QUARTERLY PROGRESS REPORT

June 1, 2011 – August 31, 2011

PROJECT TITLE: Diverting Food Waste from Landfills

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COMPLETION DATE: November 30, 2011 **PHONE NUMBER:** (352) 392-8699

PROJECT WEBSITE ADDRESS: http://biogas.ifas.ufl.edu/foodwaste/

OBJECTIVES:

1. Continue lab-scale experiments to optimize food waste digestion.
2. Conduct food waste audits at local schools.
3. Demonstrate anaerobic digestion at local schools.

WORK ACCOMPLISHED DURING THIS REPORTING PERIOD:

Objective 1:
Experiments for this objective were completed in previous quarters. We have shown that mechanical pretreatment with commercially-practical instruments significantly increases solubilization of food waste, which will facilitate high-rate digestion of food waste. A thorough scientific literature review for studies of food waste pretreatment was conducted in this quarter. In the literature, the studies involved expensive or impractical means for food waste pretreatment. Our study indicates that pretreatment with practical, mechanical methods (i.e. meat grinder or in-sink disposer) shows similar or greater food waste solubilization than the methods reported in the literature.

Objective 2:
Waste audits were conducted at three local schools in previous quarters of this project. In this quarter, we conducted an extensive literature review of school cafeteria waste generation data throughout the state and US.

Objective 3:
During this quarter, we designed and constructed a biodigester unit suitable as a teaching model for school science projects. The digester is a floating-barrel design with the biogas collector sitting inside the digester. The digester was designed for simple operation and minimal material input, consisting of two polyethylene barrels with PVC plumbing and an internal PVC mixing apparatus. The two barrels are 55 and 35 gallons for the digester and biogas collector, respectively. The biogas collector floats up and down in the digester as gas is produced and combusted. The entire digester is manually operated and requires no electrical input.

We have continued to use the portable digester to demonstrate anaerobic digestion of food waste at various events, as listed below.

INFORMATION DISSEMINATION ACTIVITIES:

- We have made several updates and additions to the project website, including details of events, news, photos, presentations, and posters. The website has been a valuable resource in sharing information about our research and the activities of the project.

- May 9-August 5, 2011
  For the duration of the summer, we hosted the *Bioenergy Summer School*, an IFAS undergraduate internship program, at our laboratory. We worked closely with six undergraduate interns and three graduate students in order for them to gain in-depth knowledge and appreciation of bioenergy and sustainable technology. The internship consisted of individual and group projects, laboratory exercises, lectures, and field trips. A central tenet of the summer school is bioenergy from waste, with an emphasis on food waste. Three of the six interns worked on individual projects related to food waste digestion. The summer school gives us the opportunity to instill knowledge and passion for sustainable reuse of society's waste.

- June 9, 2011
  We exhibited the portable food waste digester at the *UF-IFAS Tri-County Biofuel Symposium* in Bunnell, FL. The symposium included discussion and demonstration of various bioenergy solutions from around the state. The portable digester was one of four outdoor displays and included a demonstration of cooking on biogas from food waste.

- June 10, 2011
  Dr. Wilkie delivered a presentation entitled "Biopower: Sustainable Energy from Organic Wastes" at the *Third Annual Lake County Green Symposium*, held in Howey-in-the-Hills, Florida.

- July 28, 2011
  A group of undergraduates from the University of North Florida visited our laboratory to learn about our research in anaerobic digestion. The students were part of Students In Free Enterprise (SIFE) and will be working with a community in the Dominican Republic. During their visit, we talked to the students and their advisor about the potential feedstocks, including food waste, that are available for anaerobic digestion and discussed potential solutions for the community.

- August 1, 2011
  We exhibited the portable food waste digester at the *Farm-to-Restaurant Workshop* in Gainesville, FL. The workshop brought together over 90 farmers, restaurateurs, and individuals from related sectors around the North Central Florida region in order to strengthen the local food economy. At the workshop, we met with several individuals to discuss the potential and benefits of utilizing food waste digestion at their farm or restaurant. Food waste from the event was collected and fed to the portable digester to demonstrate how food waste can be converted into bioenergy.

- August 9-11, 2011
  We exhibited the portable food waste digester at the *Southeast Bioenergy Conference* in Tifton, GA. Ryan Graunke also presented a lecture entitled "Diverting Food Waste to Bioenergy" at the conference. The lecture included discussing the potential of utilizing Florida's food waste an alternative source for bioenergy in the Southeast. On the final day of the conference, the portable digester was part of the official program tour of various sustainable technology demonstrations. We conducted in-depth discussions with several individuals on the practicalities and possibilities of food waste digestion.