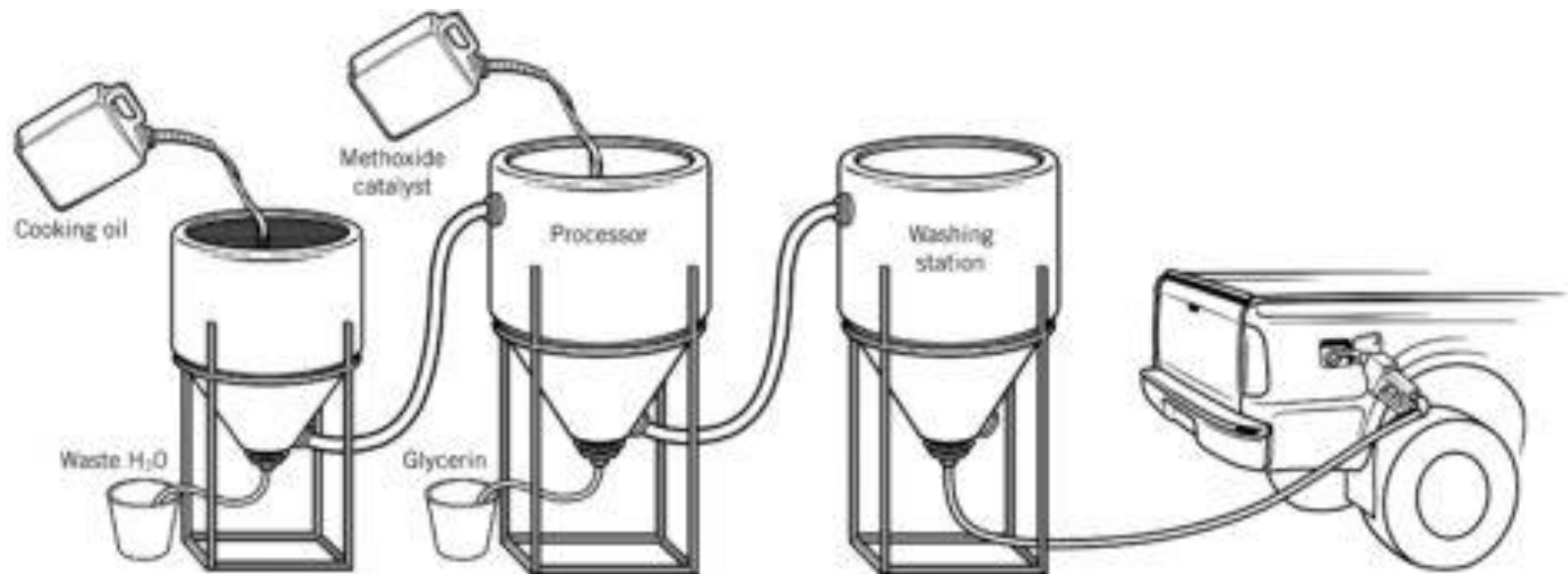


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<https://www.instructables.com/Make-Your-Own-Biodiesel-Processor/>

Another approach



Energy from Algae

- Algae are diverse producers
 - Some freshwater, others saltwater
 - Some microscopic, others large
- Can be cultivated
- Produce oils and other chemicals for fuels

