

PRE-PROCESSING TECHNOLOGIES TO PREPARE SOLID WASTE FOR COMPOSTING

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ABSTRACT

The organic constituents of municipal solid waste can be converted into compost for use as a safe, beneficial soil amendment, conserving landfill space. The solid waste must first be processed to remove contaminants and prepare the organics for composting. This paper describes five different pre-processing systems, covering a broad range of technical approaches. Three are described briefly; two, from projects managed by the author, are presented as more detailed case histories: 1) a pilot study at a refuse-derived fuel (RDF) plant in Hartford, Connecticut and 2) a solid waste composting facility in East Hampton, New York. Materials flow diagrams and mass balances are presented for each process, showing that 100 tons of solid waste will yield 32 to 44 tons of compost, requiring disposal of 3 to 10 tons of metal, grit, and glass and 16 to 40 tons of light residue that can be landfilled or used as RDF.

INTRODUCTION

Beginning in the late 1980s, a number of states enacted legislation mandating the diversion of certain percentages of the solid waste stream from landfilling. One result was an increased interest in solid waste composting and the construction of approximately 20 facilities around the Country. Many of these plants utilized proprietary technologies developed in Europe, where there was more experience with complementary production of compost and RDF from the same solid waste. Other processes were developed for the American situation, where there is less market for RDF.

The purpose of this paper is to demonstrate the range of processing technologies that are utilized to prepare solid waste for composting with and without simultaneous production of RDF.

WASTE MATERIALS WHICH MAY BE COMPOSTED

In general, the following materials in typical solid waste may be composted:

- Food waste
- Paper
- Diapers
- Yard waste

In addition, sewage sludge may be beneficial to the composting process and may be incorporated at relatively little incremental cost. Paper is generally recovered and recycled to the greatest practical extent, as recycling provides more revenue at less cost than composting. However, much of the wet or mixed paper is not being recycled. Processes that extract both RDF and composting feedstock are generally operated to maximize the paper in the RDF. Food waste and non-recyclable paper generally constitute approximately 25 to 35 percent of the waste stream. The quantity of yard waste varies greatly depending on the landscape of the community and how yard waste is collected. On the average, yard waste constitutes an additional 17 percent (Cal Recovery, 1993).

OBJECTIVES OF PRE-PROCESSING

The following objectives must be met in preparing solid waste for composting.

Size Reduction

The optimal particle size is typically in the range of two to eight centimeters to provide a high volume to surface ratio. Microbial decomposition takes place on particle surfaces.