ReFresh Nebraska
Stop the Rot
Winter 2021

Emerging Issues in Food Waste Management: Commercial Pre-Processing Technologies

The Summer 2019 issue of ReFresh featured an article about on-site aerobic digesters that utilize microorganisms and warm water in the presence of oxygen to break food down quickly. The resulting liquid is then discharged into the sewage system where it is carried to the local Wastewater Resource Recovery Facility (WRRF) for further processing. Following is an EPA overview of that, and other commercial pre-processing technologies.

Many businesses and institutions that generate food waste—including grocery stores, restaurants, hotels, universities, and correctional facilities—are installing technologies on-site to pre-process food waste. In a new report, EPA gathered and synthesized the available data on these technologies to evaluate whether (they) encourage food waste recycling or reduce the environmental impact of food waste.

There are five general categories of pre-processing technologies:

- **Grinders** mechanically reduce the volume of food waste by macerating it into a slurry
- **Biodigesters** biologically treat food waste under aerobic conditions with additives like microbes, enzymes, and fresh water to digest the waste into a slurry
- **Pulpers** mechanically reduce the volume of food waste by compressing it into a semi- dry pulp
- **Dehydrators** thermally treat food waste to evaporate the liquid and create a dry pulp
- **Aerobic in-vessel units** use the natural aerobic decomposition process and bulking additives like sawdust to create a semi-dry product that requires further curing

Does the use of pre-processing technologies encourage recycling?
EPA encourages the recycling of food waste to reduce methane emissions from landfills and recover valuable nutrients and energy. Food waste can be recycled to produce biogas and/or beneficial soil amendments with or without pre- processing by businesses and institutions, and the use of on-site pre-processing technologies does not guarantee recycling.

All these technologies require source separation of food waste from inorganic waste (like packaging), which is an important first step toward recycling. Once food waste is separated, (it) can be recycled on-site or hauled off-site to a composting, anaerobic digestion, or other recycling facility.

Whether the pre-processed food waste is ultimately recycled is dependent upon local conditions and further decisions by businesses and institutions. For example, grinders and biodigesters produce a liquid output, which is typically sent down the drain into the sewer and onto the wastewater treatment plant. Thus, recycling is dependent upon whether the local wastewater treatment plant has an anaerobic digester, which can recover energy from organic waste. Some grinder models allow businesses and institutions to collect the liquid output and transport it directly to an anerobic digestion unit, guaranteeing recycling. After wastewater treatment, biosolids remain. These biosolids may be recycled and land applied as a soil amendment – or they may be landfilled.

Pulpers, dehydrators, and aerobic in-vessel units all produce a dry output that may be hauled off- site for composting or to a landfill or incinerator. With dehydrators and aerobic in-vessel units, businesses and institutions can instead choose to further cure the waste on-site or off-site to create a soil amendment. The soil amendments created by dehydrators and aerobic in-vessel units are not compost in the traditional sense, and much remains to be learned about their stability and suitability for different uses.

Does the use of pre-processing technologies reduce the environmental footprint of food waste?
Pre-processing technologies have environmental effects beyond recycling. All the technologies require energy to operate, and many also require water. Also, pulpers, dehydrators, and aerobic in-vessel units can reduce the environmental impact of food waste by significantly reducing (its) weight, thus reducing emissions related to hauling.

The environmental effects of grinders and biodigesters are less clear. These technologies typically send processed food waste down the drain, shifting the burden of management from landfills to sewage systems and wastewater treatment plants. The net environmental burden of this shift has not been thoroughly explored in the existing literature.

Sending additional organic waste—high in biological oxygen demand, total suspended solids, and fats, oils, and grease—down the drain raises potential environmental challenges, such as:

- Fugitive methane emissions
- Reduced biogas potential
- Increased energy use
- Pipe clogs or corrosion
- Operational issues, especially in low flow or aging systems
- Increased pollution in discharges from combined systems

Pulpers and dehydrators remove water from the food waste and typically send this water down the drain, which may raise similar concerns to those noted above.

