Waste to Watts, Stage II

Wade, Blake
Pfaffe, Madison

The aim of our research in Stage I, was to evaluate the biogas production potential of three forms of animal manure mixtures (dairy, swine, and poultry manure). Dairy cow manure resulted in maximum production of CH4 Methane Gas through the process of anaerobic digestion. In Stage II, the effort was to increase, or speed up, the biodegradability conversion efficiency of dairy cow manure used to produce CH4 by infusing switchgrass (Panicum virgatum) into the mixture. Two-19 liter buckets were used to simulate anaerobic digesters; a control digester and a independent variable digester. A 51mm bulkhead adapter and a 75 watt light bulb were installed in the lids along with a balloon on one end and clear plastic tubing on the other. 19mm tubing ran to a 6mm reducer creating an increase in pressure for testing. Each digester was filled with 2268 grams of Holstein manure along with 3.8 liters of water. One digester was filled with 680 grams of shredded “Cave In The Rock” switchgrass. Both digesters were heated to approximately 97°, 24 hrs/day for 75 days then heated to approximately 69° for 15 days. Temperature and CH4 ppm were monitored and recorded. The independent variable group showed a 100% increase production of CH4 over the control group. The conclusion: it is possible to expedite biogas production by incorporating switchgrass as an economically viable source of fuel for the production of electricity, in tandem with a generator set.

Awards Won: