

# Waste cooking oil makes bioplastics cheaper

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"Bioplastics" that are naturally synthesized by microbes could be made commercially viable by using waste cooking oil as a starting material. This would reduce environmental contamination and also give high-quality plastics suitable for medical implants, according to scientists presenting their work at the Society for General Microbiology's Autumn Conference at the University of Warwick.

The Polyhydroxyalkanoate (PHA) family of polyesters is synthesized by a wide variety of bacteria as an energy source when their carbon supply is plentiful. Poly 3-hydroxybutyrate (PHB) is the most commonly produced polymer in the PHA family. Currently, growing bacteria in large fermenters to produce high quantities of this bioplastic is expensive because glucose is used as a starting material.

Work by a research team at the University of Wolverhampton suggests that using waste cooking oil as a starting material reduces production costs of the plastic. "Our [bioplastic](#)-producing bacterium, *Ralstonia eutropha* H16, grew much better in oil over 48 hours and consequently produced three times more PHB than when it was grown in glucose," explained Victor Irorere who carried out the research. "Electrospinning experiments, performed in collaboration with researchers from the University of Birmingham, showed that [nanofibres](#) of the plastic produced from oils were also less crystalline, which means the plastic is more suited to medical applications."

Previous research has shown that PHB is an attractive polymer for use as a [microcapsule](#) for effective drug delivery in [cancer therapy](#) and also as

[medical implants](#), due to its [biodegradability](#) and non-toxic properties. Improved quality of PHB combined with low production costs would enable it to be used more widely.

The disposal of used plastics - which are largely non-biodegradable - is a major environmental issue. Plastic waste on UK beaches has been steadily increasing over the past two decades and now accounts for about 60% of [marine debris](#). "The use of biodegradable plastics such as PHB is encouraged to help reduce environmental contamination. Unfortunately the cost of glucose as a starting material has seriously hampered the commercialization of bioplastics," said Dr Iza Radecka who is leading the research. "Using waste cooking oil is a double benefit for the environment as it enables the production of bioplastics but also reduces environmental contamination caused by disposal of waste oil."

The next challenge for the group is to do appropriate scale-up experiments, to enable the manufacture of bioplastics on an industrial level.

**More information:** Dr Radecka's poster presentation "Making bioplastic from different oils" will take place on Monday 3 September at the Society for General Microbiology's Autumn Conference 2012.

Provided by Society for General Microbiology

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