

BIO-FUELS

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Introduction

• Seed Pressing Operations

Our process begins with sunflowers grown on the Messiah College Campus. From there we produce sunflower oil by using a seed press. Our seed pressing team is currently working toward USDA certification to facilitate the sale of our sunflower oil to Dining Services.

• Bio-Diesel Production

Here on campus the Bio-diesel production team takes waste vegetable oil from dining services and turns it into Bio-Diesel using a base catalyzed transesterification process. This year the Bio-Diesel Production team has been researching and improving our Bio-diesel production process.

• Burkina Faso Development

Our third project team is modifying our local process to work in the developing communities in Burkina Faso west Africa where diesel fuel can cost \$8 a gallon. The focus of our current work as been determining how we can get important chemicals which we need for our reaction in a third world country.



Matt Walsh and family

Current Work

• Seed Pressing Operations

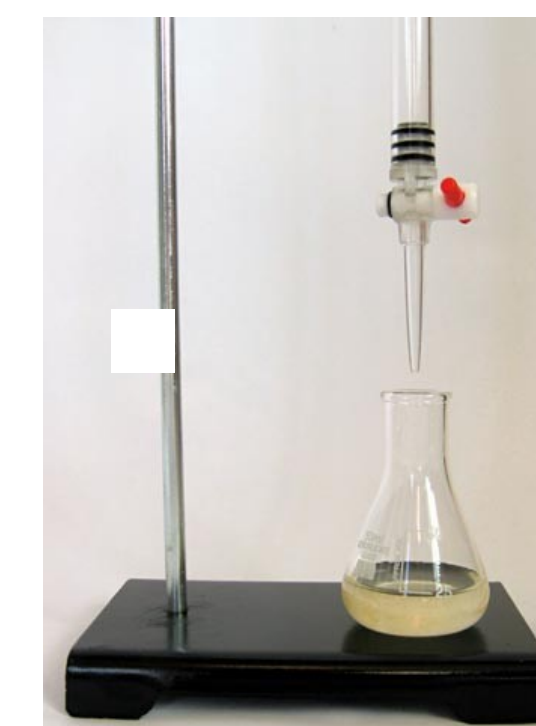
This past year the seed pressing team has been working on bringing the basement garage in the Women's Restoration House up to USDA code for oil production. This is a long process and will continue into the upcoming school year. This past year we have completed the design of the process to move from silo to filtered oil. We are now beginning to implement this design



• Bio-Diesel Production

The Bio-Diesel Production team has been researching the best practices for producing Bio-Diesel and incorporating these practices into our own process. The two main areas of deficiency we found in our process were the initial testing of the oil and the washing of the Bio-Diesel after reaction.

When we receive our waste vegetable oil from dining services the quality of the oil can vary greatly. To find the necessary quantity of chemicals required to fully react the oil into Bio-Diesel we perform a titration. We found that warming the solution and using a different titrant (NaOH) improves the reaction therefore also improves the results.



The washing of the Bio-Diesel increases the quality of the fuel by removing the excess glycerin. Our process for washing was hiding the fact that our fuel quality was poor by avoiding agitation of the Bio-Diesel. We decided that we need to agitate the fuel while washing to improve the quality of fuel produced.



Further Information

For general information concerning the Bio-Fuels project see our wiki page at:

http://www.thecollaboratoryonline.org/wiki/Biodiesel_Project

For more information concerning the recent site team visit to Mahadaga, Burkina Faso see our wiki page at:

http://www.thecollaboratoryonline.org/wiki/EN:Biodiesel_Project/J14_site_team

and to read the blog from the trip go to:

http://www.thecollaboratoryonline.org/wiki/EN:Biodiesel_Project/J14_site_team

Current Work

• Burkina Faso Development

This past J-term a team was sent over to Burkina Faso. The team was seeking to bring a reliable and sustainable source of energy to the village of Mahadaga, Burkina Faso. We believe that this can be accomplished through the pressing of Jatropha, a poisonous wild plant indigenous to the area. The pressed oil has potential to be used in lighting, soap production, and in the case of this trip, Bio-Diesel production. Once the Bio-Diesel is made it can be used to power diesel engines and generators to fulfill transportation and heating needs. While in Mahadaga we successfully set up the seed press which had been shipped overseas in the summer and were able to perform some tests on screw press optimization.

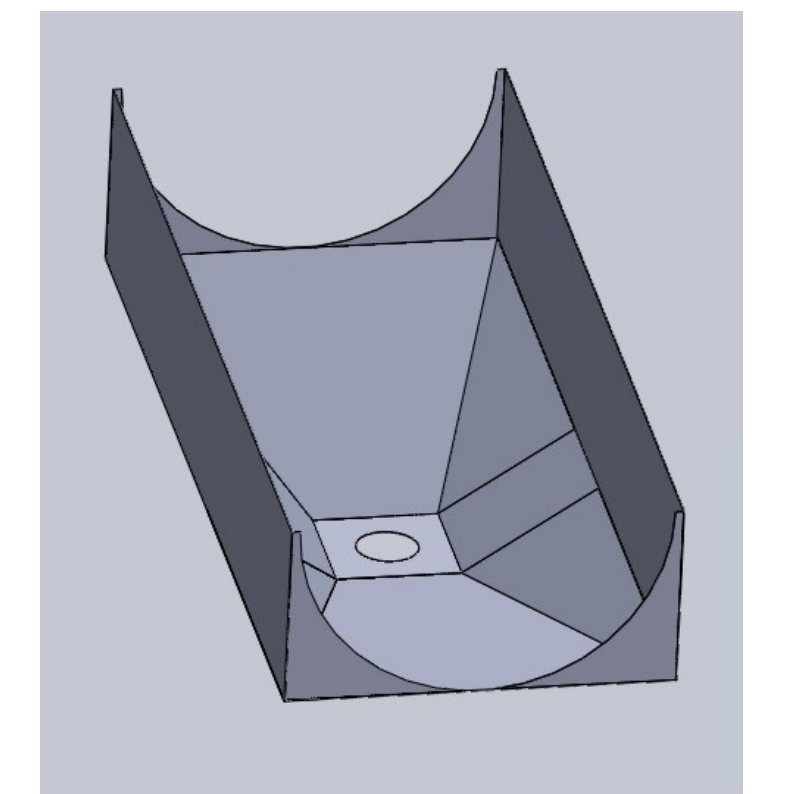


Future Work

• Seed Pressing Operations - The next step for the Seed Pressing Operation is to implement the current designs. Three of the larger goals for next fall will be the instillation of an oil catch system to collect the oil as it is being pressed, a fully functional oil filtration system, and a covered and insulated ceiling so as to be less intrusive to the students who live above the project space.

• Bio-Diesel Production - The Bio-Diesel production team will be continuing to research and update the manuals for production and methanol recovery. The next step will be implementing the updated manuals and evaluating our new process for any more updates that are necessary to improve the quality of Bio-Diesel.

• Burkina Faso Development - With a better handle on seed pressing in Burkina Faso the attention is now being turned to production of Bio-Diesel. While the chemistry of Bio-Diesel production is the same at Messiah and in Burkina nothing else is constant. Design constraints imposed by the third world setting will have to be taken into account when it comes to re-designing and building a new set up, parts to construct a processor will have to be sourced, and chemicals will have to be obtained in new and creative ways. This will be the focus of the Burkina Faso team in the next few years.



Clients and Partners



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