6 High-Tech Innovations That Could Solve Our Food-Waste Woes

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These cutting-edge technologies are revolutionizing the notion of waste not, want not.

Americans can be a wasteful bunch. In 2014, the U.S. Department of Agriculture's Economic Research Service estimates that our country threw away 38 million tons of food, the equivalent of every person in the country junking two-thirds of a pound every day. We dumped milk that had spoiled, vegetables that had turned brown and hamburger patties we were too full to eat. Not only did this excess cost us a collective $161 billion, it caused unnecessary environmental strain. Food waste, after all, is the most common material in landfills and incinerators, constituting 21.6 percent of all solid waste, according to the U.S.D.A. To fix the problem, there are some easy strategies each household should adopt (hint: buy less, freeze more, compost). But there are also some high-tech innovations that could revamp the entire food supply. Below, the most promising efforts at reducing waste, from the time food is first harvested all the way to its final destination in a dumpster.

1. Diverting unwanted food

Because of the government's health and safety regulations, supply counts or simply cosmetic issues, a warehouse manager might reject a food shipment before it even makes it to the retail stand. The app Food Cowboy redirects this ugly or unwanted surplus to food banks. A truck driver simply programs her route into the mobile app, along with what's on offer, like a pallet of bruised bananas or knobby carrots. By the time she's ready to hit the road, the driver might receive a message from a charity who will meet her at a rest stop to take the produce. The soup kitchen gets their week's supply of produce, and the distributor can take a tax deduction for the donation: a win-win.

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Recipients at a food bank in New York City pack up their groceries. *Photo Credit: Joe Corrigan/Getty Images*

2. Rethinking plastic packaging

Beyond the tons of food that Americans discard, there's also the problem of all the packaging in which it's wrapped: the egg cartons, salsa jars and snack wrappers, not to mention shopping bags. Scientists at the U.S.D.A. are trying to replace the ubiquitous plastic in grocery aisles with a mixture of casein, an edible milk protein, and pectin, a citrus extract often used to thicken jams. As long as it's kept dry, the biodegradable film is actually 250 times better than plastic at blocking oxygen, which helps prevent food from going stale. And, because it's edible, a consumer could plunk the whole package into water for an extra protein boost. "Everything is in smaller and smaller packaging, which is great for grabbing for lunch [or] for school, but then it generates so much waste," Laetitia Bonnaillie, a U.S.D.A. researcher who co-led the research, tells Bloomberg. "Edible packaging can be great for that."

3. Looking beyond the sell-by date

We tend to throw out massive quantities of food because it spoils before we can eat it. Or, more accurately, because we worry that it is has. Often, though, food is perfectly safe to eat after the sell-by date, but a home cook won't want to take the risk of poisoning his family. The FoodKeeper App, a collaboration by the U.S.D.A.'s Food Safety and Inspection Service and Cornell University, provides guidelines online about whether an ingredient has spoiled and how long it can be kept in a pantry, refrigerator or freezer. So far, the database contains over 400 different food and beverage items.

If that's not technical enough to determine whether food's still safe to eat, M.I.T. scientists have another device: chemically actuated resonant devices (or more simply, CARDs), which can tell if food has gone bad by the gases it releases. "The beauty of these sensors is that they are really cheap. You put them up, they sit there, and then you come around and read them [with a smartphone]. There's no wiring involved. There's no power," says Timothy Swager, the chemistry professor whose lab built gas-detecting sensors. Pretty soon, this "smart packaging" could do a more reliable job than the old trick of taking a whiff.

Many Americans toss out produce because it's browning or otherwise looks unsavory, even when it's still safe to eat. *Photo Credit: Matthew Peyton/Getty Images*

4. Bypassing the landfill

Only 5.1 percent of the food Americans currently trash is diverted; the rest ends up in the dump. Over time, this refuse releases clouds of pollutants into the atmosphere: either smoky emissions as it burns in an incinerator or methane, a gas that's 28 times more dangerous for global warming than carbon dioxide, as it decomposes in a landfill. To reduce the burden on dumps, a device known as the Eco-Safe Digester, produced by BioHiTech for commercial kitchens like The Cheesecake Factory and those inside Marriott hotels, can divert up to 2,500 pounds of waste elsewhere daily. Liquefied by hungry microorganisms, a sloshing smoothie of leftovers goes down the drain, reducing the burden on dumps. That is, as long as the municipal sewers can handle the extra wastewater.

5. Cutting back in commercial kitchens

As chefs rush to meet diners' demands, some waste is expected. For many restaurants and dining halls, the thinking goes that it's better to have a surplus of entrées ready than to run out halfway through dinner. But what if these establishments are consistently overdoing it? LeanPath, an Oregon-based software company, analyzes what's being trashed in commercial kitchens and creates actionable steps for managers, cooks and servers to reduce waste. "Our business is about culture and shaping behavior," Andrew Shakman, the co-founder, tells Bloomberg. "It's not rocket science to figure out how to make less mashed potatoes. It is hard to identify that it's mashed potatoes [that are overproduced] and to change behavior." After staff has inputted a night's worth of waste, the algorithm might recommend eliminating the rhubarb no one ever orders, peeling less skin off the potatoes or adding one less bread roll in the basket. By following its advice, LeanPath estimates it can save up to 6 percent of a kitchen's food costs.

Food scraps from The Slanted Door restaurant in San Francisco make their way to the compost bin. *Photo Credit: Justin Sullivan/Getty Images*

6. Designing a smarter dumpster

Of course, some food will always make its way to the rubbish heap. And when it does, we might as well have garbage trucks pick it up in the most efficient way possible. Compology, a San Francisco waste-management startup, installs sensors on dumpsters to gauge volume. As the bins fill to capacity, an algorithm plans drivers' most efficient route, eliminating the stop-and-go emissions from weekly garbage collection. The more infrequent pickups can also save haulers tons of cash, up to 40 percent of collection costs, according to the co-founders' reports from Santa Cruz, Calif., where sensors already been installed.

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