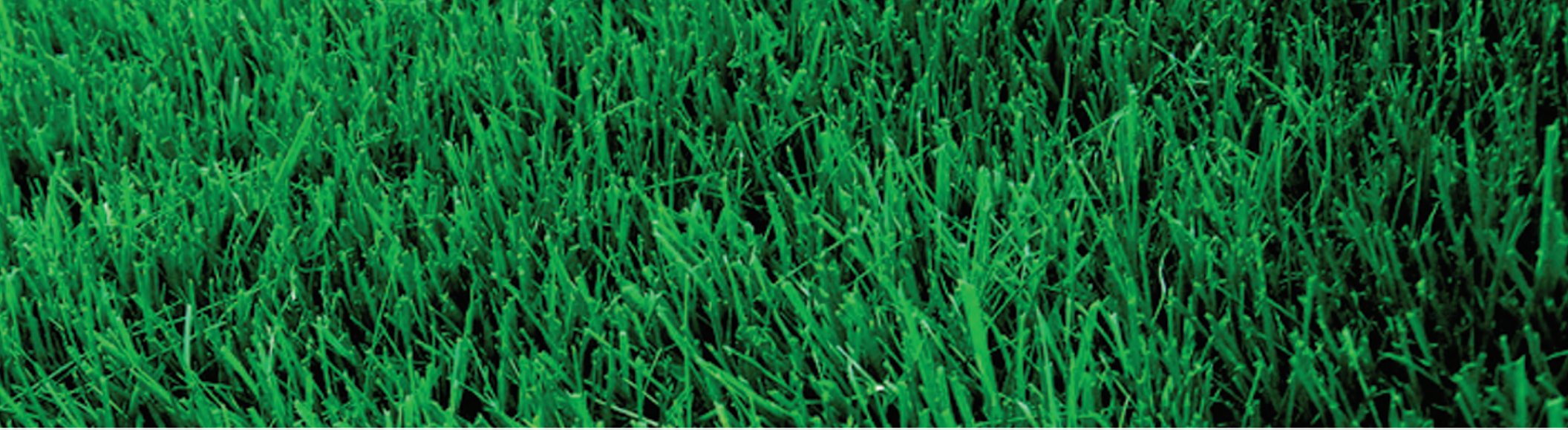
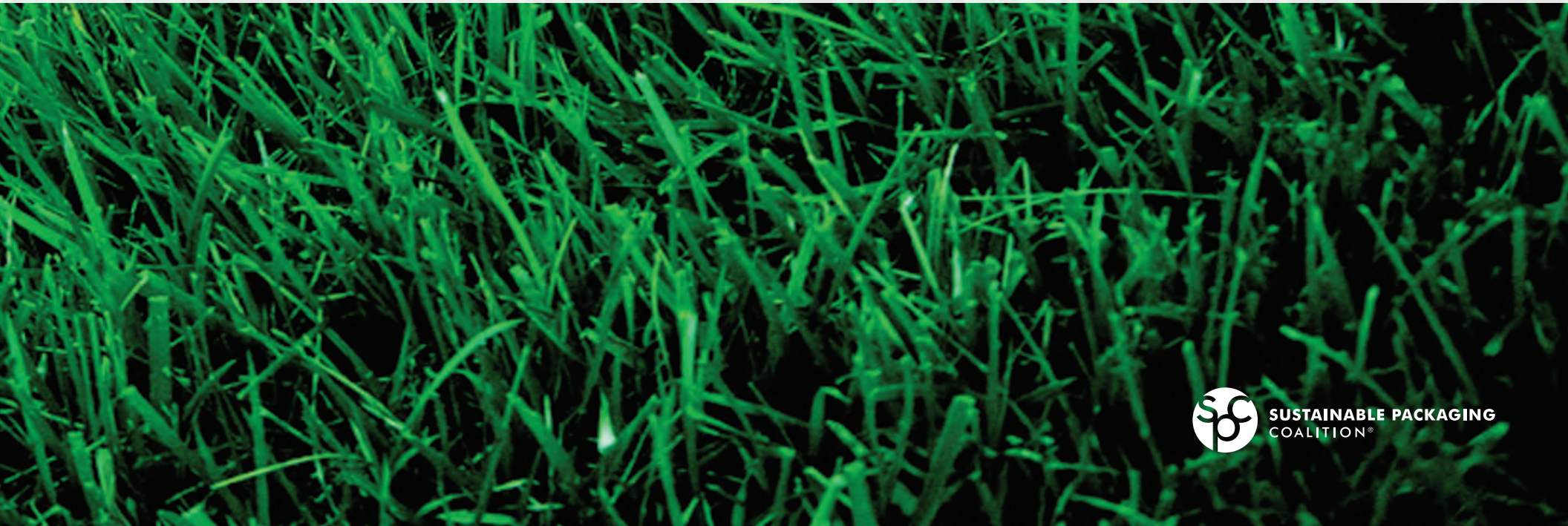


COMPOSTABLE PACKAGING

THE REALITY ON THE GROUND



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Compostable Packaging: The Reality on the Ground was prepared by the Sustainable Packaging Coalition®. The Sustainable Packaging Coalition (www.sustainablepackaging.org) is a project of GreenBlue®, a nonprofit institute that works with the private sector to enable the positive redesign of industrial systems.

PROJECT TEAM

Author:	Rhodes Yepsen, Organics Recycling Consultant
Project Lead:	Liz Shoch
Advisor:	Anne Johnson
Contributor:	Heather Martin
Designer:	Stephanie Fishwick

We graciously thank all our dedicated resident experts within the Sustainable Packaging Coalition who volunteered to craft the survey questions and the industrial composting facilities that participated in the survey.

600 East Water Street, Suite C
Charlottesville, VA 22902
tel 434.817.1824 | fax 434.817.1425
www.greenblue.org | info@greenblue.org

COMPOSTABLE PACKAGING: THE REALITY ON THE GROUND

EXECUTIVE SUMMARY

The impetus for *Compostable Packaging: The Reality on the Ground* came from interest expressed by members of the Sustainable Packaging Coalition (SPC) during the SPC's 2009 Fall Meeting discussion of the beneficial end-of-life options available for foodservice packaging. There appeared to be a significant disconnect between compostable packaging designers and the composting facilities expected to receive and process the materials. Anecdotally, SPC members had heard that composting facilities frequently reject all packaging, even certified compostable packaging, citing it as contaminant to their process and finished product. Therefore, the SPC Industrial Composter Survey Project was created to gather information about how industrial composting facilities operate, identify possible disconnects between existing standards and education on compostable packaging, and gain a better understanding of the fate of packaging in industrial composting facilities across the United States. An SPC working group was formed to provide feedback and guidance on the survey questions to ensure that pertinent aspects for the packaging community were addressed. Survey questions ranged from basic (composting method, annual throughput, types of food waste accepted, etc.) to complex (problems with compostable products/packaging, changes to operations to better handle packaging, etc.).

