Reduce, Reuse, Digest? Optimizing pETase Function Within k-12 E. coli

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One of the biggest problems of modern society is the over pollution of single-use plastics. Thus, the goal of this project is to chemically break down polyethylene terephthalate (PET) plastic using the enzyme pETase. This study will describe the function of pETase in k-12 E-coli relative to the amount of available nutrients outside of PET plastic. AddGene.org isolated the RNA sequence for pETase and inserted it into k-12 E-coli via. a plasmid vector. The culture stab containing the modified k-12 E-coli, provided by AddGene, was inoculated onto ten standard culture plates and incubated for 48 hours. Single colonies were extracted and inoculated into culture tubes containing different nutrient concentrations and PET plastic. The plastic was filtered from k-12 E-coli and any media to measure weight loss. Through microscopic images, pETase function was shown by pitting on the PET plastic and k-12 E-coli cell residue. However, the plastic weight loss was too small to be considered significant. The results of this study can be used to help further understand pETase function in an effort to commercialize “plastic-eating bacteria.”

Awards Won:
Third Award of $1,000