

Student Scientists Produce Biogas Using Anaerobic Digester



Left to Right: Myles Frierson and Nydea Terrell at Ecotek Lab testing their biodigester prototype

Finding alternative sources of energy is critical for competing in the 21st Century. Countries, large and small, are scouring the globe to find new ways to power their economies. The options can range from solar energy to wind energy to hydrogen fuel cells. France, for example, has made big investments in nuclear energy, while Brazil has placed its bet on using sugar based biofuel to grow its economy and become more energy independent.

Ecotek student scientists, Nydea Terrell (7th grader at Berkshire Middle School) and Myles Frierson (7th grader at Derby Middle School) wanted to learn about the energy potential of landfill gas and biogas. They spent hours researching bioenergy topics and learning about the chemical traits found in the byproducts of decomposing garbage and animal manure.

As part of their field work, Nydea and Myles visited a landfill gas site – WM Pine Acres. While there they learned about the process of methane gas production, collection, transfer and conversion to electricity. After doing their field work, the students returned to the lab and constructed a model biodigester. The “biobrew” consisted of a blend of bacteria and purified water along with manure that was graciously “donated” by horses owned by Jessica Eason-Butler.

Designing a working prototype of the biodigester was challenging. The student scientists tried a number of configurations. To produce a working model, they had to apply a number of scientific concepts, ranging from understanding the concepts of thermal heat absorption in polymers to anaerobic decomposition of organic matter to the physics involved in transferring and storing highly reactive gases. After four weeks of incubation, the team was able to harvest over 300ml of biogas. On January 17, 2014 Myles and Nydea presented their research at the 2014 Stewardship Network Conference at Michigan State University.



Nydea gathering data on the volume of gas produced by biodigester



Myles and Nydea conducting experiment to measure the burn rate of ethyl alcohol and butane gas



Ignition of biogas while it is stored in low surface tension surfactant aqueous solution

About the Ecotek Science Program

Ecotek is a science research lab program for young inventors and researchers in grades 5 thru 12. Student scientists work on projects aligned with the issues being addressed by world leaders at the United Nations. To learn more about Ecotek Lab go to <http://www.ecotek-us.com>