



TRANSFORMING FOOD WASTE INTO FUEL

Hyung-Sool Lee, Ziyi Xiong, and Abid Hussain

Electricity In North America, we throw out roughly 400 kilograms of food waste per person each year. The bulk of those potato peels and chicken bones ends up in landfills, where it creates methane, a potent greenhouse gas.

Some municipalities take a greener approach. Some burn the methane to produce electricity, but that's an expensive process. Others use anaerobic digestion to break down food waste, but the value of the resulting compost isn't high.

Hyung-Sool Lee, director of the Waterloo Environmental Biotechnology Lab, offers another option. Lee and his team have developed a bioreactor that engineers natural fermentation to extract useful chemicals and fuel out of rotting food.

The technology circulates a carefully selected cocktail of microorganisms through tanks of food waste. As the microorganisms trickle through, they digest the organic material, transforming it into carboxylate. Once they reach the bottom of the tank, they're recirculated to continue their mission.

The value of this approach lies in the carboxylate that's left behind. This biodegradable chemical can be refined into a crude oil substitute or used to replace petroleum-based chemicals in plastic packaging and other products.

The new technology reduces reliance on fossil fuels and is significantly cheaper than using intensive mixing to biodegrade the waste. Lee notes that even small communities could adopt the compact system, eliminating the need to truck green bin contents long distances to centralized facilities.

The researchers now aim to test their bioreactor on a larger scale, with the goal of commercializing it within the next five years.

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Partner: GHD

Read more at Innovation Toronto (posted on May 26, 2019)