# Why Biodegradable Isn’t What You Think

By John Schwartz

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You care about the planet, and would like to avoid bottles and other goods made of single-use plastic. But it’s complicated.

Choosing products with packaging that claims to be “biodegradable” or “compostable” might mean that they degrade only under special conditions, and could complicate recycling efforts, said Jason Locklin, the director of the New Materials Institute at the University of Georgia. “It’s tremendously confusing, not just to the consumer, but even to many scientists,” he said.

Here are four examples of the kinds of products you might see on supermarket shelves or at the takeout counter. It’s not an exhaustive list, but one that can give you a sense of the issues that people face.

## Corn-based plastic

It doesn’t come from petroleum. But in a landfill, it might be just as bad.

Food service items made from polylactic acid, or PLA, include bottles, disposable cutlery, plastic films, some grocery bags and other products. They look like plastic made from petroleum, but PLA is usually made from corn, though it can come from other plants, including beets, cassava and sugar cane.

The labels on PLA products often describe them as compostable. But that doesn’t mean you can just throw the stuff into your backyard compost pile, if you have one. To properly degrade, they have to be sent to commercial compost facilities.

The process of industrial composting involves high heat and precisely controlled moisture, among other conditions, and it isn’t available in many parts of the country. Worse, PLA products look enough like regular recyclable plastic bottles, which are made from the most common plastic used in recyclable bottles, known as PET, that they can get mixed in at the recycling plant, and can contaminate the recycling stream.

And if your PLA trash ends up in a landfill, it will be there a very long time, because it’s unlikely to be exposed to conditions that would help it to break down.

# Paper, kind of

It’s what’s on the inside that counts.

Similar to the push from some restaurants to replace plastic straws with paper ones, paper bottles are seen as a possible option to replace plastic ones. Because they can be made of sustainable, renewable materials (from

trees!), paper bottles are getting the attention of major companies. Coca-Cola, Carlsberg and the vodka maker Absolut are exploring the idea with the Paper Bottle Company.

Paper, of course, is recyclable — as long as it is just paper. However, paper-based bottles and containers tend to be made with several layers of materials other than paper, including plastic or foil, to form barriers. One paper bottle maker’s website calls 100 percent biodegradability a “goal.”

Hypothetically, you could strip away the layers and recycle the paper, but who’s actually going to do that?

# Fiber

Looks compostable, but may end up in the landfill anyway.

Some fast-casual restaurants use bowls designed and marketed to be compostable. They are made from bagasse, a fiber produced as a byproduct from sugar cane mills.

Sweetgreen, for instance, put the message in a longtime slogan: “Nothing from inside Sweetgreen goes to the landfill.” But getting to current levels of compostability has been a struggle for Sweetgreen and Chipotle, whose previous bowls turned out to contain PFAS, a family of chemicals linked to cancer that can remain in the environment even after the bowl has been composted.

They fixed that problem. But while your bowl may be compostable, if you don’t compost at home you have to throw it into a dedicated composting bin in the restaurant, or use a composting service.

Don’t put it in the recycling bin: Materials that come contaminated with food get rejected by recyclers. And throwing the bowl into a trash can at the office or at home means it’s likely to go to a landfill anyway.

# Bacteria do the work

Next best thing?

PHA, or polyhydroxyalkanoate, has been the next big thing in biodegradability for years. This bioplastic, which can be produced by bacteria, has promising properties: Research suggests it can break down in conventional landfills. In ocean water, it will degrade within a few years, a fraction of the 450 years that it takes standard plastic.

Producing the material economically, however, has been a technical challenge.

Cove, a bottled water company, says it is about to bring out its product in containers made from PHA. The company that supplies the bioplastic to Cove, RWDC Industries, introduced drinking straws made from the material last year in Singapore, where the company is based.



There is certainly a market for environmentally friendly goods. A report by the market research firm Mintel Group found that 34 percent of consumers said they would pay more for water packaged in 100 percent biodegradable bottles.

“There is a place for biodegradable materials” as a way to cut down the sheer amount of mismanaged plastic waste the world is dealing with, said Jenna Jambeck, a professor of environmental engineering at the University of Georgia who has studied the accumulation of plastics in the world’s oceans and the ability of PHA to degrade. However, she worries about the consequences of developing products that are seemingly environmentally friendly without planning for disposal and recycling. “You have to think about end of life when you’re designing things,” she said.

Ultimately, Dr. Jambeck said, “the best thing you can do environmentally is not create any waste in the first place.”

Illustrations by Claire O’Neill

**Correction:** Oct. 2, 2020
An earlier version of this article misspelled one chemical name. PLA is polylactic acid, not polyactic acid.