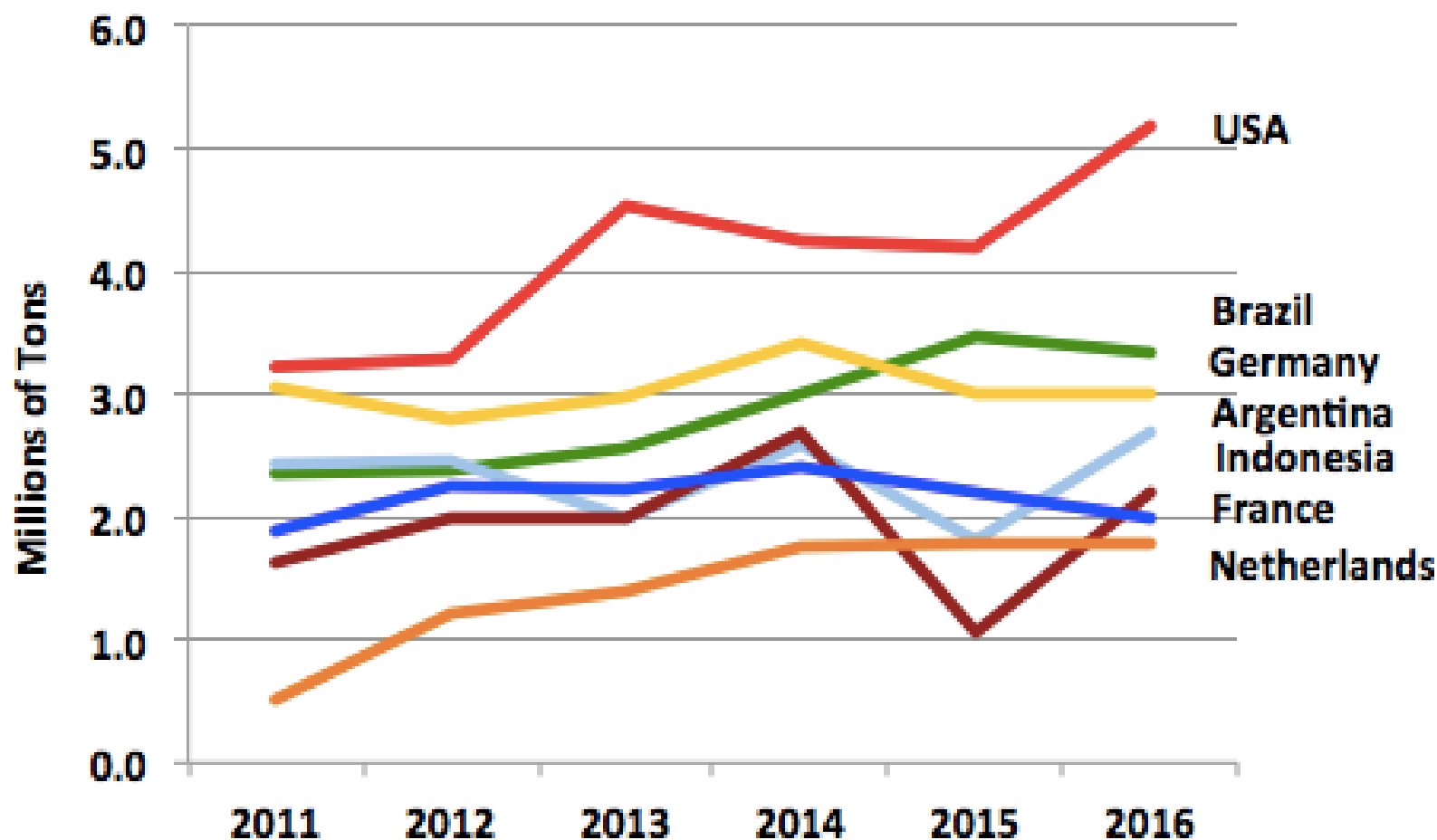


<https://energyeducation.ca/encyclopedia/Algae>



<https://www.lowtechmagazine.com/2008/04/algae-fuel-biof.html>

Biodiesel Production Trends



Advantages of using biodiesel

http://www.biodiesel.org/resources/Biodiesel_basics/

- Not based on fossil fuels
- Lower emissions
- Non-toxic
- Safe to handle
- Useful for all diesel engines
- Biodegrades readily



<http://cdn-www.greencar.com/images/biodiesel-facts/biodiesel-station.jpg>

Disadvantages of using biodiesel

<http://www.fueleconomy.gov/FEG/biodiesel.shtml>

- Use of blends above B5 not yet warrantied by auto makers
- Lower fuel economy and power (10% lower for B100, 2% for B20)
- Currently more expensive
- More nitrogen oxide emissions
- B100 generally not suitable for use in low temperatures
- Concerns about B100's impact on engine durability