Composting Food Residuals -- Food Products Travel Full Circle

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Americans waste an estimated 96 billion pounds of food each year.[1] Waste occurs throughout the food distribution chain starting with unharvested materials left in the field, and continuing with losses during initial processing, losses during preparation at both restaurants and households, and losses due to spoilage. Most of this waste finds its way to landfills. As landfill space becomes scarce, alternatives are needed. For the disposal of food waste and residuals, composting is becoming a growing alternative and farm operations are among the food residual composting pioneers.[2,3]

Overview of Composting Operations

In 1995, when the first survey of food residual projects was undertaken by Biocycle magazine,

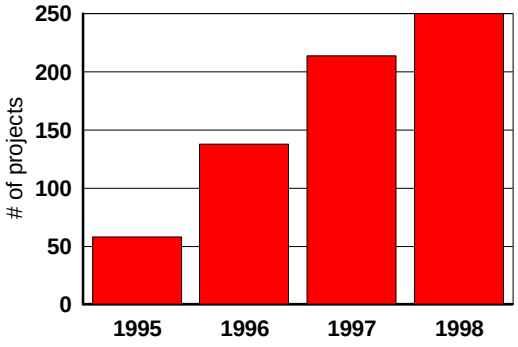


Figure 1: Food Residual Projects, 1995 -1998

a total of 58 fullscale and pilot projects were identified. The number of projects grew to 138 in 1996, 214 in 1997, and reached 250 in 1998, an average growth rate of 83% per year and 331% over the four years of the survey[4,5] (figure 1).

These projects range from small, non-commercial sites to larger facilities which sell or distribute the compost to the public. Smaller sites consist primarily of institutions such as correctional facilities, schools, and farms. Larger facilities generally consist of privately-owned commercially-operated facilities, farms, and municipalities. Many municipalities use composting as a means by which to reduce solid waste going into their landfills. In 1998, Hutchinson, Minnesota began a curb-side collection project for kitchen waste as part of a larger waste composting project aimed at reducing costs from dramatically increasing landfill dumping fees.[6]

On-farm composting sites are on the increase. In 1997, 22 projects were on-farm. By 1998, this number had increased 136% to 52 projects. In 1998, farms represented nearly 21% of all food residual composting sites (figure 2).[7]

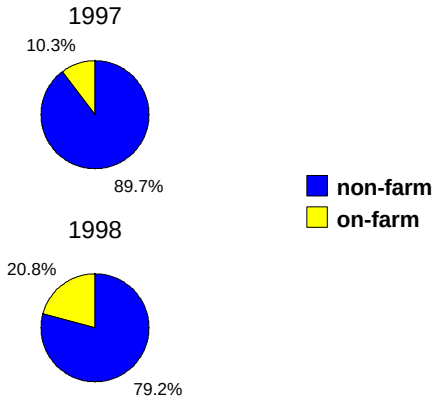
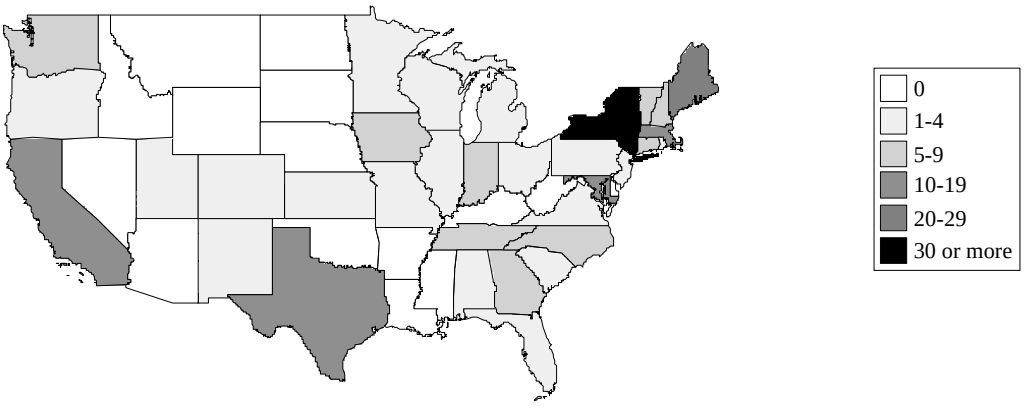


Figure 2: Location of Composting Sites

New York leads in numbers of sites processing food residuals and numbers of sites on-farm. New York now has 62 sites, an increase of nine sites over 1997, of which 16 are on-farm.[7] Maine has the second highest number of sites at 25, of which 10 are on-farm. The largest concentration of sites is in the New England area with Maine, Massachusetts (18 sites, 7

Figure 3:
Food Residual Composting Sites, 1998



Note: In 1998 there were three sites in Alaska and one site in Hawaii.[7]

on-farm), Vermont (13 sites, 6 on-farm), New Hampshire (5 sites, 0 on-farm), and Connecticut (5 sites, 0 on-farm) making up 26 percent of the total number of food residuals composters surveyed. Other major food residuals composting states are Maryland (15 sites), Texas (12 sites), and California (12 sites). Figure 3 shows the total number of sites per state in 1998, and Table 1 lists those which are on-farm for the years 1997 and 1998.[7]

