

# Foodservice Wastes

C 26

Jennifer Coval, Env. Res. Mgmt. Student  
James W. Garthe, Instructor and Agricultural Engineer

To cut operating costs many foodservice managers and owners are taking a critical look at properly managing their wastes. Targeting specific materials in the waste stream can determine if significant amounts of discards can be reduced in quantity or managed differently. For example, a good assessment can reveal if a specific food component is being thrown away continuously. In this case, the menu should be changed to serve more popular items that will be consumed, not discarded.

This fact sheet will provide an overview of how to assess any waste stream, and what components typically comprise foodservice wastes.

## Assessing Waste Streams

---

There are two methods of assessing waste streams: a *waste stream analysis* or a *waste audit*. Both methods determine the quantity, composition, and sources of waste from all types of organizations, not just foodservice establishments. Conducting either a waste stream analysis or audit provides useful information to develop a waste management plan. This plan determines the manner in which the waste is to be managed, such as by source reduction, recycling, composting, incineration, or landfilling.

### *Waste stream analysis*

In a waste stream analysis, *all* waste generated by the facility is sorted and weighed. This encompasses both the service and production areas. A waste stream analysis is normally conducted for a 1-week period. The results are averaged to obtain an idea of the amount of waste generated per day, and, ultimately, the amount per year. However, because the waste stream analysis only gives a snapshot of the amount of materials generated on the days of the study, repeat analyses may be needed to estimate the amount of waste generated annually. Common units of weight used in this process are tons or pounds, and units of volume are gallons (for trash can liner capacity) or cubic yards (for dumpster capacity).

One benefit of conducting a waste stream analysis is that it helps to determine dumpster capacity. Because the results of the analysis show the volume of waste generated by the facility, dumpster capacity is determined. The results of the analysis can help with negotiations for the number of dumpsters needed and the frequency of the pickups.

### *Waste audit*

A waste audit analyzes only *one* waste component in the facility or all waste in a particular *area* or *department*. The service area or production area may be analyzed separately, and the results averaged for the amount of waste generated daily. This method takes less time (3 to 5 days) and is easier to conduct than a waste stream analysis. The units of measure for this process are the same as in the waste stream analysis.

One benefit of conducting a waste audit is that it can be used as the basis for a waste management program. Another benefit is that the amount of a *specific* waste component is established for the entire facility. Polystyrene, for example, may be analyzed to determine if its volume significantly contributes bulk to the facility's total waste stream. A third benefit is that disposal costs are lessened; one journal article reports that 40 percent of McDonald's garbage costs were permanently cut thanks to a well planned waste audit.

## Conducting A Waste Stream Analysis Or Audit

---

There are a few general steps to follow when conducting an analysis or audit.

***Create a waste reduction team.***

This team should consist of 1 to 3 people, or more if the facility is very large. Administration, employees, maintenance, supervisors and others who are interested can make up the team. Individuals will be trained while working on-the-job.

***Communicate with management.***

Communication with management is vital to the success of the process, and to obtain accurate results. The waste reduction team should inform management of their plans, such as the benefits and costs of the assessment and expected results. Also, the encouragement, support and suggestions by management will be helpful to the team.

***Communicate with employees.***

Communicating with, and training, the employees who will be involved with the analysis or audit is the duty of the waste reduction team. The employees, as well as the waste hauler, need to know what changes may be made or if they are to be assigned specific duties along the way.

***Review purchasing and inventory data.***

Review purchasing and inventory information for a certain time period, for example, one year. This will give an indication of the amount of materials coming into the facility and the types of used components that will leave the facility.

***Develop a flow schematic.***

A map of all inputs and discharge points will help employees visualize the material flow throughout the facility.

***Conduct a facility walk-through.***

The waste reduction team should walk through the facility to observe how and where waste is generated, if the facility needs to be more efficient with waste handling, and if any materials or packaging are already being recycled. Talk to employees and personnel to gain ideas on waste generation and reduction within the production and service areas.

