ERRC Eastern Regional Research Center
Wyndmoor, Pennsylvania

Agricultural Research Service

USDA United States Department of Agriculture

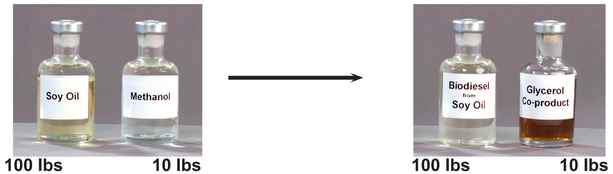
Biodiesel Research at the Eastern Regional Research Center

Fats, Oils and Animal Coproducts Research Unit

Agricultural Research Service, United States Department of Agriculture, Wyndmoor, Pennsylvania

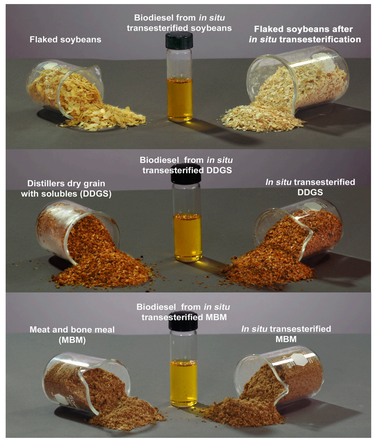
ERRC Tractors fueled with Biodiesel

Production from Alternative Feedstocks



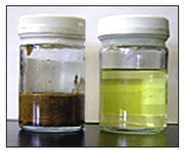
100 lbs triacylglycerols (soy oil) | 10 lbs alcohol (methanol) → 100 lbs methyl esters (biodiesel) | 10 lbs glycerol

Biodiesel from Vegetable Oil, Animal Fat, Restaurant Grease



Direct Production of Biodiesel from Oil-Bearing Feedstocks

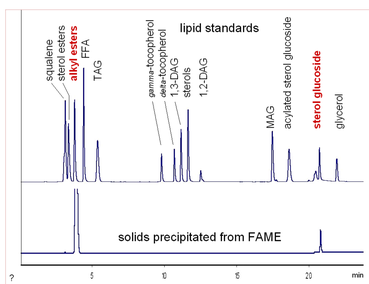
Biodiesel from Soapstock



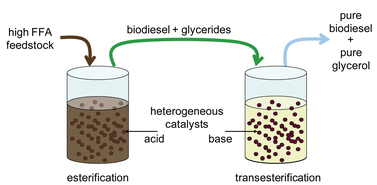
Biodiesel from Trap Grease

ERRC/Fry-o-Diesel Team

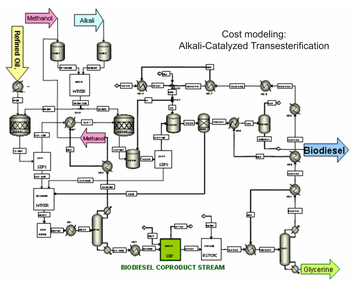
Monitor Fuel Quality



Solid-Phase Catalysis



Cost and Process Model for Biodiesel Production

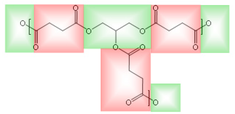


Uses for Glycerol Coproduct Stream

Hyperbranched Polymers from Glycerol

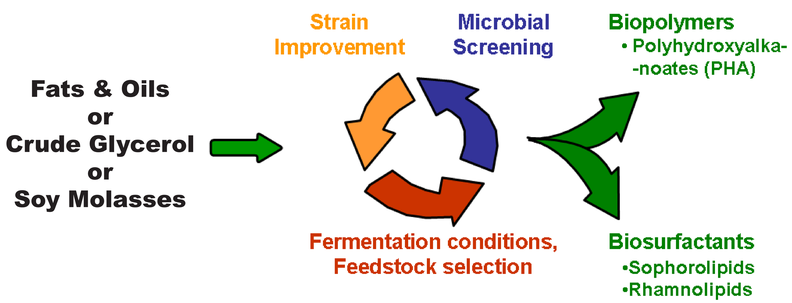
1. *Synthesis and characterization of oligomers:*
   With dicarboxylic acids (succinic or azelaic)
2. *Conversion to hyperbranched polymers:*
   Anticipated: some will be water-soluble
   Most will be soluble in polar organic solvents

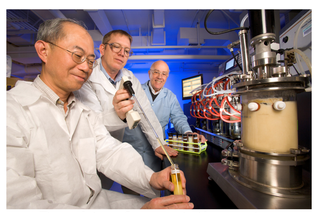
Potential uses: adhesives, films, elastomers, surgical applications



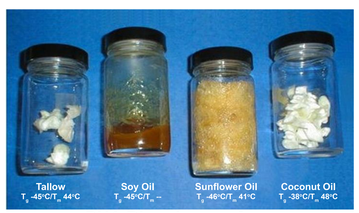
= diacid residue = glycerol residue

Biodegradable Polymers (PHA) and Surfactants by Fermentation of Glycerol





Benchtop fermentation setup

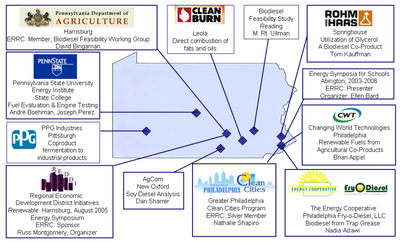


PHA Biopolymers from Various Feedstocks

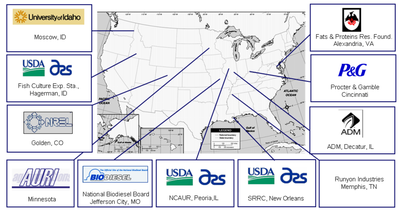
PHA Inclusion Bodies within Bacterial Cells

PHA Products

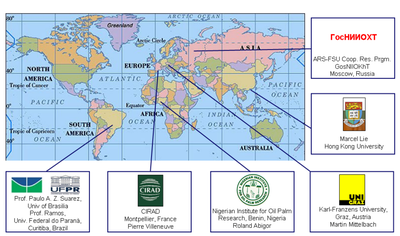
Pennsylvania Collaborations



Other U.S. Collaborations



Worldwide Collaborations



Contact:

Dr. Dan Solaiman, Acting Res. Leader
Fats, Oils and Animal Coproducts Research Unit
Eastern Regional Research Center
600 East Mermaid Lane
Wyndmoor, Pennsylvania 19038
Phone: 215-233-6585
e-mail: dan.solaiman@ars.usda.gov