State and Local Policies
Some states and municipalities are setting food waste reduction goals, implementing food waste recycling programs and/or instituting bans on landfilling large quantities of food waste. These policies may encourage the use of pre-processing technologies. However, some states and municipalities are now considering limitations on the use of particular pre-processing technologies and seeking additional data on their environmental value.

Priority Research Needs
Based upon current available research, EPA cannot conclude whether there are environmental benefits to pre-processing food waste. Scientifically rigorous data are needed to inform policy- and decision-making to increase recycling and reduce the environmental impacts of food waste. Priority research needs include:

- Independently verified operating and performance data for pre-processing technologies
- Measurement of fugitive methane emissions from sewer conveyance of food waste
- Comparison of biogas potential of food waste that is unprocessed, processed by grinder, and processed by biodigester
- Comparison of biogas potential of food waste that has traveled by sewer to a wastewater treatment plant and food waste that has travelled by truck directly to an anaerobic digestion unit
- Impacts on sewer systems and wastewater treatment plants of additional liquefied food waste (from grinders and biodigesters) and wastewater extracted from food waste (from pulpers and dehydrators)
- Influence of pre-processing technology use on frequency of food waste recycling

For more information on Food Waste Research, go to www.epa.gov/land-research/food-waste-research

Refresh Recipes

Shopping your fridge first is an important strategy for reducing food waste. Here's a recipe idea that will help you use what you have before buying more!

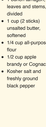
SPATCHED TURKEY WITH TURKEY SCRAPS GRAVY

FLATTEN YOUR TURKEY, ELIVIATE YOUR TURKEY GAME

Spatchcocking is a weird word, but a clever technique. Just butterfly your bird and cook it flat for crispy skin and tender meat. Then garnish with gravy made from your very own scraps.

USES UP
Turkey Giblets

MAKES
10 Servings



INGREDIENTS

- 1 10-12lb turkey with giblets
- 1 bunch tarragon, leaves and stems, divided
- 1 cup (2 sticks) unsalted butter, softened
- 1/4 cup all-purpose flour
- 1/2 cup apple brandy or Cognac
- Kosher salt and freshly ground black pepper

DIRECTIONS

Using poultry shears or a heavy knife, remove turkey backbone and wing tips. Cut backbone in half crosswise.

In a large Dutch oven or stockpot, add bones, giblets and tarragon stems. Cover with cold water and bring to a boil. Reduce heat and simmer for 3 hours. Strain into a clean pot and keep warm. This is a stock base that you'll use later to make gravy.

Heat oven to 500°F.

Place turkey breast-side up in a roasting pan or on top of a wire rack set over a rimmed baking sheet. Rub turkey with half the butter. Season with 2 tablespoons salt and a few grinds of black pepper.

Roast turkey for 30 minutes. Reduce oven to 350°F. Continue to roast, basting with pan drippings every 30 minutes for another 1 – 1 1/2 hours, until an instant-read thermometer inserted into thickest part of thigh reaches 165°F-175°F.

Remove turkey from oven and transfer to a large cutting board to rest for about 20 minutes.

Place roasting pan directly over two burners on low heat (if roasting on a sheet tray, pour drippings into a large skillet).

Add flour and whisk to make a roux. Continue to whisk until golden, about 5 minutes. Add brandy and cook until almost dry. Slowly whisk in 4 cups of stock. Continue to cook until thickened, about 10 minutes. Strain through a fine mesh sieve. Season with salt and pepper and keep warm.

Carve turkey. Pour a little gravy on the bottom of a serving platter, top with turkey and scatter with chopped tarragon. Serve with extra gravy on the side.

TIPS: Ask your butcher to spatch your turkey (and save the bones, of course!) Some turkeys also come sold with the neck. Throw that bad boy in your stock pot, too. Let your turkey rest at room temperature for about 1 hour before roasting. Bonus: your stock will get a head start just in time for gravy-making time.