Fifty U.S. composting facilities that accept food waste were identified, based on size (annual throughput), composting method (e.g. windrow, in-vessel, etc.) and geographic location. This subset was intended to provide a range of experiences with packaging, rather than gauge the total U.S. capacity for processing compostable packaging. The survey was conducted via telephone and e-mail during February and March 2010. Ultimately, 40 of the 50 identified facilities participated in the survey. This project was completed in April 2010, and was intended to provide direction for possible future work.

The main outcomes are as follows:

- 90% of facilities surveyed actively accept compostable packaging.
- 67.5% require compostable packaging to have some type of standard or certification before allowing it in the front gate.
- 82.5% want a more universally recognizable label of compostability.
- 80% actively develop food waste programs to increase throughput.
- 75% would consider promoting or already do promote the use of compostable packaging in their local communities.

INTRODUCTION

Attention is routinely focused on improving the recycling rates of materials in the United States' municipal solid waste (MSW) stream, but the U.S. Environmental Protection Agency's (EPA) 2008 snapshot of our country's MSW shows that organics dominate: a quarter of it is yard trimmings and food waste, and approximately another third is made up of paper and wood[1]. The portion that is food waste (12.7%) amounts to 32 million tons, of which less than 3% is recovered through composting. While the EPA estimates that just over half of all types of fiber-based packaging are recycled[2], a lot of organic materials, including packaging, are regularly sent to landfills where the material is lost. Yard trimmings and other woody debris degrade very slowly in modern landfills, but food waste is particularly volatile and its decomposition releases methane, a potent greenhouse gas. In fact, in 2008, landfills were the largest human-related source of methane in the United States, accounting for 34%[3]. The packaging community can redirect a large portion of those materials from a negative end-of-life fate to a beneficial one by designing packaging for compostability.

It's important to note that while composting is a beneficial end-of-life option for all fiber-based packaging, recycling is usually considered the best and highest use of that fiber. The exception is for food- or beverage-soiled or waxed paper packaging, which is typically not accepted for recycling in paper mills. Alone or in combination with paper, compostable biopolymers may also be used to package food and are not yet collected in large enough quantities to be recycled economically. Designing these types of packaging for collection and composting with the food waste stream could solve the end-of-life problem for a large segment of packaging formerly destined only for the incinerator or the landfill.

There are still several unresolved challenges to making compostable packaging a reality. One of the biggest concerns is the limited state of composting infrastructure across the U.S., including both collection systems and composting facilities. Composting facility permits are regulated at the state level, and are not consistent from state to state. Most composting facilities focus only on yard trimmings[4], which is seen as a more benign feedstock than food due to concerns about pests, odors, and disease. BioCycle magazine's "State of Garbage 2006" report noted that, as of 2004, there were approximately 3,400 U.S. industrial composting facilities that accept yard trimmings.

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1 U.S. Environmental Protection Agency (U.S. EPA). November 2009. *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2008*. www.epa.gov/epawaste/nonhaz/municipal/msw99.htm

2 Ibid.

3 U.S. EPA. March 24, 2010. "Basic Information about Food Waste." http://www.epa.gov/osw/conserve/materials/organics/food/fd-basic.htm.

4 Phil Simmons, Nora Goldstein, Scott M. Kaufman, Nickolas J. Themelis and James Thompson, Jr. "State of Garbage in America." *BioCycle*. April 2006, Vol. 47, No. 4, p. 26. http://www.jgpress.com/archives/free/000848.html

Yet only 267 U.S. facilities[5] were permitted to accept food waste (in addition to yard trimmings) as of 2008. In some areas composting facilities permitted to take food waste are regulated as strictly as landfills, necessitating an extensive and costly permitting process that may be difficult for a new start-up facility to afford.

Another challenge has been changing the ingrained behaviors surrounding the disposal of our municipal solid waste. Composting, as well as recycling, have historically not been seen as a priority for many municipalities, and low landfill tipping fees in certain areas of the country have made it easy to dispose of organic matter at landfills. Some states have landfill bans on yard trimmings, which helps to promote composting as the solution of choice for organic waste. As local and state governments become more aware of the negative climate change effects of landfill-caused methane emissions, and the fact that landfill gas collection systems do not capture 100% of methane produced, the desire to keep organic matter out of landfill will continue to grow.

Perhaps most directly related to the SPC members, questions remain about compostable packaging design specifications. One concern is that the addition of compostable packaging to compost feedstock might negatively impact the quality of finished compost. Packaging is designed to protect the product and for optimal performance in the hands of a consumer, but does the design also take into account its decomposition in a timely and non-toxic manner at a composting facility? And could biopolymer packaging designed for compostability wind up contaminating conventional plastic recycling streams?

While acknowledging the wide scope of issues surrounding our municipal solid waste infrastructure, industrial composting facilities, and compostable packaging, the SPC wanted to understand the challenges facing composting facilities and the reality of composting opportunities, so that the membership can work together with composters to identify specific ways to make a difference through packaging design.

METHODOLOGY

The SPC Industrial Composting Survey Project gathered information and experiences from a subset of composting facilities in the U.S. to increase the knowledge base of this end-of-life option, looking at types of packaging that are currently accepted, who is generating and diverting food waste and packaging to composting, operational challenges with packaging, certifications required, and other significant considerations. Because compostable packaging typically is associated with or accompanies food waste, it was assumed that facilities accepting food waste could also potentially accept compostable packaging.

Fifty composting facilities were identified for the survey. All accept food waste, but vary in size, geographic location, and composting method to provide a range of experiences. The surveys were conducted by telephone and e-mail. Out of the desired 50 surveys, 40 were completed. Most composters were willing to participate and acknowledged the importance of this project. The primary reason given for not participating was limited time, as spring is an extremely busy season for composters. Besides limited time, one facility had gone out of business, while others had no experience with packaging and therefore did not want to participate.

5 Cristina Olivares, Nora Goldstein and Rhodes Yepsen. "Food Composting Infrastructure." *BioCycle*. December 2008, Vol. 49, No. 12, p. 30; www.jgpress.com/archives/_free/001781.html.

SURVEY RESULTS

Do you accept any compostable products or packaging (bags, cutlery, cups, etc.)? If no, what are the reasons that you have for not accepting compostable products or packaging?

What would lead you to accept compostable products or packaging in the future?

GENERAL ACCEPTANCE OF PACKAGING

Overall, 90% (36 out of 40) of the facilities surveyed actively accept compostable packaging[6]. Of the four facilities not actively accepting compostable packaging, three are actually taking certain products/packaging on a limited pilot basis and are considering accepting it more widely in the near future.

Reasons for not accepting packaging include:

- Potential for contamination from conventional plastic packaging (three out of four).
- Previously accepted compostable packaging, but it did not break down quickly enough (one out of four).
- Too difficult to identify if packaging is certified compostable (two out of four).

When asked, "What would lead you to accept compostable products or packaging in the future?" all four facilities agreed that working closely with a food waste generator to ensure only certified products were used would be necessary. Half (two out of four) said clearer labeling would lead them to accept compostable packaging in the future.

What is the annual throughput of your facility (tons or cubic yards)? How much is food waste? How much is yard trimmings?

FACILITY SIZE AND LOCATION

The composting facilities surveyed range in capacity from 1,125 tons/year of incoming materials to 1,347,580 tons/year, with a median of 23,500 tons/year. Some facilities reported actual throughput, whereas others cited permitted capacity. Seventy percent of facilities also reported the amount of incoming food waste accepted in 2009, which was converted into tonnages. This ranged from 150 to 75,000 tons of food waste, with a median of 2,142 tons. More detailed research would be required to accurately measure the maximum capacity of surveyed facilities to handle food waste and packaging and to identify potential areas of growth. The location of surveyed facilities was distributed as much as possible across the U.S., looking at both number of facilities per state (Figure 1) as well as geographic region based on the U.S. EPA's 10 regions (Figure 2). In Figure 1, states that are black in color either did not have food waste composting facilities or did not provide responses, while green indicates the number of participating facilities in each state. The reason for geographic distribution was to account for regional differences, such as climate (heat and moisture), as well as varied sources of food waste — some areas of the country have highly developed residential food waste programs, others just commercial programs.

6 Although this is encouraging, it should again be noted that this statistic is not representative of the U.S. composting infrastructure as a whole, but of the subset of facilities that accept food waste. Because the purpose of the survey was to gather experiences with compostable packaging, facilities were selected in part based on the likelihood that they would be accepting compostable packaging accompanied by food waste.

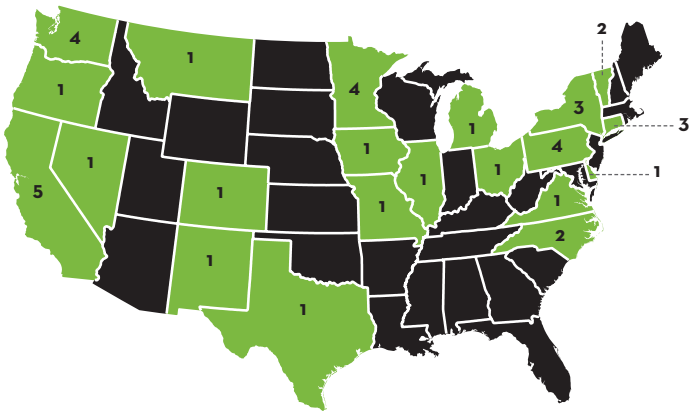
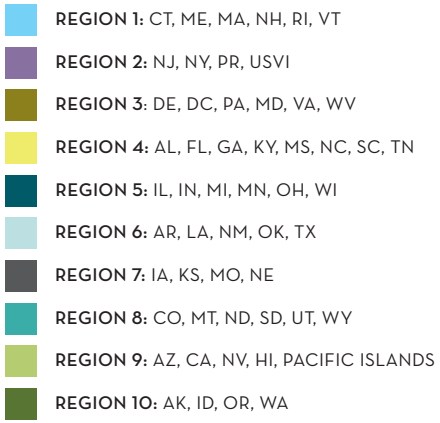


FIGURE 1: Geographic Distribution of Composting Facilities Surveyed



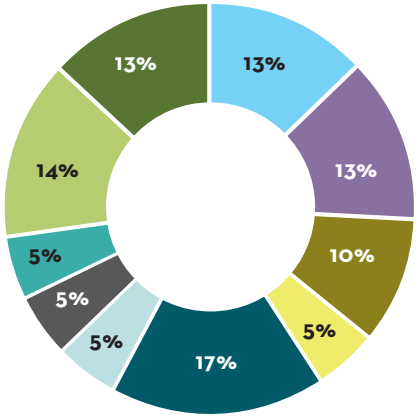


FIGURE 2: Distribution of Facilities by EPA Region

SURVEY RESULTS

What composting method is used at your facility?

COMPOSTING METHODS

The facilities surveyed use a variety of composting methods, covering the full range from windrows to in-vessel systems to vermicomposting (Figure 3).

Brief definitions of each composting method are as follows:

- Windrow: piles turned with a windrow turner (self-propelled or with a tractor)
- ASP: aerated static piles, turned infrequently (static) and with forced air (aerated)
- Enclosed ASP: aerated static piles that are covered with geotextile (breathable) fabric
- Aerated windrow: windrows with forced air
- In-vessel: composting in a container or structure (concrete walls, building, etc.)
- Static pile: piles turned infrequently, and typically without a windrow turner
- Passive pile: piles turned less than once/month
- Vermicomposting: worms, as opposed to microbes, are used to break down organic matter (also called vermiculture)

Some facilities use several composting methods, for instance starting with an in-vessel system but using windrows as a curing stage. Static and passive piles are traditionally very low-tech, requiring less capital investment, whereas in-vessel systems often include sophisticated monitoring and control equipment. All of these systems are capable of processing food waste and compostable packaging, but they carry specific operational considerations, such as space requirements, odor control ability, range in time to produce finished product, etc.

What types of feedstocks do you accept? What generators do you service?

FOOD WASTE: TYPES AND SOURCES

The types of food waste accepted are of particular interest when considering compostable packaging. As explained, compostable products and packaging typically accompany food waste streams. The highest sectors of food waste accepted are preconsumer (90%), postconsumer (87.5%), food processing waste (70%) and out-of-date/off-spec food (60%; see Figure 4). Probably the most significant for the packaging community are postconsumer, residential, and out-of-date food wastes.

