Title

Using Composting To Recycle Meat Processing By-Products

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Abstract

From January 2 to October 14, 2004, meat processing by-products (meat scraps, fat trim, bones, internal organs, gastro-intestinal tract contents, and wash-water solids originating from beef, pork, goat, cervidae, bison, and lamb harvest) were composted by Jones Farm Meats, LLC, Saranac, Michigan. This demonstration project was done with the technical assistance of Michigan State University and the financial support from the Michigan Department of Environmental Quality Retired Engineer Technical Assistance Program Technology Demonstration Program. The objective was to evaluate if a small meat processing business could use composting to effectively, safely and economically convert inedible by-products into a product that could be used beneficially by crop and plant growers as a soil amendment.

A passive pile system comprised of twenty-eight, 2.44 x 4.27 meter bins was constructed. The compositing bins were designed with floors having a 2% slope toward the back wall and with the back and end walls sealed at the floor-wall interface to retain leachate that may occur as the result of rainfall up to 10.8 cm (25-year, 24-hr storm). The facility was constructed to compost about 5,200 kg of by-products produced each week, with an initial compost bulk density of 160 to 240 kg animal tissue per cubic meter.

Prior to active composting, by-products were ground using a 14.9 kW Rietz Prebreaker/Grinder to reduce bone size and increase homogeneity. Grinding reduced the volume of animal tissue by-product by 250%. The chemical analysis of meat processing by-product was 79.2% dry matter, 71.4% lipid, 5.0% crude protein, and 1.5% ash. Because of the high amount of lipid, composite pile structure or form was difficult to maintain, as piles melted, sagged, and flowed out of bins slightly, especially in warmer months. This problem was avoided by keeping a minimum of one foot fresh hardwood sawdust at the base of each pile, increasing the number of and decreasing the thickness of layers of by-product and amendment, and increasing the ratio of by-product to bulking agent from 2:1 to 2.5:1. Bedding (hardwood sawdust and soft wood shavings) from the calving pens of a neighboring dairy farm was also used an amendment.

Composting proved useful in recycling meat processing by-products generated by from a small butcher shop. The compost facility was sized appropriately for the continuous flow of by-product. Composting reduced total volume by 42%, with finished compost chemically consisting of 51% dry matter, 1.2% total N, 0.5% NH_4, 0.9% P_2O_5, 0.3% K_2O, and 1.1% Ca. The end product was suitable for application to crop land as a soil amendment. Hours of labor associated with inedible management at the butcher shop using composting instead of rendering, have increased, but have been offset by the conversion of refrigeration space and an increased slaughter capacity. Income from the sale of compost as a soil amendment or fertilizer is currently being negotiated. The composting facility should have a useful life of 25 years or more and long-

term control of by-product management is expected to help sustain the meat processing business well into the future.

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