

IN AUGUST 2005, the U.S. Department of Agriculture (USDA) and U.S. Environmental Protection Agency (EPA) teamed up on a pilot project with the vision to overcome the challenge of advancing federal cafeteria facilities' acquisition and use of biobased cafeteria ware. The full-scale cafeteria test of biobased, biodegradable food service products such as cups, plates, cutlery, etc. was conducted at a small USDA headquarter's employee cafeteria in the Jamie L. Whitten Building, which serves approximately 2,500 patrons per week. The overall goals of the pilot project were to demonstrate a full-cycle process for biobased food service ware by selecting and using it in a cafeteria and then composting it with the food scraps, leftovers, and out of date foods. An additional goal was to promote awareness of biobased food service products to USDA staff in USDA cafeterias. The compost by-product would then be used in the USDA Whitten Building Gardens as a soil amendment.

Project objectives included: Evaluating customer acceptance and satisfaction with the biobased food service ware; Educating staff and customers about the program and evaluating compliance with source separation; Determining the compostability of the food service ware; Characterizing and using the compost produced in the Whitten Building Gardens in 2006; and Assessing the feasibility of expanding the program to the main USDA cafeteria and other federal agencies. In fact, numerous federal facilities in the Washington, D.C. area already had expressed interest in establishing a food composting program and using biobased food service ware after a pilot test involving a limited number of biobased items was completed in 2000 by USDA-BARC, USEPA-Office of Solid Waste, and the Department of Interior Headquarter's cafeteria.

The project specifically supported USDA's Federal Biobased Procurement Preference Program by actively promoting biobased products and was designed to address two specific USDA program requirements: 1) Biobased product procurement preference and promotion; and 2) Review and monitoring of program effectiveness. In addition, it addressed EPA's charge to promote the use of recycled content products including food residuals compost.

In January 2006, USDA completed its Biobased Affirmative Procurement Program which formally established its Biobased Preference Program for designated biobased items. Biobased products are defined in the Farm Security and Rural Investment Act of 2002 as: commercial or industrial products that are composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials. Examples include compostable plastic bags, food service ware (cups, plates etc), hy-

SUCCESS WITH COMPOSTABLE FOOD SERVICE WARE

USDA CAFETERIA TESTS BIOBASED PRODUCTS

Project covers overall concept, operational strategies, costs and lessons learned in using compostable, biobased cafeteria ware and its impact on food residuals composting.

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draulic fluids made from plant oils, and specialty filters made from poultry feathers.

The full-cycle approach of the pilot project included: 1) 100 percent replacement of current polystyrene, polyethylene and plastic food service items with biobased products wherever possible; 2) Daily data collection of comments from cafeteria patrons; 3) Partnering with the USDA Agricultural Research Service's (ARS) Beltsville Agricultural Research Center (BARC) and EPA to provide training to patrons on how to dispose of waste to prevent contamination with noncompostables and to compost the cafeteria residuals; 4) Collecting biobased product and food residuals on a daily basis, and transporting and composting them at the BARC Composting Research Facility in Beltsville, Maryland, including evaluation of biobased product compostability; 5) Use of the finished compost in the Whitten Building gardens; and 6) Diversion of cafeteria-derived organic re-



Phases of the biobased products/food residuals composting pilot project can be seen in the sequence of photos above, starting at the top: Place setting of biobased cafeteria ware; Delivery of cafeteria residuals to USDA composting site; Daily mixing of feedstocks as new materials are delivered; Pile monitoring; Decomposition of biobased products as of day 38 of composting.

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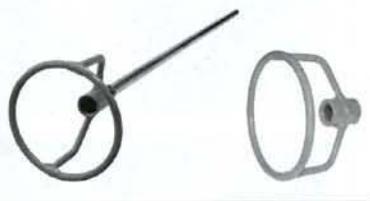
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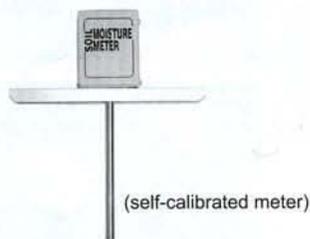
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This three-month pilot served as a practical demonstration of the effectiveness of the products and patron acceptance of compostable, biobased cafeteria ware. It also provided experience to the staff and patrons relative to compliance with the source separation disposal aspects and compostability.

EDUCATING STAFF AND PATRONS

Staff and patrons were informed about the biobased procurement program and the reasons and benefits of the pilot project. The educational efforts were essential to fostering compliance and avoidance of contaminants (plastics, foils, etc.) that might otherwise enter the compostable stream. The training became an integral part of the pilot and was conspicuously located just outside of the Whitten Cafeteria for the duration of the pilot. It included: 1) A short slide presentation about the biodegradability of the biobased materials and on the separation of items for later composting; 2) Visual display that compared the lifecycle of polystyrene, polyethylene and other plastics to that of the biobased materials; and 3) Brochures on biobased products and composting, along with sample materials.

