



A SUSTAINABLE WAY TO A BETTER WORLD



GOALS

The BioICEP project seeks to revolutionize the management of plastic waste through the development of an innovative environmental technology. Its main objective is to create an efficient and sustainable biotechnological system for the degradation of plastics, thus contributing to mitigating environmental pollution. This pioneering approach is based on using specialized microorganisms to break down plastic waste in a natural way, transforming it into biodegradable products. In addition, BioICEP aims to boost environmental awareness by promoting responsible consumption practices and fostering the transition to a circular economy.

By integrating biotechnology with waste management, the project aims to provide sustainable solutions that address the global plastics problem, offering a path towards a cleaner and more environmentally friendly future.



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BioICEP
Bio Innovation of a Circular Economy for Plastics



PRE-TREATMENT

One of the main goals of the project is to biologically transform plastic waste into bioproducts. However, plastic materials are known to be inert, i.e. they have a low capacity to be transformed by bacteria and enzymes. Therefore, the BioICEP project has developed innovative solutions to try to avoid these barriers and facilitate the transformation of synthetic plastics by microorganisms and enzymes. These pre-treatments have succeeded in transforming waste plastics by up to 99% by transforming them into monomers or by modifying the surface and chemical structure of the waste, demonstrating that after these pre-treatments, waste plastics are transformed more rapidly. In addition, energy-efficient technologies have been developed through the use of microwaves, reactive extrusion, or green solvents. These techniques have made it possible to subsequently convert synthetic plastic waste into bio-based products.



TECHNOLOGIES DEVELOPED IN THE PROJECT

BIOPROSPECTION

The BioICEP project focuses on the development of biotechnologies to efficiently degrade plastic waste in order to avoid its accumulation in landfills and natural environments. However, very few microorganisms and enzymes are currently known that efficiently degrade plastic waste, which is why one of the main developments in BioICEP has focused on the search for and identification of microorganisms that are capable of degrading different types of plastics. Thus, numerous microorganisms and enzymes have been found that can feed on and eliminate plastics such as PET, PUR, rubber, or polyethylene. This is a breakthrough as it can help clean up natural environments contaminated by plastics and improve the recycling of plastics.

PERMANENT RECYCLING OF PET THE PERPETUAL TECHNOLOGY

PerPETual will for the first time, develop a continuous recycling technology for all grades of PET -spanning pristine bottle grade to low grade PET pots tubs and trays. PerPETual will make a significant contribution towards halting resource depletion, landfilling and incineration of waste plastics, instead converting them into valuable resources and demonstrating the implementation of an Irish circular plastics model.



BIOPRODUCTS

BioICEP aims to add value and recycle plastic waste by obtaining high-value-added bioproducts. Thus, within the framework of the project, numerous solutions have been developed to transform synthetic plastic waste as monomers into biodegradable bioproducts such as bacterial nanocellulose produced from styrene, a polystyrene monomer, and ethylene glycol and terephthalate, PET monomers. Other innovations have made it possible to couple the degradation of PET waste with the production of PHB so that this biodegradable bioplastic is produced using fossil materials as raw materials. In addition, work has been done on the development of other bioproducts such as biosurfactants and muconic acid with applications in various fields such as the cosmetics and pharmaceutical industry, and the production of biopolymers. In this way, the BioICEP project has contributed to promoting and developing circular solutions for the production of sustainable bioplastics and bioproducts.



CONTACT



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