CREDIT: Joel Gamoran, Sur La Table National Chef and Host of Scraps

FOOD STORAGE TIPS FROM SAVETHEFOOD.COM

SWEET POTATOES

REFRIGERATE IT: No

AT FRESHEST: 1 to 2 weeks if stored at room temperature, 1 month or longer in a root cellar environment

OPTIMAL STORAGE: Do not wash until ready to use. Store in a cool, dark, dry, well-ventilated place—ideally a root cellar with temperatures of 55° to 60°F/13° to 15°C. Avoid potatoes with holes or cuts in the skin; this leads to decay that can affect the whole sweet potato.

FREEZING: Cook until almost tender, and let cool. Peel and cut in halves or slices, or mash. Dip in a solution of ½ cup/120 ml lemon juice to 1 qt/1 L water to prevent browning, or if mashing, add 2 Tbsp lemon juice per 1 qt/500 g of sweet potatoes. Place in container with ½-in/12-mm headspace and freeze. Baked sweet potatoes can also be frozen slightly undercooked and wrapped in foil, then put in a container, with final cooking completed when ready to eat.

USE IT UP/REVIVAL: Sweet potato skins are edible.

TOMATOES

REFRIGERATE IT: No, unless cut

AT FRESHEST: Whole, ripe, up to 3 days at room temperature; cut or nearing overripe, 2 to 5 days in refrigerator

OPTIMAL STORAGE: Do not wash until ready to use. Store fresh tomatoes on the counter away from direct sunlight, with the stem end up. Storing them on their sides will cause bruising. Refrigeration can cause loss of sweetness and flavor but is an option to add a few days of life if nearing overripe; cut tomatoes should be refrigerated. If refrigerating, store in their original container or in a breathable bag in the low-humidity drawer. Let come to room temperature before eating for best flavor.

FREEZING: Freeze raw or cooked in zip-top freezer bags. Frozen whole tomatoes won't have a great texture once you defrost them, but you can add them into sauce or salsa or soup, where they are mashed up anyway. You can leave the skin on whole tomatoes, because it will come off under cold running water during defrosting. You can also freeze tomato juice, stewed tomatoes, tomato paste, and any tomato products, such as salsa.

USE IT UP/REVIVAL: To ripen green tomatoes, put them in a brown paper bag with a piece of ripe fruit to initiate the ripening process. Cracked tomatoes can still be eaten. Just cut out and discard the cracked parts and enjoy the rest.

TURNIPS

REFRIGERATE IT: Yes, unless there is a root cellar

AT FRESHEST: 2 weeks in refrigerator, 2 months in a root cellar environment

OPTIMAL STORAGE: Do not wash until ready to use. Separate from their green tops (otherwise the greens will draw out moisture). Store in an airtight container in the refrigerator, unless a root cellar is an option. Store the greens as you would hearty greens in the refrigerator.

FREEZING: Wash, peel and chop, blanch, cool, and pack in an airtight container.

USE IT UP/REVIVAL: Turnip greens are edible. Turnips do not need to be peeled before eating. Turnips can be pickled.

To download the entire Food Storage Guide, go to: www.savethefood.com/food-storage

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QUICK TRICKS

How to Store and Prepare Fresh Fruits and Vegetables to Prevent Food Waste

Alice Henneman, MS, RDN Extension Educator

About 90 billion pounds of edible food goes uneaten each year in the United States, costing consumers around $370 per person yearly. Tossed fruits ($45) and vegetables ($66) account for about 30% of this amount. Proper storage and preparation of fresh produce can help save money and better utilize the resources that go into producing food (land, water, energy).

Following are some methods for prolonging the life of fresh produce.

How to Store Produce in the Refrigerator

Store fruits in a separate refrigerator crisper drawer from vegetables. Other than those mentioned previously, most other fresh fruits and vegetables keep best stored in a clean refrigerator at a temperature of 40°F or below. Use your refrigerator crisper drawer for whole produce. Store fruits in a separate refrigerator crisper drawer from vegetables. Fruits give off ethylene gas, which can shorten the storage life of vegetables. Some vegetables give off odors that can be absorbed by fruits and affect their quality.

For more waste reducing tips, go to:
www.food.unl.edu/cook-it-quick-documents/makeover-your-leftovers.pdf

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