

Farm Energy IQ



Biodiesel and Straight Vegetable Oil (SVO) Module Outline

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AG SERVICE PROVIDER (ASP) TRAINING DESCRIPTION

Learning Objectives: Participants in the educator training session will understand the basics of biodiesel and straight vegetable oil (SVO) sourcing, production and use on-farm. This includes the ability to:

- Summarize the benefits of alternatives to petroleum based diesel fuel on-farm (why this matters)
- Describe the common feedstocks used as SVO and biodiesel (what do I need to have to make the fuels)
- Summarize the agronomics and economics of dedicated crop production for these fuels (including co-products) as well as other options for sourcing
- Explain the process of collection, filtration and storage of SVO
- Explain the process of crop production, harvesting, cleaning, and drying of oilseed crops
- Explain the process of oilseed pressing and filtration
- Explain the process of transesterification for conversion of oil to biodiesel (methyl esters)
- Explain the process of settling and separating glycerin from biodiesel and final cleaning for quality control to ASTM-6751 standards including on-farm test options and use of regional labs
- Summarize safety guidelines in the production of biodiesel and use of supplemental chemicals (alcohols and lyes)
- Summarize nascent alternative sources and production methods (algae, different chemical conversion options, and advanced equipment options)
- Describe fuel blending best practices and equipment (engine) considerations when using these fuels

SUPPORTING DOCUMENTS:

1. ASP Presentation Slides (Biodiesel and SVO—ASP.PPT)
2. ASP Activity Sheet
3. Calculation Tool
 - a. Oilseed Cost and Profit Calculator - <http://www.vsjf.org/resources/reports-tools/oilseed-calculator>
4. Additional Reading for ASP

- a. See list under Farmer Additional Reading

FARMER TRAINING DESCRIPTION

Learning Objectives: Farmers who participate in the farmer presentation will learn the basics of biodiesel and straight vegetable oil (SVO) production and use on-farm, including:

- Biodiesel and SVO in the context of farm energy (why this may matter)
- The difference between biodiesel and SVO
- What are B5, B20 and B100? And what should I use in my tractor?
- What crops can be grown to supply oil for SVO or biodiesel
- Basic agronomics and economics of these crops and the co-products produced
- Basic equipment required to produce and process the crops to oil and meal
- Process of biodiesel production and the equipment required (including economics and costs of fuel production)
- Safety considerations involved in making and using biodiesel
- Equipment (engine) considerations when using biodiesel

SUPPORTING DOCUMENTS

Farmer Training Presentation File (Biodiesel and SVO—Farmer.PPT)

Fact Sheets for Farmer Training

1. Cost of Production Summary for On-Farm Oilseeds, Meal, Oil and Biodiesel - <http://blog.uvm.edu/cwcallah/2013/05/21/vermont-on-farm-biodiesel-costs-of-production/> (includes 5 case studies)
2. State Line Farm Biofuels: System Overview. C. Callahan & J. Williamson. 2008. http://vsjf.org/assets/files/VBI/StateLineBiofuelsSystemOverview_08.pdf.
3. On-Farm Biodiesel Production: Borderview Farm. 2014. http://www.vtfoodatlas.com/assets/resources/files/On-Farm%20Biodiesel%20Production_Borderview%20Farm_Final.pdf
4. Video Series: BioEnergy NOW!. Vermont Bioenergy Initiative YouTube Channel. <https://www.youtube.com/user/VermontBioenergy>. Series of ten videos summarizing the work of this state-wide farm-based biofuels initiative. Includes segments on crop production (sunflowers, soy, canola), biodiesel production, economics and farm case studies. 2013.
5. Oilseed Production in the Northeast. H. Darby, P. Hallteman, H. Harwood. 2013. USDA NE-SARE Project #LNE09-282. <http://www.nesare.org/Dig-Deeper/Resources-Nationwide/Project-Products/Northeast-SARE-Project-Products/Oilseed-Production-in-the-Northeast>
6. Oilseed Fact Sheet: Oilseed Presses. Schaufler, D. 2013. <http://www.uvm.edu/extension/cropsoil/wp-content/uploads/Oilseed-Presses.pdf>
7. Video - Small-Scale Oilseed Presses. Callahan, C., H. Harwood, L. Madden. 2014. YouTube. http://youtu.be/4bfkb_FOn3w (accessed 27 Feb. 2014).
8. Small-Scale Oilseed Presses: An Evaluation of Six Commercially-Available Designs. C. Callahan, H. Harwood, H. Darby, D. Schaufler, & R. Elias. 2014. USDA NE-SARE 11-309. http://www.uvm.edu/extension/cropsoil/wp-content/uploads/OilseedPressEval_report.pdf.

9. Diesel Engine, Tractor and Vehicle OEM Statements on Biodiesel. National Biodiesel Board.
<http://www.biodiesel.org/using-biodiesel/oem-information/oem-statement-summary-chart>.
10. Biodiesel Safety and Best Management Practices for Small-Scale Noncommercial Use and Production. <http://pubs.cas.psu.edu/FreePubs/pdfs/agrs103.pdf>
11. Materials Compatibility with Biodiesel. National Biodiesel Board.
http://www.biodiesel.org/docs/ffs-performace_usage/materials-compatibility.pdf?sfvrsn=4
12. Case Study for Farmer Training
 - a. Cost of Production Summary for On-Farm Oilseeds, Meal, Oil and Biodiesel -
<http://blog.uvm.edu/cwcallah/2013/05/21/vermont-on-farm-biodiesel-costs-of-production/> (includes 5 case studies)
 - b. State Line Farm Biofuels: System Overview. C. Callahan & J. Williamson. 2008.
http://vsjf.org/assets/files/VBI/StateLineBiofuelsSystemOverview_08.pdf.
 - c. On-Farm Biodiesel Production: Borderview Farm. 2014.
http://www.vtfoodatlas.com/assets/resources/files/On-Farm%20Biodiesel%20Production_Borderview%20Farm_Final.pdf
13. Additional Reading for producer
 - a. State Line Farm Biofuels – System Schematic – C. Callahan & J. Williamson. 2007.
http://vsjf.org/assets/files/VBI/State%20Line%20Biofuels%20Engineering%20Schematic_12_07.pdf
 - b. State Line Farm Biofuels – Failure Modes and Effects Analysis – C. Callahan & J. Williamson. 2008. <http://vsjf.org/assets/files/VBI/FMEA%20-%20State%20Line%20Farm%20Biodiesel%20Process%20Rev1%201.2.08%202008.pdf>
 - c. State Line Farm Biofuels – Standard Operating Procedures – C. Callahan & J. Williamson. 2008. <http://vsjf.org/assets/files/VBI/State%20Line%20Biofuels%20-%20SOPs.pdf>

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