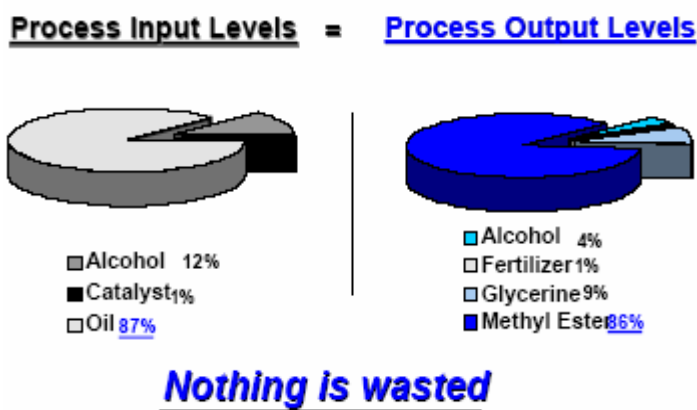




## BIODIESEL PRODUCTION PROCESS

The production of biodiesel, or alkyl esters, is well known. There are three basic routes to ester production from oils and fats:

- Base catalyzed transesterification of the oil with alcohol.
- Direct acid catalyzed esterification of the oil with methanol
- Conversion of the oil to fatty acids, and then to Alkyl esters with acid catalysis (NaOH)



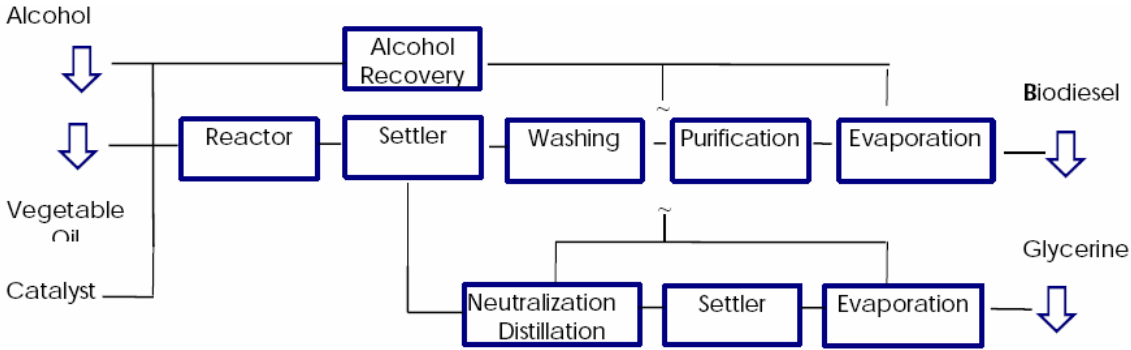
The CEN Rural Biodiesel Electrification in the Brazilian Amazon with Community Applications project will use utilize with the base catalyzed reaction because it is the most economic for several reasons:

- \* Low temperature (150 F) and pressure (20 psi) processing.
- \* High conversion (98%) with minimal side reactions and reaction time.
- \* Direct conversion to methyl ester with no intermediate steps.
- \* Exotic materials of construction are not necessary.

The general process is depicted below. A fat or oil is reacted with an alcohol, like methanol or ethanol, in the presence of a catalyst (usually Sodium Hydroxide) to produce glycerine and methyl esters or biodiesel. Bi-products from the process include:

- Alcohol, which is converted and recovered for reuse.
- Glycerine, which is valuable and can be sold directly or used in making quality soap.
- The feedstock residue which can be used as organic fertilizer and to improve soil consistency.

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Source: Adapted from the National Biodiesel Board  
[http://www.biodiesel.org/pdf\\_files/fuelfactsheets/Production.PDF](http://www.biodiesel.org/pdf_files/fuelfactsheets/Production.PDF)