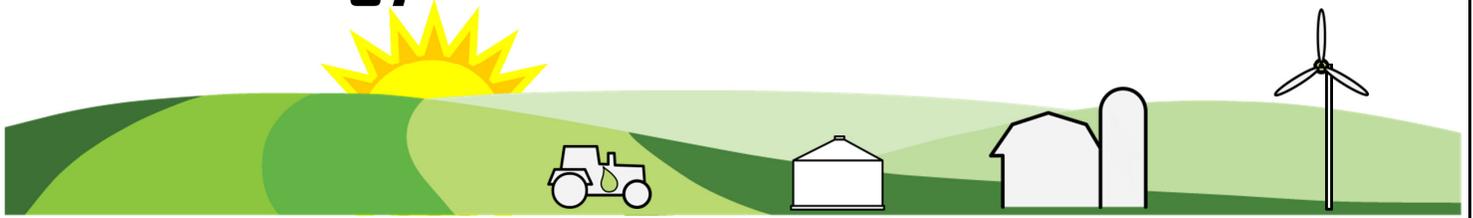


Farm Energy IQ



Pellet Module ASP Activity – Running a Small Pelletizer

In this exercise, you will prepare feedstock and run a small pellet mill to produce biomass pellets.

EQUIPMENT AND SUPPLIES NEEDED

- Safety glasses
- Pelletizer
- Scale, 0.1 g accuracy
- Moisture sensor
- Dust masks
- Feedstock such as ground switchgrass (6mm screen)
- Distiller's dried grains
- Water in spray bottle
- Plastic containers for weighing samples
- Plastic bucket for mixing samples
- Plastic container for collecting pellets
- Allen wrench to tighten roller bolts
- Stick for tapping sample into hopper

SAFETY PREP

- Always wear safety glasses
- Remove or tuck in any loose clothing, tie back long hair
- Wear dust mask
- Ensure that pelletizer is in a space free of clutter or obstructions, and that shut-off switch is readily accessible
- Keep pets and children away from machinery

PROCEDURE

1. Prepare the plugging mixture by measuring 100g of switchgrass and 233g of distiller's dried grains (DDG). Mix thoroughly by hand.
2. Measure the moisture content of the switchgrass by tightly squeezing a handful of the ground material, and plunging the probes of the moisture tester into the sample. Be careful not to poke yourself. This is an approximate reading (oven drying is the more accurate method), but this is quick and gives a sufficiently accurate value for the purpose of the exercise.
3. Measure a 500g sample of switchgrass. Adjust the moisture content to 15% (wet basis) by adding the following amount of water:

$$M_w = M_{sg} * (M_{Cd} - M_{Cc}) / (1 - M_{Cd})$$

Where M_w = Mass of water to be added (g)

M_{sg} = Mass of switchgrass sample (g)

M_{Cd} = Desired moisture content of sample (expressed as fraction – i.e., enter 15% as 0.15)

M_{Cc} = Current moisture content of sample (expressed as fraction – i.e., enter 7% as 0.07)

Use the spray bottle to add water to the feedstock, and then mix by hand until uniform.

4. Tighten the rollers on the machine to “finger tight,” turn on the machine and re-tighten the rollers to “finger tight.” Use an Allen wrench to tighten the rollers an additional $\frac{1}{4}$ turn.
5. Dump the pre-mix into the hopper. Two seconds afterward, dump the sample mix into the hopper. Collect the pellets and ground material as they exit the pelletizer. You can use the stick to gently tap material into the die.
6. When all of the material has been pushed into the die, add about one cup of DDG or Soybeans to clean the die (these materials work well to keep the die from clogging when not in use).
7. After the die cleaning material has been pushed into the die, shut the machine off.
8. Let pellets air dry and cool thoroughly before storing or testing.

POSSIBLE PROBLEMS:

- Machine seizes (die doesn't rotate) – shut machine off immediately, loosen rollers, and try to restart.
- Die clogs (nothing goes through) – shut machine off, use hammer and punch to clear the clogged holes in the die.

This project supported by the Northeast Sustainable Agriculture Research and Education (SARE) program. SARE is a program of the National Institute of Food and Agriculture, U.S. Department of Agriculture. Significant efforts have been made to ensure the accuracy of the material in this report, but errors do occasionally occur, and variations in system performance are to be expected from location to location and from year to year.

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