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Bacterial Degradation of Plastics

Plastics are not only a major component of societies on Earth but also those in Space. After use, plastics can accumulate and become difficult to recycle or reuse. Finding ways to degrade and recycle synthetic plastics would provide a way to reduce the upmass of Space Travel, create a closed-loop system of resources and even benefit life on Earth. The purpose of this project is to identify and characterize bacterial species that can degrade and recycle plastics. It has been suggested that bacteria can use plastics, like polyethylene and polystyrene, as a carbon source. These plastics are broken down into intermediary molecules which can then be used in the bacterium's metabolism. Environmental samples were collected from various locations rich in plastic waste. These samples are currently being used to culture bacteria in M9 minimal media containing polyethylene and polystyrene beads as the sole carbon source. High Performance Liquid Chromatography (HPLC), Scanning Electron Microscopy (SEM), and DNA sequencing are among the various methods that will be used identify and characterize bacteria that can degrade plastics. The results from these experiments will provide methods to reduce waste of plastics and ultimately improve sustainability for long-term space exploration.