

Mealworms: An Unlikely Solution to Styrofoam Waste

Alex Crich November 4, 2015 20:43 <http://www.yalescientific.org/2015/11/mealworms-an-unlikely-solution-to-styrofoam-waste/>

Related Articles

Historically, mealworms have been known for little more than being popular pet food. But their status — at least scientifically — is on the rise. Researchers at Stanford and Beihang University in Beijing believe that these small, cheap, and ever available creatures may be the solution to one of our biggest environmental issues today: Styrofoam waste.

Extruded polystyrene foam, better known as Styrofoam, presents a significant environmental and waste management challenge. Although Styrofoam is considered to be almost completely non-biodegradable, Americans continue to dispose of about 33 millions of tons of it each year. Worse yet, Styrofoam is mostly composed of air, so it fills a major percentage of the country's landfill volume. Developing an effective method to recycle Styrofoam is an eco-friendly imperative.

The first step towards solving this crucial issue was detailed in a pair of September 2015 papers published in *Environmental Science and Technology*, which showed that mealworms have the ability to eat Styrofoam. The papers, which are a collaboration between researchers at Stanford University and researchers from several institutions in China, provide a striking cover image of a Styrofoam cup reduced to a mere Swiss cheese-resembling shell of its original form by an army of mealworms.

To conduct this research, the team began by examining what material was produced when the worms degraded Styrofoam. Over the course of 16 days, worms were sealed in a container and given only a block of Styrofoam to eat. The mealworms transformed about 48 percent of the carbon from the polystyrene into carbon dioxide gas and about 49 percent of the carbon into feces, which is a similar proportion to the waste from a worm's normal diet. One hundred worms consumed approximately 37 milligrams of Styrofoam per day, which is about equivalent to the mass of a pill.

In the second paper, the scientists expanded on these findings by examining whether mealworm gut bacteria were responsible for the Styrofoam digestion. They tested this idea by suppressing the gut bacteria of the worms, which prevented the digestion of plastic, showing the necessity of gut bacteria in the digestion of Styrofoam.

If this discovery pans out, it could advance how we address plastic waste. "Our findings have opened a new door to solve the global plastic pollution problem," study coauthor Wei Min Wu

said to the Stanford News Service. Craig Criddle, another Stanford professor not involved in the study, was similarly impressed. “Sometimes science surprises us. This is a shock,” Criddle said.

The Styrofoam researchers are currently collaborating with Criddle in a follow-up study that investigates whether or not mealworms can also digest other common plastics that are environmental hazards, such as polypropylene, microbeads, and bioplastics. Another research project involves studying mealworm gut bacteria in order to commercially produce similar enzymes that are capable of degrading plastics. Sparking several exciting avenues of research, these studies promise to expand on progress made in our approach to waste. Hopefully, ongoing scientific inquiry into these issues will lead to a feasible solution for the world’s rampant plastic waste problem.

Cover image: This striking image of mealworms eating through Styrofoam exhibits a potential solution to a major waste problem. Image courtesy of Stanford News.

By **Alex Crich** November 4, 2015 20:43

TAGS: [Earth and Environment](#)[Environmental Science](#)

© 2015 Copyright **Yale Scientific**. All Rights reserved.

Designed by Orange Themes. Modified by YSM.

SOURCE: <http://www.yalescientific.org/2015/11/mealworms-an-unlikely-solution-to-styrofoam-waste/>