***Determine a representative sample size.***

Before beginning the waste stream analysis or audit, determine whether all of the waste stream will be analyzed, or whether a smaller sample will suffice. This is likely to depend on the size of the establishment. If all of the waste is not analyzed, use a representative and random sample. A good guide to choosing an indicative sample is a standard by the

American Society for Testing and Materials, described in the For Further Information section.

***Present written report of results to management.***

After the results of the waste stream analysis or waste audit are examined, they should be reported in writing to directors and managers of the establishment. These people can then help develop a waste management plan. In time, the plan can be evaluated for successes, weaknesses, and inefficiencies.

## **What's In Foodservice Waste?**

---

Foodservice wastes will vary depending on the type of establishment, the menu items available, or if waste reduction is already being practiced. In general, foodservice has a lower percentage of paper than plastic. About one-third of the waste is recyclable. The types of establishments compared herein are school cafeterias, college and university eateries, restaurants (fast food, table service, fine dining, and cafeteria), and hotel food and beverage operations. See Table 1.

The typical waste stream of school foodservice facilities includes paper (milk and juice cartons, napkins, lunch bags), food, corrugated cardboard, metals, and if disposables are used, polystyrene. College and university waste streams may encompass packaging, food, plastic, and paper. According to one source, these facilities generate less paper and aluminum, more steel and plastic, and a greater percentage of recyclable waste than other types of foodservice operations.

Contrary to popular belief, fast food packaging is not the cause of municipal solid waste problems. One researcher found that only about 0.25 percent of the municipal solid waste is fast food packaging! Another source reports that 70 percent of fast food operation total waste is generated in the service area, and 30 percent is generated in the kitchen, or production, area. Typically, production wastes consist of corrugated cardboard (34%), paper and paperboard (11%), and plastic (7%).

Table service restaurants may have a great deal of food waste and paper, often from napkins and placemats, for example. If the paper is contaminated with food, it is not recyclable. One source reports that 60 percent of wastes from some restaurants is organic!

Table 2 lists typical waste stream components and average quantities that can be expected from various facilities that serve food.

**Table 1. Percent of total waste stream comprised of packaging materials from various foodservice operations.**

Packaging material	Weight of waste (%)				
	Hotel food & beverage (2 mid-size) <sup>a</sup>	Food service (6 schools) <sup>b</sup>	Food restaurant (2 McDonald's)	University dining hall <sup>c</sup>	
				A	B
Corr. paperbd.	7.4	29.0	34.0	10.3	9.1
Metals	2.3	15.4	—	3.0	2.4
Aluminum	0.1	—	—	0.5	0.3
Paper & paperbd.	1.9	12.6	11.0	10.6	9.8
Plastic	0.7	8.6	7.0	3.8	4.9
Glass	19.0	—	—	—	—
Wood	—	—	—	0.5	0.6
Total	31.4	65.6	52.0	28.2	26.5

  

Packaging material	Volume of waste(%)					
	Collapsed volumes			Uncollapsed volumes		
	Hotel food & beverage (2 mid-size) <sup>a</sup>	University dining hall <sup>c</sup>		Food service (6 schools) <sup>b</sup>	University dining hall <sup>c</sup>	
	A	B		A	B	
Corr. paperbd.	6.6	6.1	4.5	55.8	44.6	35.1
Metals	5.6	0.9	0.6	14.0	2.3	1.8
Aluminum	0.5	4.1	4.3	—	2.1	2.6
Paper & paperbd.	3.6	33.8	35.1	17.1	21.7	25.4
Plastic	3.7	13.3	14.5	8.2	7.5	10.2
Glass	8.1	—	—	—	—	—
Wood	—	0.2	0.1	—	0.6	0.6
Total	28.1	58.4	59.1	95.0	78.8	75.7

<sup>a</sup> Production waste only. <sup>b</sup> Production waste only. Figures represent gable-top milk containers with the grease waste stream not included in the totals. <sup>c</sup> Two dining centers at Kansas State University. Source: Ferris et al., *Food Tech.*, Vol. 48(3) pp. 110-115.

