

# A Biofuel Production Process- Learning the Process and Its Sustainability



**Biofuel, synthesized from waste cooking oil, to be used for running diesel engines.**

**Are you interested to learn about:**

Concepts of utilizing biomass for bioenergy/fuels?  
Bioeconomy: utilizing biomass materials as our new source of carbon and energy for driving our economy?

Sustainable Engineering: applying engineering concepts and sustainability concepts for creating a better more sustainable world?

Concepts of entrepreneurship by exploring what products can be made from various biomass materials?

Production of biofuels from the waste cooking oil from Villanova dining center?

**Then, this project may be for you!**

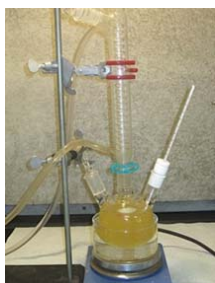
## **Objective of the Project:**

Introduce the Villanova freshman engineering students to two very important aspects in bioeconomy: 1) the production of biofuels and 2) the sustainability issues related to how biofuels are produced and utilized.

## **Specific Objectives on What Students will Learn:**

- Biofuel process synthesis and characterization by using basic engineering and chemistry principles to synthesize and characterize biodiesel from a renewable resource,
- Mass and energy balance and design concept by using experimental data to develop mass and energy balance and basic design of a biofuel processing.
- Concepts of entrepreneurship by exploring what products can be made from various biomass materials
- Sustainability concept by doing Life Cycle Analysis of biofuel process synthesis
- Concept of heat transfer, energy efficiency through evaluation on the energy usage in the production of biodiesel.
- Concept of materials and their properties by synthesizing soaps from biodiesel by-product and characterizing the textures of the soap materials.

In addition to the technical skills and knowledge, in this project you can expect to learn some “non-technical skills”, such as: teamwork (conflict resolution, communication), project & time management, ethics, and oral presentation skills.



**For more information, please contact:  
Primary instructor: Dr. Justinus A. Satrio  
E-mail: [justinus.satrio@villanova.edu](mailto:justinus.satrio@villanova.edu)**