Identifying composting facilities' typical sources of food waste is also important, as it demonstrates the possible growth areas for the use of compostable packaging (Figure 5, next page). Overall, most facilities accept food waste from commercial and institutional sources (97.5% and 95% respectively), as well as special events and festivals (87.5%). All of these categories have high potential for compostable packaging. Only 37.5% currently accept residential food waste, but that is primarily because residential source separation programs in the U.S. have been slow to emerge. As of December 2009, there are approximately 90 communities in the U.S. with residential food waste collection programs[7].

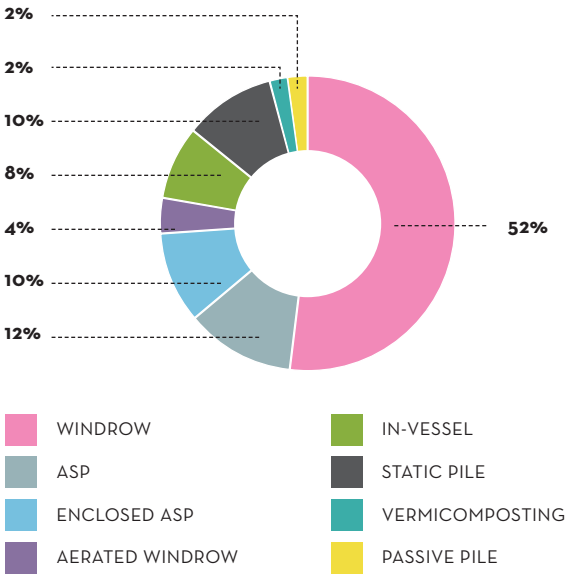


FIGURE 3: Composting Method

From which sources do you currently receive compostable products or packaging?

SOURCES OF COMPOSTABLE PACKAGING

Who are composting facilities receiving compostable packaging from currently? According to the facilities, those sources diverting the most compostable packaging were special events (75%), schools (63.9%), restaurants (61.1%) and supermarkets (52.8%) (Figure 6).

7 Rhodes Yepsen. "U.S. Residential Food Waste Collection and Composting," *BioCycle*. December 2009. Vol. 50, No. 12, p. 35; www.jgpress.com/archives/_free/001992.html.

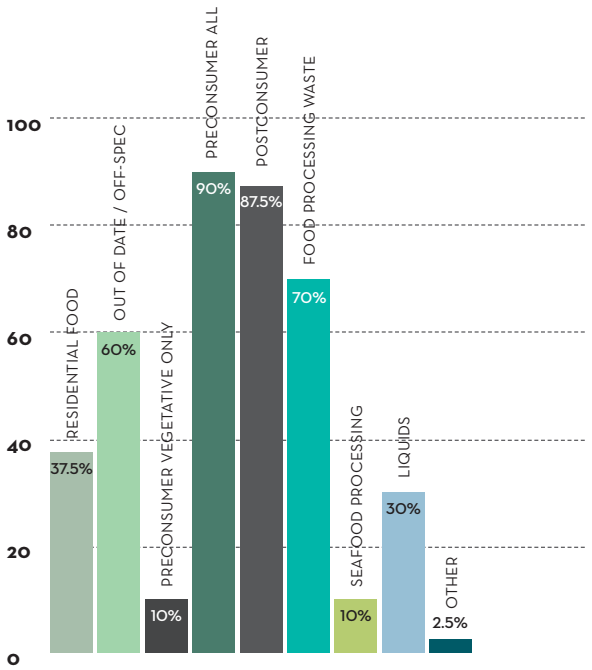


FIGURE4: Types of Food Waste Accepted, Percent by Facilities

Facilities stressed that the answer to this question was difficult for many of them to measure accurately, as they often work with haulers who pick up organics from multiple sources along their routes, obscuring the origins of packaging discarded with food waste. For example, was it the supermarket or one of the restaurants on the route that included packaging in the collection bins?

While identifying the sources of compostable packaging is often difficult, it is possible to be more specific about whether or not compostable packaging is coming from residential organics collection. This is because several composting facilities specifically note that compostable packaging is not allowed in food waste collected from residential sources. As mentioned, 37.5% (15 out of 40) of the facilities surveyed currently accept residential food waste, and all 15 accept compostable packaging from commercial and institutional sources. However, 4 of the 15 facilities stipulated that though they welcomed packaging from commercial and institutional sources, they do not allow compostable packaging from residential sources. This discrepancy demonstrates the complexity of the issues surrounding compostable packaging.

The primary reasons those facilities stated for not allowing compostable packaging in residential food waste streams are:

- Citizen confusion about compostability and difficulty identifying appropriate products/packaging.
- Potential for contaminating conventional plastic recycling streams with compostable plastics.

More specifically, composting facilities are able to work directly with commercial and institutional food waste generators, offering staff trainings on acceptable items. However, residential populations instead rely on marketing and educational materials to learn whether something is compostable, recyclable, or trash. Although this could be seen as a barrier, it is also an opportunity. If companies collaborate to develop a consistent and coherent message about composting and recycling, this will raise the bar for public awareness, which in turn will create greater demand for recycling and composting initiatives. The harmonization of labels across states and regions would be a boon to both the packaging and composting industries.

Which of the following compostable products or packaging do you accept?

What, if any, preexisting rules does your facility have for accepting/rejecting whole categories of packaging (e.g. pizza boxes, anything paper, all cups, napkins, cutlery, or items that appear to have a plastic coating)?

COMPOSTABLE PACKAGING CHOICES

A variety of different types of compostable products and packaging are currently being accepted at composting facilities (Figure 7, next page). Categories included in the survey were:

- Compostable paper bags (uncoated)
- Compostable plastic bags/film
- Clay-coated paperboard (e.g. cereal boxes)
- Uncoated paper (e.g. napkins, take out bags, etc.)
- Mixed paper (e.g. old mail, paperboard, cardboard, etc.)
- Paper plates, bowls, trays
- Waxed corrugated cardboard
- Wooden/bamboo utensils
- Compostable plastic utensils
- Molded fiber/pulp (wood, bagasse, palm, etc.) cup carriers, trays, plates
- PLA (polylactic acid) clamshells
- PLA (polylactic acid) clear cups
- Paper cups with PE (polyethylene) lining
- Paper cups with compostable biopolymer lining