Table 1: Sites on Farm by State[7]

State	1997	1998
California	0	1
Maine	9	10
Massachusetts	5	7
New Mexico	0	1
New York	6	16
Rhode Island	1	1
Vermont	1	6
Washington	0	1
Wisconsin	1	1
Totals	23	44

Types of Food Composted

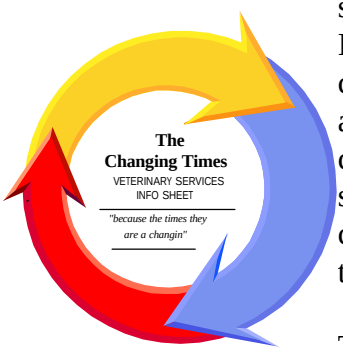
Approximately 42% of the 250 full-scale and pilot projects process preconsumer vegetative materials only, 17% process all types of preconsumer items including meat products, 24% process postconsumer materials including plate scrapings, 20% process materials from food processors excluding seafood, 14% process out of date items or "off spec" food, (eg. produce with bruises), 7% process out of date or "off spec" liquids, and 11% process seafood and aquaculture residuals (table 2).

Table 2: Summary of feedstocks used by composters

Category	Number of Processors
Pre-consumer, vegetative only	106
Pre-consumer, with meat	43
Post-consumer with meat	61
Food processors, excluding seafood	49
Out-of-date or off-spec food	36
Out-of-date or off-spec liquids	18
Seafood & aquaculture residuals	27

Among the on-farm projects, 38 process feedstocks from grocery stores, restaurants, hotels, resorts, produce terminals, produce wholesalers, and produce distributors. Fourteen on-farm projects process materials from food and seafood processors, farms (including manure, bedding and crop residuals), public agencies (including yard trimmings and municipal biosolids), landscapers, and paper mills. It is more likely that feedstocks from restaurants, hotels and resorts will contain post-consumer materials such as plate scrapings, some of which may contain meat.

Distribution of the finished compost is generally dependent on the size and commercial nature of the facility. Large, commercially- oriented facilities generally sell their finished product. Municipalities which use composting primarily to reduce the waste stream going into landfills may sell their compost, but usually at very low prices, or may distribute the compost for free. Large on-farm sites may sell their compost and/or apply it on-site. Small sites and those serving institutions such as prisons with farms or agricultural schools generally apply the finished compost on-site.[5,8] According to the 1998 survey, 202, or 81% of the composters sell or distribute to landscapers, farms, the public, nurseries, public works projects, and soil blenders. Only 34, or 14% of the composters use the compost on-site.



Regulatory Environment/Health Issues

Regulation of food-residual composting varies greatly from state to state and even from locality to locality. State requirements on pathogen reduction are often minimal, especially as regards on-farm or other small-capacity operations. States and localities appear to be primarily concerned with odor reduction and the prevention of water pollution from compost leaching. Toward these ends they require composting operations to have varying amounts of enclosure and usually a nonporous leachate surface. However, states are generally more stringent regarding the handling of post-consumer and/or meat products and may require, for example, a solid waste permit or limits on the volume of post-consumer material handled.[2,5,8] Texas (as reported in the 1997 survey) does have pathogen reduction requirements. The California Department of Agriculture has specific requirements for Medfly control. In California, food residuals for composting must be ground before they are allowed to leave quarantined areas, composting feedstocks must not touch the soil to prevent larvae from pupating, and composting must be done on a 10-inch thick cement pad.[9]

The majority (59%) of the sites responding to questions in the 1998 Biocycle survey regarding regulation fall under some form of exemption, such as “permit by rule” (24%), an on-site use exemption (13%), an agricultural exemption (6%), or no permit required (17%). Thirteen (9%) facilities need only to register, and four (3%) operate under a research and development permit. The rest, (35 or 25%) operate with a solid waste permit and/or a wastewater permit.

This lax regulatory environment stands in stark contrast to that of biosolids composting. Biosolids are dewatered, partially treated sewage sludge. The Environmental Protection Agency’s “Part 503” rule stringently regulates the composting methods and pathogen limits for biosolids composts which can be publically distributed.[10]

Pest control is an issue for food residual composting facilities with mosquitos, flies, rats, seagulls, dogs, coyotes, raccoons, skunks, and bears being cited as problems.[11] Currently, there are no studies which assess the risks of transferring pathogens from compost via vectors to susceptible hosts. Properly aerated and balanced compost achieves a high enough temperature and a large enough composition of beneficial bacteria to inactivate virtually all pathogens, thereby obviating any risk. However, the possibility exists that pathogens may repopulate under the right conditions after the composting process has taken place.[12,13,14,15]

The EPA's "Part 503" rule pertaining to biosolids composting specifies vector attraction reduction requirements and pathogen limits which must be met as close in time to the distribution of the compost as possible.[10] No similar federal regulation covers food-residuals composting.

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