

Small bugs for big problems: Enriching microbes to degrade plastics

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Plastics have revolutionized many industries, but their desirable properties also bring disposal challenges. Importantly, plastics are recalcitrant to biological degradation and have negative impacts on the ecosystems in which they accumulate. This research seeks to develop a methodology to depolymerize and convert plastic waste into a commodity. Currently, plastic-rich samples have been collected from the Rapid City Water Reclamation Facility and Rapid City Landfill and are being enriched to isolate microbes in purity and consortia with the ability to degrade various plastics. Additionally, degradation testing protocols are being refined, and once the microbes are isolated, metatranscriptomic analysis will begin in order to understand what genes are responsible for degradation and how they might be engineered to improve efficiency. In the future, we will create a 'consortium' of engineered microbes to valorize plastic waste, and model microbial isolates will be used to transform degradation products into valuable bioproducts and green chemicals.

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Primary authors: Ms HOFF, Brianna (Department of Chemical and Biological Engineering & Department of Materials and Metallurgical Engineering, South Dakota Mines, Rapid City, SD, USA); Mr SALEM, David (Department of Chemical and Biological Engineering & CNAM-Bio Center, South Dakota School of Mines and Technology, Rapid City, SD, USA); Mr HARROUN, Paycen (Department of Chemical and Biological Engineering, South Dakota Mines, Rapid City, SD, USA); Mr SANI, Rajesh (Department of Chemical and Biological Engineering & CNAM-Bio Center, South Dakota School of Mines and Technology, Rapid City, SD, USA); Ms GOVIL, Tanvi (Department of Chemical and Biological Engineering & CNAM-Bio Center, South Dakota School of Mines and Technology, Rapid City, SD, USA)

Presenter: Ms GOVIL, Tanvi (Department of Chemical and Biological Engineering & CNAM-Bio Center, South Dakota School of Mines and Technology, Rapid City, SD, USA)

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