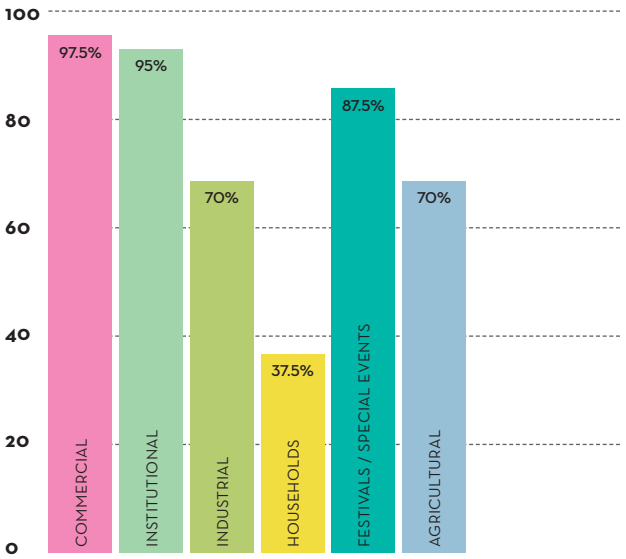


FIGURE 5: Sources of Food Waste by Generator, Percent of Facilities

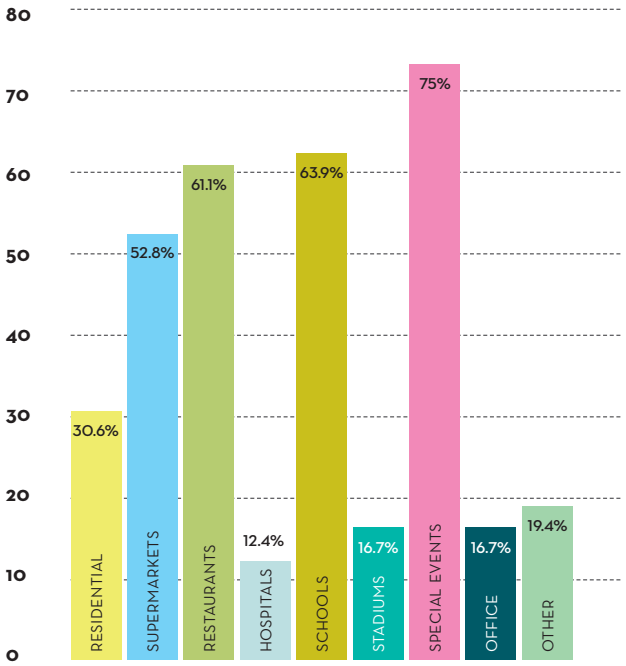


FIGURE 6: Sources of Compostable Packaging, Percent of Facilities

While many facilities accept a wide range of compostable packaging, several categories received low rankings. Paper cups lined with PE were only accepted at three facilities (7.5%) because of the non-compostable plastic lining. Most likely these cups mistakenly find their way to many facilities, but are considered feedstock contamination if identified. Also, both mixed paper and clay-coated paperboard were accepted at only 18 facilities (45%), which is lower than the average for other items. The primary reason given was that these paper products have a higher value in conventional recycling streams (the exception being food-soiled paper). This demonstrates composters' understanding and commitment to the EPA's municipal solid waste hierarchy of materials, and not a desire to accept feedstocks solely for tip fees.

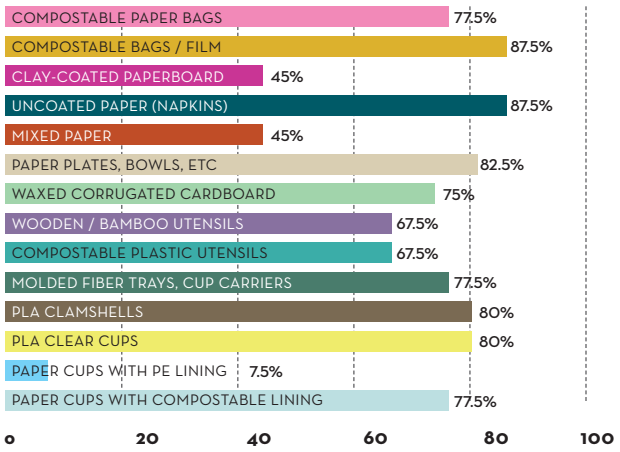


FIGURE 7: Types of Compostable Products Accepted, Percent by Facilities

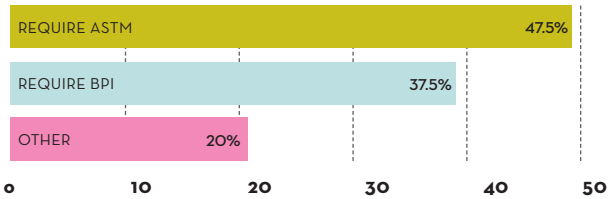


FIGURE 8: Certification / Specification Requirements, Percent by Facilities

Do you require compostable products to meet certain specifications or certifications?

What is the length of time (duration) of your composting process? Please differentiate between active composting and curing if possible.

TESTING METHODS, COMPOSTING TIME, AND CERTIFICATIONS

The composting survey also sought to address the SPC's interest in knowing how many composting facilities require packaging and products to meet compostability standards and certifications. This arose out of a concern that facilities were not following American Society for Testing and Materials (ASTM) standards, and instead were establishing individual facility, state, or regional guidelines. This patchwork approach makes it difficult or nearly impossible for companies with national or international distribution to properly design products and packaging that can satisfy all standards.

Of the surveyed facilities, 67.5% require compostable products and packaging to follow some type of specification or certification. Specifically, 47.5% percent of all respondents require products and packaging to meet ASTM specifications, while 37.5% require Biodegradable Products Institute (BPI) certification (Figure 8). BPI is a third-party verifier that certifies products, packaging, or raw materials that meet the appropriate ASTM standards, and then allows approved companies to use its label of compostability, which was developed in conjunction with the U.S. Composting Council.

Twenty percent of facilities checked "other" for specifications and certifications. These facilities indicated that on-site testing was conducted prior to accepting compostable products or packaging. While some have developed specific protocols, others are less scientific, simply attempting to determine whether products or packaging will break down in their operation. These additional tests may help account for variability in climate, composting time, equipment used, and other circumstances that are not currently part of ASTM.

Almost one-third (32.5%) of the survey respondents do not require any specifications or certifications, and reasons provided vary considerably. Some facilities have designed expensive screening systems, configuring multiple types of equipment to successfully remove anything from the finished compost that does not fully biodegrade. On the other end of the spectrum, facilities that have a great deal of control of incoming materials can work with food waste generators to quickly identify problematic packaging and remove it, and therefore devote fewer resources to screening equipment. Composting facilities noted that ASTM uses laboratory conditions for tests rather than real world settings[8]. Of particular concern is that composting facilities may operate in shorter time frames than allotted by ASTM, which specifies that materials must disintegrate to less than 10% of original weight after 12 weeks, and must biodegrade in less than 180 days (60% of organic carbon must be turned into CO_2 for single polymers, and 90% for copolymers). Almost half (19 out of 40) of the facilities surveyed report an active composting time of 70 days or less, and a few have an active composting time as short as 14 days. While these facilities typically have a secondary and/or curing stage, this initial composting time is shorter than that allotted for ASTM disintegration tests.

