Conversion of Food Residuals into Liquid Soil Amendment

Introduction

The EPA sponsored report "Municipal Solid Waste in the United States 2006" indicates that approximately 251 million tons of solid wastes were generated in the United States in 2006. Of that, food wastes comprise about 12.4% or 31.1 million tons of solid waste annually. Currently only 2.4% of food waste (744,000 tons) is recovered for recycling; the rest, about 97.6% (3.04 million tons) are disposed in landfills or waste to energy facilities. Diversion of organics from the municipal solid waste stream into recycled products has been slow, due to the high moisture, putrescible nature, non-homogenous composition and difficulty in handling and transportation of organic materials. The U.S. EPA lists increase in organics recycling as a priority in order to meet the 35% recycling goal set for the U.S.

Current technologies available for processing food residuals into useful products include composting and anaerobic digestion. The use of these technologies has been limited due to concerns over collection and processing of food residuals, which are highly putrescible and create health, safety, odor and pest control concerns. Composting and anaerobic digestion also cause the emission of significant greenhouse gases, and recycle food residuals into finished products that may have limited economic value.

Organic Recovery has developed an alternative technology that addresses these concerns. The key factor in the process is the quick recovery and, efficient recycling of food residuals into liquid soil amendment products. The process is a simple enzymatic bio-conversion which takes a couple of hours to accomplish. The technology is scalable to fit the needs of the community, and the entire operation can be housed in an existing commercial warehouse, making the facility accessible in urbanized areas. The food residuals are never allowed to rot or ferment, which eliminates the odor and leaching problems of the other technologies. The air exhausted from the facility is collected and treated to neutralize the minor odors that are associated with fresh food processing. This technology avoids the need for long distance transportation, with the attendant cost and demands on transportation infrastructure, associated with composting or anaerobic digestion facilities that must typically be remotely located, due to their adverse environmental impacts. Finally, Organic Recovery's technology digests food residuals before they rot or ferment, producing a high quality soil amendment product that has many valuable agricultural applications. These factors make the bio-conversion of food residuals into liquid soil amendment a cost-effective, efficient alternative to composting and anaerobic digestion.

The Feedstock – Food Residuals

Food wastes are constantly generated by the commercial sector, primarily grocery chains, food processing and preparation facilities, and institutions. These source-separated food residuals can be collected and will be the

feedstock for Organic Recovery's facility. Since OR's process requires that the residuals be fresh, and not decomposing, OR has developed a collection system with frequent, in-house collection of insulated containers and transportation in refrigerated trucks. This is a benefit to the generators, as they get the convenience of the containers provided, pick-up directly from their facilities, and avoid the health, odor and pest problems created by decomposing materials stored in their back-rooms or their garbage compactors. Generators improve the hygiene of their facilities by eliminating food waste from the premises, and OR obtains the fresh food residuals needed for its process. Generators typically can save on garbage disposal costs even with paying for pick-up of the food residuals from their facility by OR.

Environmental Considerations

Diversion of the food residuals and other organic materials qualify as source reduction and/or recycling, as it prevents the materials from entering the waste stream, and creates useful products. Elimination of food wastes benefits companies that would otherwise generate the waste, as well as municipalities who can include the tons of waste eliminated in their waste reduction/ recycling rate calculations.

Elimination of food residuals from the municipal solid waste stream further reduces the communities' costs of collection and disposal, and reduces quantities of materials disposed of in landfills. The communities can include the quantities recycled in meeting state mandated recycling goals, while freeing up capacity in existing landfills and waste to energy facilities. In areas where wastes are disposed at waste to energy (WTE) facilities, diversion of food wastes actually improves the performance at the WTE facility, since it no longer has to burn food wastes, which have a high water, low btu content.

Elimination of food residuals from the waste stream also prevents the formation of methane gas, which is estimated to be 23 times more potent than carbon dioxide. It also eliminates formation of N_2O in the food rotting process, which can be up to 200 times more potent than carbon dioxide. Eliminating food residuals from the municipal solid waste stream eliminates the fuel use and adverse impact on transportation infrastructure associated with the transportation of food waste to a remote landfill or composting facility, a further reduction in greenhouse gases. Finally, substituting the finished soil amendment product for conventional fertilizers that emit N_2O further reduces greenhouse gas emissions. Therefore there is potential for obtaining carbon credits in using this technology. According to Dr Sally Brown, University of Washington, about 6 tons of carbon equivalent are generated per ton of food waste, not including the carbon credits that may be obtained when considering the replacement of petrochemical fertilizers with OR's soil amendment products.

Soil Amendment

Most recycling facilities run into difficulties if the product produced is not marketable, or if there is no demand for their product. Organic Recovery's product – H2H Harvest 2 Harvest™ ("H2H™") is a liquid concentrate that is a cost-effective, environmentally beneficial replacement for petrochemical based fertilizers.

The price for petrochemical fertilizers continues to increase. Supplies for production of petrochemical fertilizer are increasingly limited, causing lower quantities of the petrochemical fertilizers to be produced and available to growers. Due to Organic Recovery's efficient operations, H2H™ can be priced competitively with conventional petrochemical based fertilizer.

Transportation of H2H™ is also favorable, as the concentrate is reconstituted with water at the growers' premises. Organic Recovery locates their processing facilities in areas in close proximity to agricultural markets, to minimize product trucking distances.

Growers are becoming more aware of the environmental impacts of using organic based fertilizers compared with using petrochemical based fertilizers. Petrochemical fertilizers (in addition to using fossil resources and consuming fossil fuels in their production) are less efficient – only about 20% of the fertilizer is used effectively. The other estimated 80% is released through off-gassing (emissions) or through leaching into near-by surface water or groundwater. While petrochemical fertilizers may improve crop production, growers also incur significant costs in the use of pesticides and herbicides.

Organic Recovery's H2H™ organic based soil amendment directly benefits the soil by releasing nutrients that promote healthy soil-web activity, promoting good soil health. This in turn promotes crop growth while inhibiting disease and pest activity. As a result, growers can expect reduction in the use of herbicides and pesticides, and reduced water demand due to reduced stress on the crops and greater water retention capacity of healthy soil. In the long-term, soil health is assured, as the nutrients in the fertilizer are released, and encourage better use of the minerals present in the soil. The cycle is complete, as there is carbon sequestration in the soil and plant uptake of what was once food residuals.

These factors have been demonstrated by Organic Recovery's sister company's Advanced Marine Technology's soil amendment product, Organic Gem.™ Organic Gem™ (which is made from fish-processing wastes) has been successfully used on over 100,000 acres over the past 15 years. Demand for the fertilizer from growers (including organic farmers and vineyards in California) is increasing, prompting the formation of Organic Recovery to produce fertilizer from food residuals, which are in far more abundant supply than fish residuals.

Organic Recovery is opening its first food residual conversion facility in Pompano Beach, Florida, and will produce H2H™ for sale into the Florida agricultural market.

Summary

In summary, Organic Recovery takes a problem material – food wastes – and converts it through a cost-effective, efficient process into a useful product that has significant agricultural and environmental benefits. OR's technology involves the local collection and processing of food residuals at facilities that have minimal environmental impact, and can be permitted in existing warehouses in major metropolitan areas that are zoned for industrial use. OR's soil amendment product is then deployed in the regional agricultural market, to supplement and reduce dependency on petrochemical fertilizers, while reducing greenhouse gas emissions. It is the type of innovative, environmentally sensitive technology that policy makers and regulatory bodies should support, for its positive contributions to both the environment and the economy.