Plastic Eating Enzymes

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In the last few decades, the manufacture of low-cost, durable, and adaptable plastics has grown, and they have infiltrated every aspect of our lives; nonetheless, this once-desirable polymer has a downside. Plastic pollution is one of the most pressing environmental concerns facing the world today, as it can take hundreds of years for plastics to degrade. With global production of approximately 350 million tons per year.

In March 2016, scientists in Japan published a remarkable discovery. After scooping up some sludge from outside a bottle recycling facility in Osaka, they discovered bacteria called Ideonella sakaiensis which had developed the ability to break down a specific type of plastic called PET (polythene terephthalate).

PET is a thermoplastic and one of the most widely used polyesters, and it can take hundreds of years to decompose.

According to a news release from the University of Portsmouth, The super-enzyme was created by combining two different enzymes, PETase and MHETase. In 2018, a team of researchers published an engineered version of the first enzyme that started breaking down plastic in a matter of days. A combination of the two enzymes breaks down PET twice as quickly.

John McGeehan, the lead co-author and director of the Centre for Enzyme Innovation at the University of Portsmouth, stated that this latest development represents a huge step towards using enzymes to recycle plastic and reduce plastic pollution.

“It makes the possibility of true industrial-scale biological recycling of PET a possibility. This is a very large advance in terms of speed, efficiency, and heat tolerance,” McGeehan said. “It represents a significant step forward for true circular recycling of PET and has the potential to reduce our reliance on oil, cut carbon emissions and energy use, and incentivize the collection and recycling of waste plastic.”

The French company Carbios announced the discovery of a new enzyme that decomposes 90 percent of plastic bottles in 10 hours but requires heating above 70 degrees Celsius.

Scientists are also making progress in finding biological ways to break down other major types of plastic. Bugs that consume other polymers, such as polyurethane, which is frequently used but rarely recycled, have also been discovered by researchers. When polyurethane degrades, toxic chemicals are released, which would kill most bacteria, but the bug identified uses the substance as food to fuel the process.

All in all, the above stated are a series of scientific discoveries about plastic-eating enzymes that help subdue plastic pollution and have the potential to lessen our reliance on oil, as well as reduce carbon emissions and energy consumption.