This is not to state that ASTM time frames are unreasonable, or that composting facilities should follow a more defined standard. Composting facilities make money on tip fees (incoming materials) and compost sales (outgoing materials), so quick turnaround is of utmost importance, especially if space is limited. However, this discrepancy bears noting, and should be addressed in the future.

8 Full text of ASTM standards can be viewed and purchased online www.astm.org. Standard D6400 is for compostable plastics and D6868 refers to biodegradable coatings on paper.

While everything compostable is biodegradable, not everything biodegradable is compostable. ASTM standards test whether materials will biodegrade in an industrial composting environment. There are also certifications for marine biodegradability, backyard compostability, etc.

What type of issues has your facility had with compostable products or packaging, and which are the most problematic?

Approximately how much compostable packaging is not successfully composted? Include estimated percentages and tonnages when possible.

PROBLEMS WITH PACKAGING

There are several reasons that a compostable package might not perform as it is supposed to, even if it meets ASTM standards. As mentioned above, real world composting conditions include variables of temperature, moisture, and composting methods, which can alter the performance.

It is important to note that there is considerable bias and individual preference when it comes to how composting facility staff track and describe problems with compostable packaging. For instance, it is difficult when asking qualitative survey questions, such as "Is compostable packaging a problem for you, and why?" to determine precisely how severe the problem is, and to what degree the problem has been or could be solved. This has to do with varying tolerance levels for contamination (based on markets for finished compost and regional regulations about contamination) and difficulty in measurement (how to determine compostable vs. conventional), not to mention individual reactions.

It becomes particularly challenging for facility staff to distinguish between compostable and conventional plastics once they have entered a composting environment. They are often mixed with putrid food wastes, and as both compostable and conventional materials are shredded or begin to degrade they become even less identifiable. At that point, lab tests may be required to determine whether materials are compostable or conventional plastic. This identification problem may lead staff to wrongly attribute problems to either the unwanted presence of conventional plastics or compostable plastics that are not performing properly.

The biggest problem reported with compostable packaging was regarding items not breaking down thoroughly or quickly enough. Many listed compostable plastic cutlery as particularly problematic, with large chunks not breaking down, leading to contaminated "overs" (the material screened from finished compost that could otherwise be sold as mulch, or re-composted).

Another common issue cited was that compostable film and bags create litter at the site. This was most prevalent at facilities with uncovered piles but not exclusively so. Again, because compostable film looks similar to conventional plastic film to begin with, it is difficult to ascertain percentages of partially degraded plastic film scraps versus conventional plastic film scraps.

While accounting for this bias is tricky, we attempted to correlate problems with packaging by composting method (Figure 9), as well as by region (Figure 10). Although the results are presented here, the apparent differences shown in these correlations cannot be considered conclusive. While the possibility is significant that composting method and geographic location may impact the performance of packaging at a composting facility, a more targeted set of questions and a larger sample size of facilities would be needed to develop reliable correlations.

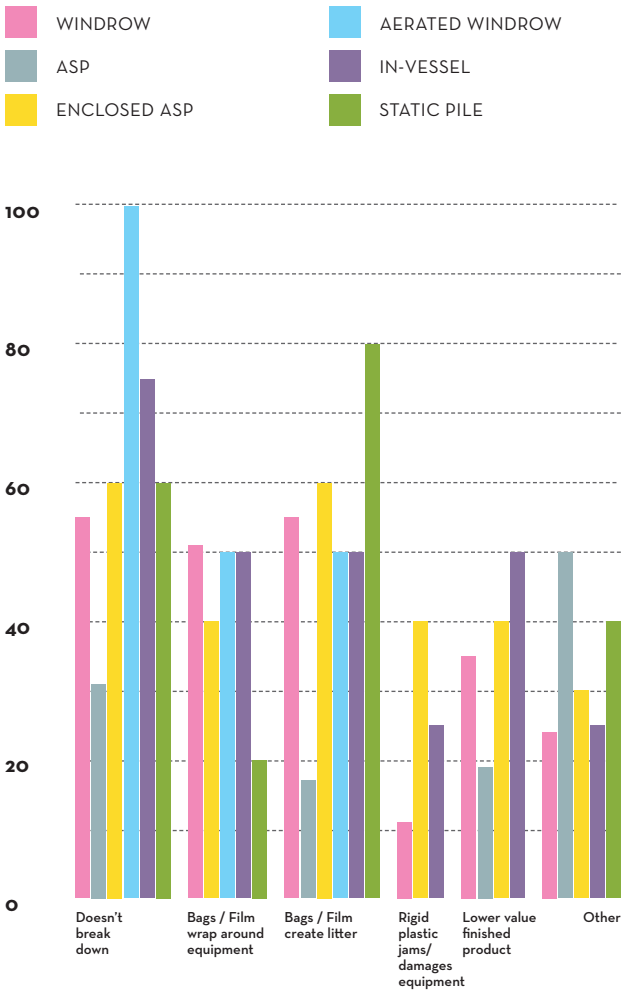


FIGURE 9: Problems with Packaging by Method, Percent by Facilities

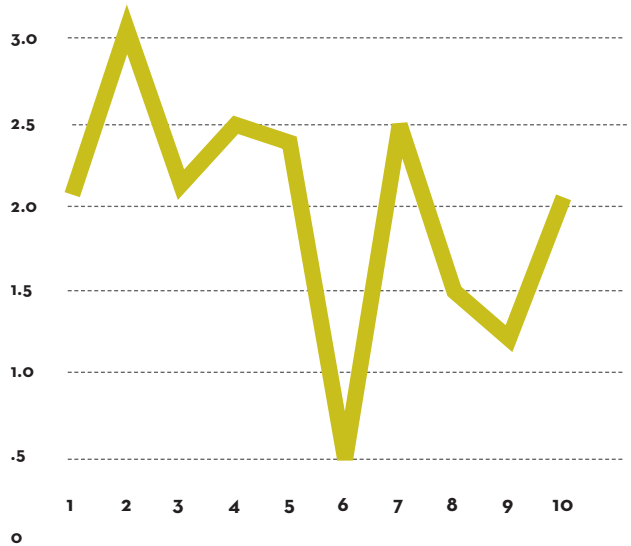


FIGURE 10: Number of Problems Reported with Packaging by EPA Region

Describe your composting site operations and equipment. What, if any, modifications have you made to equipment or systems to better process compostable products (e.g. added a grinding stage, longer curing process, more screening)?

