

Biomass

Business



Currently, the world relies on fossil fuels and nuclear products for power and energy. Both fossil fuels and nuclear sources put large amounts of pollution into the biosphere. Fossil fuels and nuclear products are also expensive to make, obtain and refine. Biomass is a cheaper, cleaner, and more socially appealing alternative to fossil fuels and nuclear products. The only set back to this fuel source is that most trees are 50 percent moisture.

They must be as dry as only 10 percent moisture before they reach maximum efficiency. This means that they must be dry. What is Biomass? Biomass is anything that comes from a plant or animal. The biomass most likely to be used as an alternative fuel is from plants. Most trees and plants are 50 percent moisture. Biomass for power plant could come for many sources.

When a logging company clears a tract of land, biomass debris is generally unused. Branches are usually thrown into a bonfire. These branches can be dried and be used as an alternative fuel source. There is also a species of grass that can grow at about 1 inch every hour. This can be harvested and re grown on a fast cycle; making is an ideal source for biomass fuel. How can biomass be dried? There are multiple ways to dry biomass as stagnant air solar drying, flowing air solar and flowing heated air type drying.

Stagnant air solar drying is the most efficient way to dry biomass. The biomass is put in a flat tray with sides and spread out evenly and placed in direct sunlight. It is then set to wait until the wood is dry. Flowing air solar is one of the other types of biomass dryers. A box is mad with the floor, mesh, on an angle and an open to.

A fan, covered in metal, set in the sun, blows hot, solar heated air at the wood chips, removing the moisture from the chips. The final drying procedure is to use the same box as the flowing solar air dryer, and to use an artificial heat source with an air current flowing up and through the box, removing moisture from the wood. Energy would be captured by burning the dried biomass, creating thermal energy, and heating water by radiation. The water would then turn into steam, and by convection, turning a turbine, creating electricity. Experiments in the future would have greater test sizes. This would increase statistical legitimacy.

Also, it would be good to use actual wood chips rather than mulch, as they would be closer to a real world scenario. If a real bomb calorimeter was used, the results of the main test would be more accurately collected, as this is a more precise instrument. Finally, a better burning procedure would be required. In the test, the wood did not burn very evenly, even though the tests were in small amounts.

1. Obtain materials and be supervised at all times.

2. Put on safety goggles
3. Make a calorimeter
 - a. Use a ring stand and a ring with an S hook to hang a soda can that contains 200 mL of water
 - b. Place a thermometer in the water
 - c. Place the large metal can on the base of the ring stand
 - d.

4. Lower the soda can until it is 5cm inside the metal can
5. Mass out 3 groups of 4 g of wood chips
6. Put 4 g of wood chips in drying box
7. Turn on hair dryer
8. Allow the hair dryer heat wood chips for 30min
9. Mass the batch of wood chips for post drying mass

Using the dry wood chips mass out 2g groups of dry wood chips 10. Put one group of dried chips in the metal can of the calorimeter. 11. Light chips on fire 12. Heat water with burning chips for 5 min 13. Check temperature in of water every minute and record 14.

Repeat steps 12-16 one more time 15. Mass out 4 g groups of wood chips 16. Put 4 g of wood chips in solar drying box (wood drying box) 17. Dry chips for 30min 18. Mass the batch of chips and record post drying mass 19.

Using the solar dried chips repeat steps 12-17 two times and record 20. Mass out 4 g groups of dry wood chips for control group 21. Repeat steps 12-17 two times and record The Hypothesis (If the Solar dryer dries the wood the most, than the wood will produce more heat.) was not supported. The Heat dried wood had a higher joule output, (17.

43330), whereas the solar test only put out 11. 62218 J, as did the air dried wood. The control burn put out 8. 04612 J. There was a 9.

38718 J difference between the Heat dried wood and the control and a 3. 57606 J difference between the solar dried wood and the control, and a 3. 57606 J difference between the Air dried and the control. Sources of error include burn speed, and changes in room temperature. Major power plants are slowly moving towards more green energy sources. More and more pressure is upon them to find a way to make a smaller carbon footprint.

One of these ways is biogassifacation and the use of biomass in the Power plant itself. This works with a similar technique to coal and other fossil fuel power plants, but with one ginormous difference. Instead of using non-

renewable resources, such as Fossil fuels and coal, compressed biomass is burned to heat water to make steam to turn the turbines to create electricity. There is no great demand for biomass used for power plants because few have switched to biomass. But the supply of biomass for burning is astonishing.

Scrap limbs from logging tracts and mills, cornstalks and other crop or plant waste can all be used in power plants. Unfortunately there is a problem standing right in the way. On average, biomass can be easily more than 50% moisture. And moist things do not burn well. So how will this be solved? It will be solved by simple testing, such as this experiment.

There are three main techniques to dry wood. Hot, flowing air blown through the wood chips, unheated air blown through the chips, and the solar method. These are pretty much what the sound like. In this experiment, a hot air dryer was replicated by blowing the chips with a hair dryer, the unheated air with a small fan, and the solar simply sun-dried. The wood chips were then divided and burned in separate trials in a home-made calorimeter.

The caloric output was then converted into joules. The original hypothesis (If the Solar dryer dries the wood the most, than the wood will produce more heat.) was not supported. The solar dried chips only put out 11. 62218 J whereas the heat dried chips delivered 17. 43330 J.