SUMMARY OF FINDINGS

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The conversion of waste PET plastic to a high value added biodegradable plastic.

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Abstract

This project reports the results of a research program that aimed at converting waste plastic into a biodegradable plastic.Petrochemical plastics, such as polyethylene terephthalate (PET) (e.g. plastic bottles), have become indispensible to modern society. Their durable nature and relative low cost of production have seen them become invaluable in modern society. The extremely recalcitrant nature of these plastics coupled with the fast paced disposable culture of today has lead to a variety of different plastics becoming a major waste problem within Ireland, the EU and worldwide. A combination of a chemical treatment and a biological process was employed by the research team to produce the value added polymer PHA from waste PET plastic.

Background

The aim of this project was to investigate and develop a technology to convert waste plastic namely polyethylene terephthalate (PET) (which is most commonly associated with plastic drinks bottles) to a virgin value added polymer polyhydroxyalkanoate (PHA). Plastic waste is and will continue to be a major problem for Irish society as a whole. Our need to reduce the amounts of waste land-filled is of utmost importance, and will be a burning issue for the foreseeable future. In tackling the problem of waste plastic there is an opportunity to develop new and innovative ways to deal with excess waste that is not currently reused or recycled but incinerated or dumped. PHA is a plastic produced naturally by a range of microorganisms. PHA is known to have interesting properties; one such property is that PHA is biodegradable which means it will degrades in garden compost heaps, another interesting property is its biocompatibility which means it can be used in the human body for medical devices without causing any negative effects.

Key points

- An Irish EPA funded research team has developed a unique, globally recognised, and game changing technology for the conversion of waste plastic into biodegradable plastic

- This is the first study to convert waste PET plastic and mixed plastic waste to the biodegradable plastic PHA.

- The technology is being scaled up with a view to commercialisation with the backing of international industry.

- A Spin out company, Bioplastech Ltd, was created in 2009 to commercialise technologies developed by Dr O'Connor and his team arising from this EPA funded project.

- Two patents have been secured protecting this technology and while both of these processes require further investigation to achieve commercial viability the results of this project have laid the foundations for a new and innovative green technology that may prove valuable to an Ireland striving towards a greener future.

- Scale up testing has commenced in 2011 for this technology and a pilot plant will be built and operated in Ireland in 2012.

- Success in this project represents an important step towards developing a technology with a broad significance to the global community. The value of this indigenous novel technology which can help deal with one of the world's waste problems will be of great advantage to Ireland both environmentally and economically.

- Dr O'Connor is an invited member of the EU commission high level committee "Lead market initiative for bio-based products and co-author of the 2009 EU report "Taking bio-based from promise to market: measure to promote the market introduction of innovative bio-based products."(see below)

For Further Information

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The full report '' **The conversion of waste PET plastic to a high value added biodegradable plastic'' -** ***An investigation of the conversion of waste polyethylene terephthalate to the biodegradable polymer polyhydroxyalkanoate***

is published by the Environmental Protection Agency and is available from link.
http://www.epa.ie/downloads/pubs/research/tech/

Publications connected to this work and Further Reading

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