COMPOSTING EQUIPMENT AND SYSTEMS

Besides considerations of climate and composting method, facilities also have different equipment and systems for processing yard trimmings, food waste, and packaging (Figure 11). Of particular interest to the packaging community is the presence of equipment and processes used to deal with packaging at many facilities: pre-grinding food waste and packaging (37.5%), pre-sorting for contaminants (50%), automated mixing for consistent recipes, as well as size reduction (30%), windrow turners for sufficient agitation and aeration (55%), and final screening to remove bits of contamination (100%). Types of screening equipment vary widely, and some facilities use several technologies in combination. For instance, an air classifier pulls light plastic film away from finished compost, whereas a trommel screen sorts heavier inert material.

Facilities have different operating strategies for processing incoming materials. Some have a great deal of control, working directly with food waste generators by conducting staff trainings and by enforcing penalties for contaminated loads (e.g., fees for picking litter out, rejecting a contaminated load entirely, etc.). This reduces the need for serious screening equipment and labor on both the front end (pre-processing) as well as back end (finished compost). Other facilities have invested in sophisticated screening equipment, and are able to handle a higher degree of contamination in the incoming feedstock. For example, some facilities allow paper cups lined with PE, as they are able to sufficiently screen out the plastic lining after the paper fibers have composted. There are also facilities designed to compost unsorted municipal solid waste (MSW), which involve a series of screening stages. One such MSW composting facility was included in the survey.

Other variables in equipment and systems relate to markets for finished compost, which range from high-end applications such as horticulture, organic food production, turf application (e.g. golf courses, athletic fields), home landscaping and potting mixes, to lower-end uses such as general agriculture, erosion control, re-vegetation on roadsides and degraded sites, and even alternate daily cover (ADC) at landfills. High-end markets have very low tolerance for contamination and inert materials, and thus require quality control and/or sophisticated screening equipment. Compost used for lower-end applications like ADC does not have to be as "clean." None of the facilities surveyed, including the MSW composting operation, use finished compost as ADC. More than half (52.5%) sell compost for use in food production and almost all (95%) sell compost for use in landscaping.

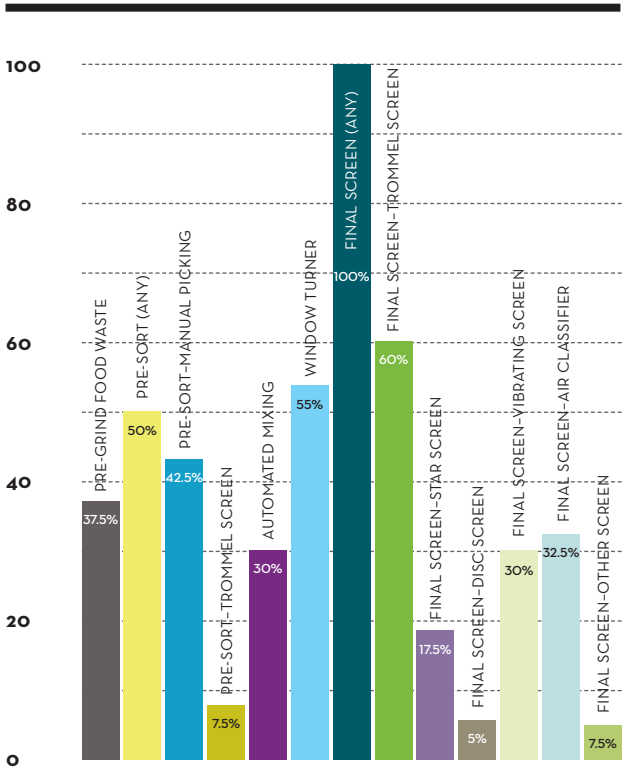


FIGURE 11: Operations and Equipment, Percent by Facilities

Almost half (42.5%) of facilities reported making modifications to equipment or systems to better process compostable packaging. **These include:**

- Increased labor for litter control.
- Longer curing time.
- Sorting feedstock with packaging and composting it in separate windrows.
- Adding a grinding, mixing and/or screening stage.
- Using bigger piles, less frequent turning (for heat and moisture).

While it is encouraging that composting facilities are willing to adapt, it would be preferable for their operations if packaging materials could be processed without the need to modify equipment or systems. This will help ensure a willingness to accept new materials.

The variability of composting facilities cannot be stressed enough. No two are the same when looking at the operating systems, feedstock sources, state regulations, markets for compost, etc.

Is your compost certified for use in organic agriculture? If yes, do compostable products put this certification at risk? Are loads with compostable products processed separately, or rejected?

ORGANIC CERTIFICATION

When developing the survey questions, the SPC working group members were concerned that one reason compostable packaging was not accepted by facilities was that its inclusion might impact the ability of compost to be approved for use in organic agriculture. When asked whether their finished compost was approved for use in organic agriculture, 32.5% responded "yes." Of that group, 23% said that compostable products and packaging put that certification at risk, while the rest were either unaware or uncertain whether it was an issue in their state. Also, 31% of that group currently processes compostable packaging separately from other materials due to organic certifications.

One composter made a point of explaining that materials allowed in organic agriculture were regulated on a national level. He encouraged the packaging industry to work with U.S. Department of Agriculture's National Organic Program to clarify compostable packaging's role in organic certification, and if necessary, have all compostable packaging specifically approved for use. Currently, only newspaper and other recycled paper without glossy or colored inks are specifically listed as acceptable "synthetic materials"[9] for use in organic agriculture.

What changes would you like to see in compostable products and packaging? Could you recommend any changes to compostable packaging that would make your facility more likely to accept them? What type of label would allow identification of compostable products/packaging more quickly and authoritatively? Please include specific criteria if possible (color coding, placement, etc.)

IMPROVED LABELING

One of the most significant areas for improvement that composting facilities identified is a standardized labeling system: 33 out of 40 (82.5%) respondents said they would like to see a more universally recognizable label of compostability. This could include a visual cue such as color-coding, a prominent and consistent logo, a combination of the two, or other improvements. To ease compliance concerns across jurisdictions and to maintain a consistent look and feel, it may be appropriate to codify the label in law to enable government oversight, level the playing field, and limit greenwashing potential.

