Energy and Nutrient Resources from Organic Wastes for Small Farms

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Organic wastes, energy, and organic fertilizer have a synergistic, closed-loop relationship that has become disconnected in modern society. Current organic waste disposal requires substantial energy and eliminates these nutrients from the productive cycle. Through anaerobic digestion of food waste, energy as methane-rich biogas and organic nutrients as biofertilizer are simultaneously produced. This process creates a sustainable cycle that mimics nature through the reuse of waste products for resource extraction. Small farms present an ideal scenario for this opportunity to occur. Small farms have many sources of on-farm feedstocks that are suitable for digestion, including culled/diseased crops, animal manure, and food waste. Food waste from surrounding communities could also be brought onto the farm as an additional source of energy and nutrients. This has many benefits for the small farmer and the community. The farmer is able to reduce energy and fertilizer costs by producing these products on-site. The surrounding community is able to reduce the problems associated with disposal of food waste, while furthering the 75% recycling goal set by the Florida legislature. This project seeks to assess the opportunity for small-farm food waste digestion through examining community food waste production and characterizing this food waste for energy potential and nutrient availability. Waste audits were performed at local schools and restaurants to determine available food waste. Food waste was characterized for total Kjeldahl nitrogen and total phosphorous. It is hypothesized that food waste digestion is a feasible option for small farmers to obtain energy and nutrients from organic waste resources.