MQ COMMERCIALISATION

MACQUARIE University

Efficient Biodegradation of Plastics using Synthetic Organisms

BACKGROUND

Polyethylene (PE) is a highly recalcitrant form of plastic that comprises a significant portion (~40%) of total plastic production including all types of petroleum-based polymers (polypropylene, polyvinyl chloride, polyethylene terephthalate, polystyrene, polyurethane, polyamide and polyethylene).

Due to its inert nature, it is not easily recycled, especially low-density PE, which is not currently recyclable and comprises 64% of all single-use plastics globally. Existing methods for handling PE waste in order of most common are landfill, incineration, and recycling (of which less than 20% of all PE produced is recycled).

The lack of widespread recycling of PE results in an accumulation of the waste in the environment which damages wildlife and is a potential threat to human health as it moves up the food-chain.

OUR SOLUTION

Our innovation is a novel method of biodegradation whereby a synthetic pure culture or synthetic consortia is engineered to produce moth, fungal and/or bacterial PE degrading enzymes in a yeast and/or bacterial chassis. These synthetic cultures and/or consortia will allow for efficient PE degradation/recycling into commercially viable products such as biofuels.

The innovation involves genetically engineered microbial (yeast or bacterial) synthetic strains that will be utilised for enhanced PE degradation and subsequent chemical commodity production (including but without limitation to biofuels, nutrient sources and fertilisers).

APPLICATIONS

- ✓ Waste Management
- ✓ Biofuel manufacturing
- ✓ Agricultural Nutrient Management
- ✓ Chemical commodities production

INVENTORS

Amy Cain, Lucie Semenec, Ian Paulsen, Thomas Williams

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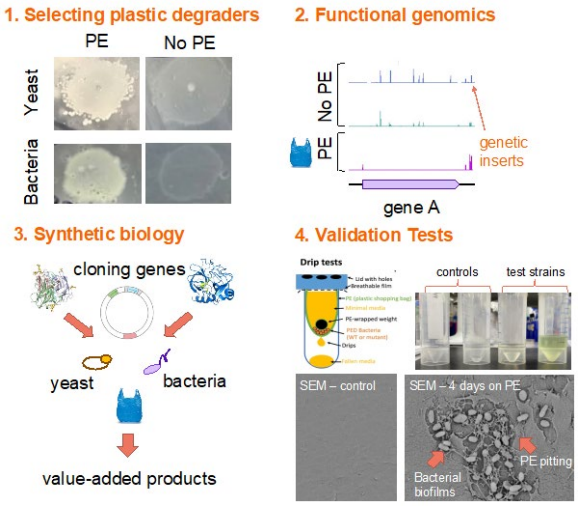
BENEFITS

Efficient PE degradation/recycling into commercially viable products.
Mitigate accumulation of plastic waste in the environment
Create value-added products from plastic wastes that are otherwise costly to remove from the environment



INTELLECTUAL PROPERTY POSITION

Australian Provisional Patent Application – 2021902548

PARTNERING OPPORTUNITY

We are seeking an industry partner for further development and commercialisation of this technology through a research collaboration or technology licence.

WOULD YOU LIKE TO KNOW MORE?

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ip@mq.edu.au