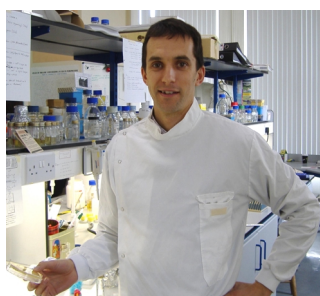


Plastic-eating Bugs

European researchers have opened a new route to recycle polystyrene via bacterial degradation.

Polystyrene is a type of plastic with a whole range of uses, including all sorts of packaging and disposable cups. More than 14 million metric tons of polystyrene are produced annually worldwide. Its major drawback is its very long lifespan. Researchers from the University College Dublin Centre for Synthesis and Chemical Biology (CSCB), associated with the University of Hamburg, have found a possible solution to divert polystyrene from landfills.

In a first step, the plastic is turned into an oil through a chemical process called pyrolysis. This oil is composed 83% of styrene - the "bricks" that form the polystyrene when grouped together. Professor Kaminsky from the University of Hamburg provided the expertise for this chemical degradation.



Dr Kevin O'Connor in his lab.
Photo - CSCB

This oil was then fed to a specific bacterium, *Pseudomonas putida* CA-3, by Kevin O'Connor from the CSCB. This bacterium proved capable of turning the styrene oil into tiny granules of a biodegradable form of plastic called PHAs (polyhydroxyalkanoate). The PHA granules are easily extractable from the bacteria through washing with mild detergents.

The possible uses of this new process are numerous thanks to the properties of PHA, which is heat resistant and can be used in a variety of forms.

Two ways of increasing the efficiency of the recycling process are still under study. The crude oil could be redistilled; the styrene fraction could be consumed by the bacteria and the remaining fraction could be burned to provide energy for the whole process. On the bacteria side, ways to increase the yield of the PHA plastic are under study.

Sources:

Centre for Synthesis and Chemical Biology
<http://www.ucd.ie/cscb/>