

Giving plastic a second chance, saving the environment

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Garbage washed up on a beach in Compton Bay, Isle of Wight, United Kingdom. Photo by: Jason Swain/Getty Images

Plastic is part of our everyday lives. Companies produce 420 million tons of plastic every year, and as much as 14 million tons of plastic enter the oceans. Scientists are finding traces of plastic in our sea salt and tap water.

We need plastics. They're crucial for our food packaging and blocking out bacteria and parasites. Physicians choose plastic for their gloves, sample vials and thermometer covers because it helps prevent contamination. Plastic often replaces metal on car bodies to make them more fuel-efficient and safer in accidents.

Humans dispose of 91 percent of plastics rather than recycling them. Now scientists and inventors are finding new uses for plastics that would otherwise end up in the trash, or alternatives to the most wasteful plastic products we use today.

More than 27 million tons of polystyrene are manufactured every year. Polystyrene is a thin layer of plastic used in many products. Our polystyrene takeout containers, plastic spoons and packing

peanuts are commonly thrown away after a single use. However, this plastic could have a useful second life or could be avoided altogether, thanks to two research projects.

600 Billion Cups Thrown Away Every Year

"The question was never really asked" about what to do with plastics after we've used them, said John Williams, a chemist. He is the business director of Aquapak, a biodegradable plastic manufacturer. For example, recycling plants can't process paper coffee cups, which have a layer of plastic. The plastic makes the inside of the cup waterproof. An estimated 600 billion cups are thrown away every year.

Williams said the problem stems from our economies, in which plastic loses its value after use. It is discarded instead of being reused.

Purposefully Producing Plastic Products

Rather than producing a stream of unnecessary plastic items, Williams said plastic products should be more purposefully produced. They should be salvaged after use, even if that brings additional costs, he said.

While this might not seem like good business, note that plastic pollution comes with a social and environmental cost. It's estimated at \$139 billion a year by The Economist, a British news magazine.

Damage to our health and the environment account for one-third of this cost because of plastic-related pollution in air, water and land. So although reusing waste products might raise prices for manufacturers and consumers, it could reduce environmental and health costs.

A Plastic Alternative

Williams' company spent 15 years developing a plastic alternative called Hydropol. It can be more easily recycled.

Hydropol can replace layers of plastics in products like the plastic coating on an orange juice label, which would normally make recycling more difficult. Hydropol breaks down in water and dissolves harmlessly. It can also be recycled with paper and plastic.

While it sounds great, the material behind Hydropol still needs some work, said Yu Dong. He is a scientist from Curtin University in Perth, Australia.

Dong studies polyvinyl alcohol, the main material in Hydropol, and how it is used in packaging. While polyvinyl alcohol is biodegradable and easily blends with other materials, Dong said it has some setbacks.

"It has limited stiffness, and that means that the mechanical properties are probably not that great," Dong said. The cost to use it is higher than other plastic, he said.

Dong said polyvinyl alcohol plastic is also sensitive to the environment. The wrong temperature or humidity can break it down.

There's still work to be done to find the best plastic alternatives, Dong and Williams said.

Swapping polystyrene with alternatives will keep waste from entering landfills. However, it doesn't completely address the discarded plastic already in the environment.

Reprocessing polystyrene isn't economical because the process gives a small amount of reusable material. A bathtub full of packing peanuts made of polystyrene would provide only about three bowling balls' worth of recyclable plastic.

So, some labs are looking into using one environmental problem to solve another.

Researchers in Brazil and the United Kingdom have created a way to break down a major pollutant from wastewater plants. They are cleaning up pollution from artificial dyes using filters made from polystyrene.

The scientists' filter cleans up Rhodamine B, a dye that can kill fish and animals. It can also carry potentially dangerous substances along to humans. It is used for printing and dyeing fabric and paper.

Making Use Of Plastic Waste

"The concept was to try and see if there was another way of making use of waste plastics instead of just the normal recycling process," said Julian Eastoe. He is a scientist at the University of Bristol in England.

To make the filters, the team dissolves discarded polystyrene and freezes it to create a foam block. The scientists shine light on the mixture and add tin oxide.

Think of the foam block like a kitchen sponge and the tin oxide as dish soap, cleaning up pollution. The combination also breaks down pollutants into compounds that are better for the environment, like carbon dioxide.

When tested in the study, the blocks broke down 98 percent of the dyes. The foam blocks can be reused, and Eastoe hopes to expand this method to other uses.

"It uses a waste product to get rid of another waste product. It's kind of a win-win situation," said Erica Wanless, a chemist at the University of Newcastle, Australia, who wasn't involved in the project.

Quiz

1 Read the statements below.

1. *There are many reasons why people use plastics.*
2. *Polystyrene is a thin layer of plastic used in many products.*
3. *Scientists are trying to find new uses for waste plastics.*
4. *New plastic alternatives could help reduce plastic pollution.*

Which two statements are central ideas of the article?

- (A) 1 and 2
- (B) 1 and 4
- (C) 2 and 3
- (D) 3 and 4

2 The author emphasizes the importance of some types of disposable plastic in modern life.

Which of the following BEST explains how John Williams' perspective is DIFFERENT?

- (A) Williams believes that plastic will eventually break down if environmental conditions are right.
- (B) Williams believes that plastic alternatives work just as well as traditional plastic.
- (C) Williams believes that plastic should become more expensive so fewer people use it.
- (D) Williams believes that plastic should be produced more purposefully and reused.

3 What is the author's purpose for writing this article?

- (A) to encourage readers to do more to reduce plastic pollution
- (B) to convince readers that plastic pollution needs to be reduced
- (C) to inform readers about some efforts being made to reduce plastic pollution
- (D) to compare the effectiveness of two different methods for reducing plastic pollution

4 Which sentence from the article would be MOST important to include in a summary of the article?

- (A) Scientists are finding traces of plastic in our sea salt and tap water.
- (B) Humans dispose of 91 percent of plastics rather than recycling them.
- (C) Dong said polyvinyl alcohol plastic is also sensitive to the environment.
- (D) The scientists' filter cleans up Rhodamine B, a dye that can kill fish and animals.