An improved and standardized label would:

- Help composters quickly and authoritatively identify packaging received at their facility as compostable or contamination.
- Reduce consumer confusion about compostable vs. recyclable/conventional, which in turn would mean less contamination at composting facilities and in recycling bins.
- Resolve recycling industry concerns about contaminating conventional plastic recycling streams with compostable biopolymer packaging.

Many composting facility operators were upset about "greenwashing," noting that companies and product distributors are misleading consumers with unsubstantiated marketing claims about biodegradability, instead of following ASTM compostability guidelines.[10] This includes packaging that is only partially biodegradable, or labels that neglect to mention the long time frame needed for complete biodegradation. Unless a package is certified as compostable based on a common standard, a "biodegradable" label becomes nothing more than a vague claim that gives the public the wrong impression. This causes non-compostable packaging and products to be mixed in with certified compostable packaging, making it difficult for both the consumer and composting facility to sort properly. On the other hand, although there is no justification for greenwashing, the packaging community has expressed concern about a lack of harmonization for standards and labels, since ASTM is not always accepted by individual composting facilities. This sends a conflicting message that, despite being designed to meet a national standard, compostable packaging is still not consistently accepted. To move forward, it should be noted that BPI operates the established certification program and logo for compostability in North America, so the solution is not to replace that logo. Rather, to address the mentioned concerns, it must be a dialogue about modifications for visibility, commonality, and enforcement. The SPC could be a convener to bring together BPI, government officials, composting facilities, and packaging designers to develop a cohesive and effective labeling and outreach program.

9 Electronic Code of Federal Regulations (e-CFR). May 11, 2010. U.S. Department of Agriculture. National Organic Program. §205.601 Synthetic substances allowed for use in organic crop production. Under Authority of Title 7 U.S.C. 6501–6522.

10 Cheryl Long. "The Truth About Biodegradable Plastics." Mother Earth News. Ogden Publications, Inc. June/July 2010. http://www.motherearthnews.com/nature-community/the-truth-about-biodegradable-plastics.aspx

According to the U.S. Federal Trade Commission's Green Guides, "it is deceptive to misrepresent, directly or by implication, that a product or package is compostable. A claim should be substantiated by competent and reliable scientific evidence that all materials in the product or package will break down into usable compost in a safe and timely manner..."

Do compostable products or packaging allow you to increase food waste tonnages (waste that would otherwise not be compostable)?

CONCLUSIONS AND FUTURE RESEARCH

Overall, composters' opinions of packaging are quite positive (Figure 12). Compostable products and packaging are most effective when they assist in the diversion of other organics, particularly food waste, because this improves business for composting facilities and makes hauling more efficient. By helping to divert food waste from landfills and incineration, compostable packaging has the potential to improve a company's carbon footprint, reduce potent methane emissions, and more. Composting facilities are the necessary partner in this project: 72.5% reported that compostable packaging allows them to increase food waste tonnages (accepting loads that would otherwise not be compostable if conventional packaging were used); 80% actively develop new food waste programs and work with generators to conduct staff trainings to limit contamination; and 75% would consider promoting, or already do promote, the use of compostable packaging.

While composting facilities report having some issues with packaging, most are manageable. Plastic cutlery is a commonly cited issue, but there is a high degree of understanding about the complexity of designing cutlery that would both perform well for the user (withstanding high temperatures in foods) and still compost in a short time.

Although some composting facilities have set up protocols beyond ASTM and BPI requirements, pilot projects testing compostable packaging are part and parcel of being early adopters. Compostable packaging is relatively new, and both the packaging designers and the composters are learning by trial and error and rapidly developing viable solutions.

This survey was intended to provide an initial overview of compostable packaging, aimed at gathering experiences from a small group of facilities to help the SPC understand composting as an end-of-life option for packaging.

Areas of future research could include:

- Case studies of successful operations.
- Analysis of labeling and identification issues.
- Updating national standards concerning compostable packaging.
- Research on current and future capacity of composting facilities, both those that currently accept food waste and those that are only permitted to accept yard trimmings.
- Development of a cohesive education and outreach campaign.
- A deeper look comparing the behavior of compostable packaging among a variety of composting methods or climatic conditions.
- Working with other organizations to update national databases, such as FindAComposter.com, to include listing more facilities and information about compostable packaging.

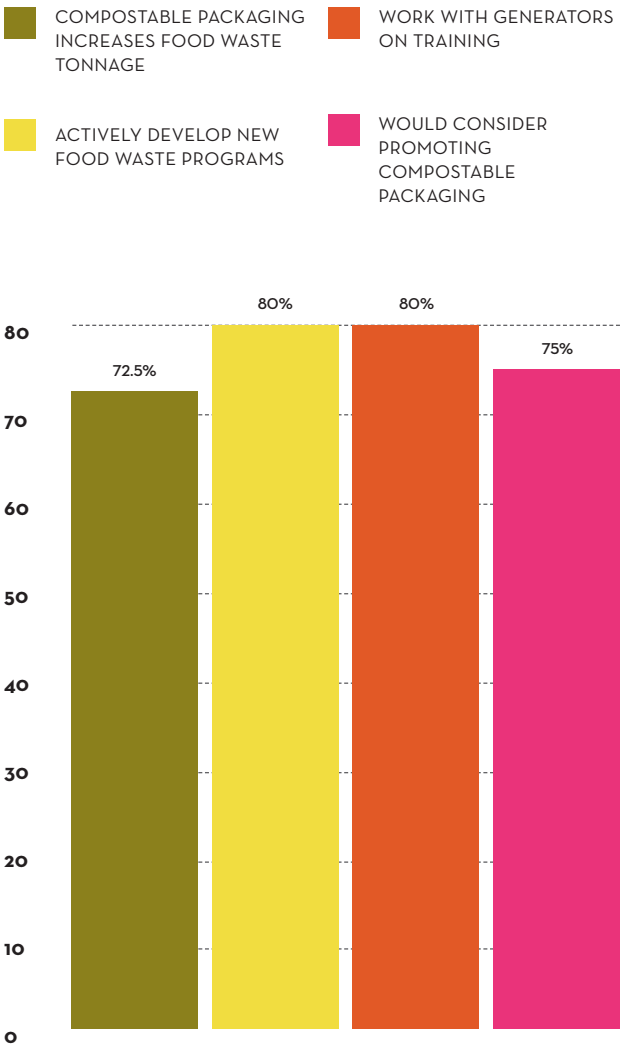


FIGURE 12: Opinions of Compostable Packaging, Percent by Facilities