### For Further Information

For free information on waste prevention, recycling, composting, and purchasing recycled materials, call EPA hotline: 800-424-9346. Request *Decision Makers Guide to Solid Waste Management*, EPA 530-SW-89-072, Nov. 1989. For conducting a waste stream analysis, request *Business Guide for Reducing Solid Waste*, EPA 530-K-92-004, Nov. 1993.

For standard procedures for taking samples and sorting waste, refer to ASTM Designation D 5231-92, *Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste*, available from ASTM, 1916 Race Street, Philadelphia, PA, 19103. E-mail: service@local.astm.org.

For information on single-use foodservice disposables, contact: Foodservice & Packaging Institute, Inc., 1901 North Moore Street, Suite 1111, Arlington, VA 22209; Ph.: 703-527-7505; Fax: 703-527-7512; Web: <http://www.fpi.org/fpi>.

For information on composting contact: Composting Council at (703) 739-2401.

For worksheets covering solid waste, air quality, water and energy usage, and hazardous materials, refer to *Environmental Issues Impacting Foodservice Operations*, by Shanklin & Mason of Kansas State University, Department of Hotel, Restaurant, Institution Management and Dietetics, 1996. To order, call (913) 532-2206, or e-mail shanklin@humec.ksu.edu. \$30.

**Table 2. Quantities of wastes generated from various establishments.**

Source	Category of Establishment	Waste Generation Description		
		<b>Rate (Total Waste)</b>		
Illinois Dept. of Energy & Natural Resources, 1991	Hospitals	10-17.5 lb/occupied bed/day		
	Schools	0.4-1.0 lb/student/school day		
	Hotels	1 lb/occupied room/non-checkout day 2 lb/occupied room/checkout day		
	Restaurants	200 lbs/\$1000 of sales		
	Restaurants	<b>Recyclables/1000 meals/day</b> 60 lb corrugated containers 24 lb steel cans 3.6 lb aluminum 3.6 lb glass		
		<b>Rate (Average Total Waste)</b>		
Restaurant Management, August, 1988	Fast Food	3.5 cu yd/1000 sq ft/wk 650 lbs/1000 sq ft/wk 2.5 cu yd/\$1000 in sales 450 lb/\$1000 in sales		
	Family-Style	0.1 cu yd/seat/wk 25 lb/seat/wk		
	Fine-Dining	0.125 cu yd/seat/wk 30 lb/seat/wk		
	Cafeteria	0.005 cu yd/meal served 1 lb/meal served		
			<b>Weight Discarded Per Meal Served, lbs</b>	
Shanklin & Mason, KSU, 1996	Nursing Home	Food	Packaging	Total
	School	0.68	0.31	0.99
	University Dining Hall	-----	-----	0.49
	Military Dining Hall	0.36	0.13	0.49
	Military Dining Hall	0.74	0.27	1.02
		<b>Volume/Meal Served, Uncollapsed, Gallons</b>		
	Nursing Home	Food	Packaging	Total
	School	0.31	1.23	1.54
	University Dining Hall	-----	-----	0.63
	Military Dining Hall	0.17	0.57	0.74
	Military Dining Hall	0.12	0.82	0.94
		<b>Total Waste Per Meal Served, lbs</b>		
Unknown, Wisconsin Solid Waste Handbook, c.1974	Luxury Class Restaurant	1.5		
	Full Service Restaurant	1.0		
	Cafeteria	0.5 to 0.75		
	Fast Food	0.5		

For a copy of our Fact Sheet listing contact: Agricultural & Biological Engineering Extension, 246 Ag Engineering Building, University Park, PA 16802; Ph: (814) 865-7685, FAX: (814) 863-1031, Email: agbioeng@psu.edu