During the pilot, 33,426 patrons were served and the compostable cafeteria ware as well as the food preparation trimmings and outdated food were collected for composting. In general, patrons accepted the change from the usual polystyrene and plastic ware to biobased products with little difficulty. Only a few (150 out of more than 33,000 patrons served) made negative comments regarding the pilot project. As a rule, the comments were minor in nature and did not indicate any serious issues that would call for the discontinuance of the use of biobased products. All comments were carefully monitored and adjustments were made to the products as necessary. Many patrons expressed their enthusiasm for the biobased products, and took the opportunity to register their dissatisfaction about the polystyrene and other plastic products that were being replaced. At the end of the project, when the polystyrene and other plastic products were put back in use, there were complaints again particularly about the polystyrene ware.

Throughout the pilot, cafeteria operations and services were not adversely impacted by the change to biobased products. Kitchen staff compliance with source separation was excellent. The team-monitored separation system relied on staff placing all the compostable food trimmings into clearly designated receptacles that were lined with com-



postable bags. Receptacles were located adjacent to the cutting and preparation stations. At the end of the day, all the compostable bags filled with trimmings and used biobased food service items were picked up and delivered to the composting facility by USDA staff. EPA and USDA provided recycling outreach to cafeteria patrons for the first two weeks. Thereafter, USDA staff members were on hand at the Whitten cafeteria to explain the pilot and the recycling program. Clearly marked receptacles were provided for source separation of compostables at the two exits to the cafeteria.

COSTS OF THE PROJECT

At the beginning of the pilot, a fairly small number of manufacturers could provide the quantities of products needed in the time span required and few companies were making a wide assortment of biobased cafeteria ware. Thus, for this pilot project, USDA obtained the biobased products from a distributor who could deliver the quantity, variety, and types of items needed to meet the cafeteria's expected number of customers — approximately 2,500/week — for the entire pilot project. Biobased products for the pilot cost approximately three times as much as the usual polystyrene and plastic products being used. However, the difference in cost was expected due to the limited supplies available and the infancy of the industry. As the pilot continued, an increased number of companies began to call the project manager for information on how to become involved with the existing or future pilots that USDA would conduct using biobased cafeteria ware. It is expected that as the number of manufacturers of these items increases, so too will competition and the costs of these types of biobased products should decrease.

The pilot included a wide variety of biobased products, including compostable bowls, plates, cups, food containers, knives, forks, spoons, straws, and some lids. All 29 products were obtained through the distributor rather than the more than seven individual manufacturers. The major biobased constituents in the items were polyac-



Finished compost was used at the USDA Whitten Building Gardens (left) as a soil amendment. Avoided cost of purchasing compost was \$880.

tic acid (PLA) from corn, bagasse from sugarcane, banana peels, recycled paper, wheat straw, vegetable by-product mixed with limestone, and wood (coffee stirrers). There were only a few products that were not readily available as biobased compostable products (hot liquid lids and water cups). Those products that were compostable, along with the food preparation scraps, trimmings, leftovers, and outdated foods, as well as the source separated post-consumer residuals from the cafeteria, were composted at the BARC Composting Research Facility. The total composting effort included: 11,370 pounds of compostable cafeteria materials, (10,945 pounds of food and 435 pounds of biobased cafeteria products); and 168 cubic yards of leaves and grass.

The effectiveness of the educational efforts was markedly evident by the trace amount of plastic contaminants recovered from the compostables in the postconsumer collection bins. Out of the total amount of materials used for composting, only 20 pounds or 0.18 percent of noncompostable plastics were recovered. This minor amount of contaminants from such an activity with more than 33,000 patrons shows an excellent level of compliance with the source separation program requirements.

COMPOSTING RESULTS

Grass, straw and leaves were mixed with the food residuals and biobased items to achieve a porous compostable mix. Water was added as needed. The relatively small amounts of cafeteria and biobased inputs received — an average of 200 lbs per day, when mixed with the other compost feedstocks — were not enough to make a separate daily windrow. The amount was suitable for bin composting. As daily additions were received, they were mixed into the pile from the prior day, and more grass and straw were added as needed to maintain air space. The entire mix was covered with a two-inch layer of straw. Temperatures achieved 140°F in the central core and out to 4-inches below the surface of the pile within 24 hours. Compostables were turned weekly after the first week, and by week 4 the pile volume (initially approximately 10 to 12 cubic yards total per week) had decreased approximately 50 percent. At week 5, the contents of two bins were combined. By week 10, self-heating after

turning was not sustained for more than 7 days and the peak temperatures averaged 20°F to 25°F above ambient. At this stage, the compost piles were piled for curing where they remained until March 2006. Prior to use in the Whitten Building Gardens in summer 2006, the compost was screened on a three-eighth inch screen to remove any remaining large clumps.

