

QUARTERLY PROGRESS REPORT

June 1, 2010 – August 31, 2010

PROJECT TITLE: Diverting Food Waste from Landfills

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OBJECTIVES:

1. Estimate food waste production throughout Florida.
2. Develop protocols for effective pretreatment of food waste for anaerobic digestion.
3. Construct a portable digester for professional and public outreach.

WORK ACCOMPLISHED DURING THIS REPORTING PERIOD:

Objective 1:

From the overall food waste produced in the state, we seek to determine food waste production by different sectors of society. In order to begin this evaluation, we will be conducting food waste audits at local schools and restaurants. These waste audits will be carried out in the next quarter. We have selected three local schools at which to conduct these audits: Oak Hall School (a private K-12 school), J.J. Finley Elementary School (a public school), and the Loften School (a public vocational high school). Food waste produced at these schools will be normalized against student numbers and compared to other school waste audits in the state. In addition we will be conducting similar waste audits at local restaurants and comparing our results to other restaurant food waste production studies.

Objective 2:

Additional pretreatment experimentation was performed to better understand the effects on solubilization of pretreating food waste with an in-sink food disposal or a meat grinder. For this study, the synthetic food waste that was formulated in the second quarter was again used. Food waste samples were either ground through a manual meat grinder, run through an in-sink food disposal, or chopped into small bite-sized pieces (which acted as a control). An enzyme cocktail was then added to half of the samples under each treatment. The enzymes' purpose was to act as a surrogate for biological substrate availability of the food waste. Due to increased particle-size reduction, ground food waste would have a higher surface area for enzyme activity and hence would be more available to microbes in an anaerobic digester setting. Initial analyses of the results from this study indicate increased solubilization through enzyme degradation on the pretreated food waste over no pretreatment; however, this increase may not be significant. Follow-up studies, including a digestibility study of pretreated food waste will be carried into the second year of the project.

Objective 3:

Construction of the portable, food waste anaerobic digester was completed. The portable digester will be used to demonstrate anaerobic digestion of food waste at various conferences and events, and at local schools, to spread awareness and increase public support for food waste digestion.

INFORMATION DISSEMINATION ACTIVITIES:

- May 10-August 6, 2010
For the duration of the summer, we hosted the *Bioenergy Summer School*, an IFAS undergraduate internship program, at our laboratory. We worked with seven interns to give them an in-depth learning experience about bioenergy, waste, and sustainability. This was a great opportunity to immerse undergraduate students in the issues we are trying to solve at the laboratory. The summer school was much more than just teaching; the students developed and carried out individual projects on a subject of their choice. Several of the students worked on projects that dealt directly or indirectly with food waste and anaerobic digestion. They also gained first-hand experience by assisting in our waste audits and visiting landfills, food banks, and wastewater treatment plants to observe the fate of much of society's food waste.
- June 6-8, 2010
We delivered a presentation entitled "Biofertilizer Potential of Food Waste Anaerobic Digestion on Small Farms" at the *2010 Joint Meeting of the Florida State Horticultural Society and the Soil and Crop Science Society of Florida* in Crystal River, Florida. At this meeting, we discussed the utilization of biofertilizer from food waste digestion as a novel nutrient source in Florida. Creating value for all the products of anaerobic digestion (energy and nutrients) is critical for its widespread adoption. By building support for food waste digestion among soil and crop scientists, we are promoting the long-term viability of food waste digestion in Florida.
- July 15, 2010
We delivered a presentation entitled "Food Waste – An Opportunity Feedstock" at the *Sunshine State Renewable Energy Expo* in Orlando, Florida. The conference was attended by state lawmakers and industry professionals. It gave us the opportunity to share our knowledge with those in the political realm in order to put food waste digestion on the renewable energy agenda.
- July 19, 2010
We exhibited our portable food waste digester at a workshop in Gainesville, Florida, bringing local small farmers and restaurant owners together. This was the first meeting of a *Farm to Restaurant* group that is working to increase communication and partnerships between small farmers and restaurant owners. We were asked to participate in order to share the potential of food waste digestion both on farms and in restaurants, and the synergistic relationships that this can promote.

- July 31-August 1, 2010
We delivered a presentation entitled “Anaerobic Digestion and Algae Farming: Energy and Nutrients for Small Farms” at the *Florida Small Farms and Alternative Enterprises Conference* in Kissimmee, Florida. Several small farmers approached us after the presentation and were interested in further discussions with us about establishing anaerobic digesters on their farms. We believe that farmers, and especially small farmers, can play an integral role in diverting food waste from landfills.
- August 3, 2010
We delivered a lecture to 26 undergraduate students in the Agriculture and Environmental Quality class (ALS 3133). The lecture included discussion of food waste digestion and its role in the larger bioenergy and sustainability picture.