

Using Microbes to Combat Ocean Microplastic Pollution

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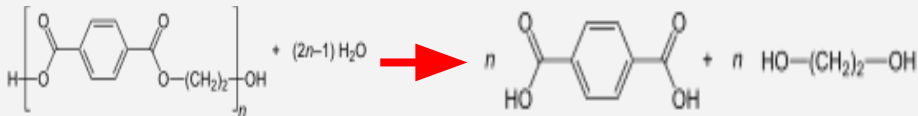
Introduction & Project Details

Microplastics:

- fragments of any type of plastic less than 5 mm in length
- come from a variety of sources, including from larger plastic debris that degrade into smaller segments
- can reduce growth, reproductive output, blockage of the digestive tract, suffocation, starvation, and drowning in many aquatic animals
- can end up in humans' diet if the aquatic animals that are consumed have ingested microplastics

Solution:

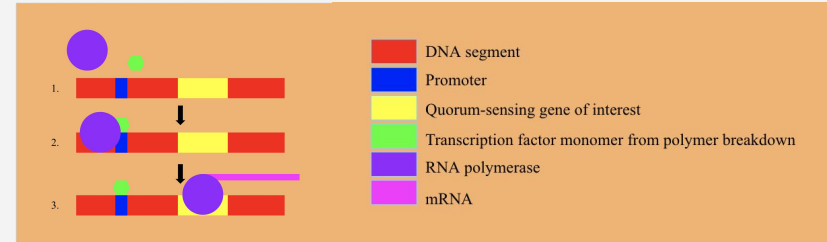
- combat this microplastic pollution through the use of *E. coli*
1. a plasmid will be constructed using bio-blocks (pre-assembled nucleotide sequences) of the following genes: ISF6_4831 and ISF6_0224
 2. said plasmid will be inserted into *E. coli*
 3. successful transformation and insertion of desired genes will be detected by luminescence.



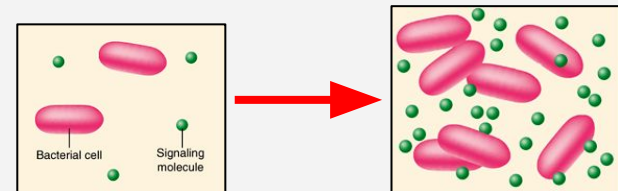
Experiments We Did &/or Planned

Objective: Modifying *E. coli* to promote microplastic degradation

Techniques: A plasmid will be constructed using bio-blocks (pre-assembled genes/nucleotide sequences) of the following genes: ISF6_4831, ISF6_0224. Said plasmid will be inserted into *E. coli*. Successful transformation and insertion of desired genes will be detected by luminescence.



Limitations: Access to necessary materials and equipment, limited vigor of response in *E. coli* to environmental stimuli, feasibility of inserting our desired genes into bacteria.



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About This Year's Micro-Dragons

We are students from Masterman, a public school in Philadelphia. Every student in our group has a strong passion for making a positive impact on the world through the sciences. As a team, we loved brainstorming ideas at the beginning of the school year and seeing our ideas come together into a coherent experiment. While we were not able to actually test our experiment due to our school being completely virtual since March 2020, we are extremely thankful to the BioBuilder program and our school for providing us this opportunity to expand our knowledge of bio-building and, overall, have fun with science!



Challenge for Next Year's Team

Recommendations For Future Study:

- Share slack thread with our community
- Investigate different pH levels and compositions (salt water, fresh water, etc...)
- Run the experiment in at least triplicates for increased statistical significance
- If done in person, we would recommend the next team to meet up and do the experiment

References & Acknowledgements

We would like to thank our teacher, **Richard Zimny**, and mentor, **Ben French**, for their guidance and time.

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Catalog, parts.igem.org/Catalog.