The experiment yielded 44 cubic yards of compost that would have cost the Department \$20/cubic yard to purchase. The compost is being used at USDA's Whitten Building Demonstration Gardens during the 2006 growing season at a cost avoid-

Overall costs for the cafeteria ware will be reduced as more producers and distributors enter the marketplace.

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ance to the government of \$880. In addition to the monetary savings realized, use of composted biobased products has considerable intrinsic environmental value and will help to sustain soil quality and reduce chemically-based soil amendments in the Gardens.

SIGNIFICANT LESSONS LEARNED

Several valuable lessons were learned by the USDA/EPA team. The most significant include the following:

1. Biobased products of the type, size, and amounts needed for ongoing cafeteria service demands were difficult to find. However, based on industry feedback, this is expected to diminish considerably as more demand and production capacity are reached.

2. Although the biobased cafeteria ware currently costs more than conventional cafeteria ware, as more producers and dealers enter the marketplace, competition will increase and overall costs will be reduced.

3. Good planning, quality awareness training, constant communications, superior teamwork and management backing are essential to a successful program.

4. Composting of the full range of cafeteria residuals not only reduces the amount of material sent to landfill, and the costs associated with that, but also provides a product for landscaping federal buildings that would otherwise have to be purchased.

During the three-month pilot, the Whitten cafeteria did not contribute any polystyrene or other plastic cafeteria ware to landfills. If this were replicated throughout the government, or even just within the Washington Metropolitan area, it would considerably reduce the total amount of material that has an extremely long half-life from being landfilled by the Federal government.

Interagency collaboration was key to accomplishing project objectives. The USDA, through its Office of Procurement and Property Management, and Office of Operations, identified sources and obtained the biobased service ware, identified a suitable size cafeteria space for the project, coordinated with the foodservice contractor to make necessary changes during the contract period, and provided daily oversight to the project. The ARS-Beltsville Composting Research Facility and EPA, Office of Solid Waste, SEE representative Dr. Rosalie Green provided expertise on composting the residuals, as well as education and training of staff and customers, and oversight of source separation by staff and customers during the first two weeks. Thereafter, staff at the Whitten cafeteria explained the pilot and recycling program. ARS and the Cooperative State Research Education, and Extension Service (CSREES) coorganized a one-day Roundtable Discussion, "Food and Biobased Cafeteria-Ware Composting for Federal Facilities in Washington, DC" (December 2005), in which public, private, nonprofit affli-

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ates, biopolymer, compost, and other experts discussed strategies for overcoming various limitations to moving the pilot project model to the next level of implementation. A written proceedings of the Roundtable is posted on the web at <http://www.csrees.usda.gov/nea/plants/pdfs/caferetiaware.pdf>.

FULL INTEGRATION OF BIOBASED FOODSERVICE PRODUCTS

USDA and EPA consider the pilot project a complete success and that the use of biobased products is the wave of the future. As the biobased program grows, the reduction in waste generation becomes more significant; the use of petrochemicals becomes less necessary; and the demand for biobased raw materials from agricultural feedstocks will increase. Information on the Federal Biobased Products Preferred Procurement Program, including currently designated items and updates, is available on the Internet at <http://www.biobased.occ.usda.gov/public/index.cfm>. Compost is one of the items in the process of being designated.

The knowledge and experience gained from the pilot provided the necessary base from which to recommend that management consider the full integration of biobased food service products into all of USDA's cafeterias and at Forest Service field food service sites used during fire season. As a result of this pilot, USDA submitted a "Sources Sought" request for biobased cafeteria and food service ware to FedBizOps (the single point-of-entry for U.S. government procurements greater than \$25,000; available at www.FedBizOps.gov) to identify greater numbers of companies that can provide quality biobased service ware, thus reducing overall costs through greater competition. Additionally, USDA included biobased products in its overall strategy for the recompetition for cafeteria services that will be in place by Autumn 2006. Finally, the pilot project results have stimulated support for more collaborative research between USDA-ARS Beltsville and EPA-Region III to evaluate the cost-benefits, by-products, and public acceptance of various types of composting technologies useful for cafeterias using biobased service ware, as well as for food distribution warehouses and retail food markets that generate large amounts of vegetable trimmings daily. ■

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