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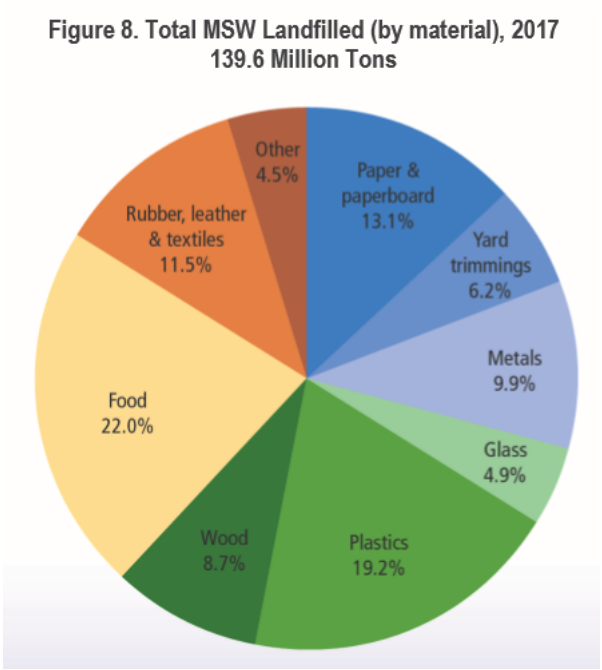
Advancing the Bioeconomy: From Waste to Conversion-Ready Feedstocks Workshop

02/20/2020

Landfill-designated waste streams: organics and post-consumer absorbent hygiene products (AHPs)

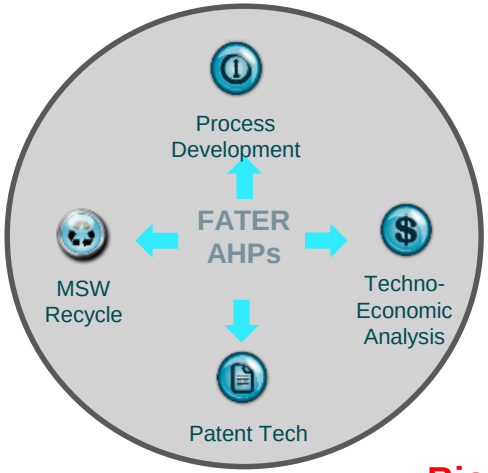


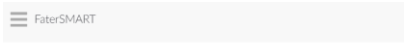
Organics: ~ 30-50%

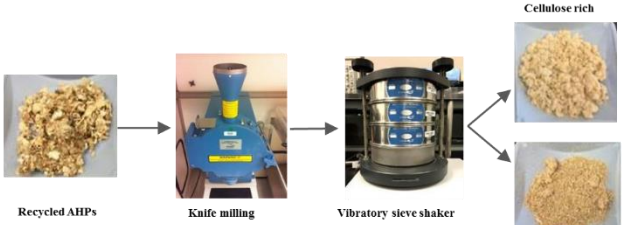
AHPs

Upgrading and conversion of post-consumer AHPs

AHPs Collection
↓
Transport
↓
Sterilization
↓
Plastic Separation
↓
Mechanical Processing







Mechanical processing

Biological conversion

Liang et al. 2018, ACS Sustainable Chem. Eng. 6, 3589-3595.
Li et al. 2017, European Union Patent No. Patent Application# PCT/US2016/042863.

Characterization and conversion of landfill-designated organic waste streams

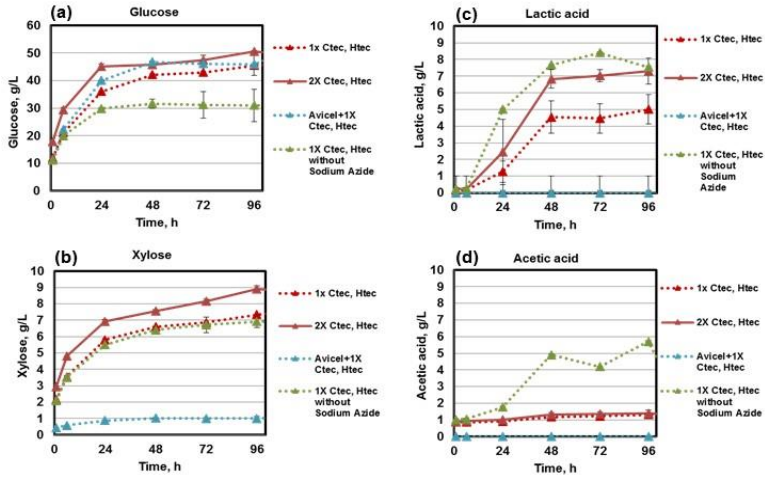
Recology WASTE ZERO

Food Waste

Paper Waste

biocatalysts

novozymes® Rethink Tomorrow

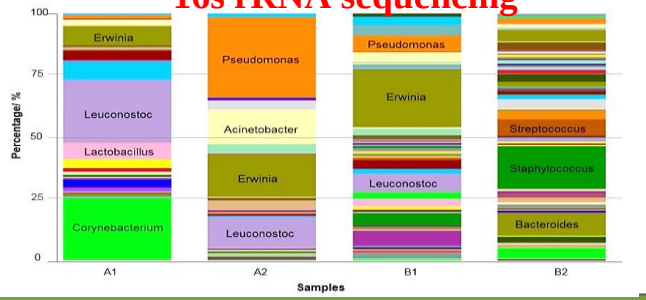


Major chemical composition of the sorted MSW streams

Sample	Moisture (%)	Glucan (%)	Xylan (%)	Lignin (%)	Ash (%)	Starch (%)	Others* (%)
Paper-rich MSW	22.8	41.2	5.2	7.2	8.6	2.6	12.2
Food-rich MSW	63.2	7.8	0	5.5	6.8	4.1	10.4

Liang et al. manuscript submitted
Liang et al. U.S. Patent Application 62/578,248

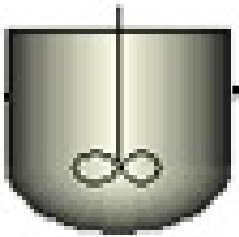
16s rRNA sequencing



Municipal solid waste (MSW)+ lignocellulosic biomass blends conversion

INL: MSW blends

MSW blends
Catalyst/solvent
Enzyme

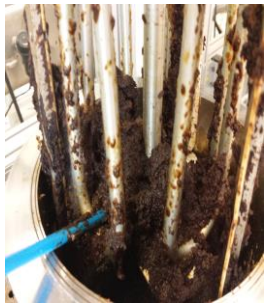


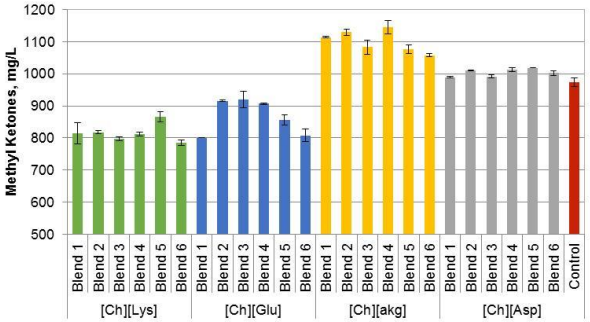
Sugars

600x

SNL: Deconstruction

ABPDU: Deconstruction scale-up & Fermentation





- The waste stream did not inhibit the conversion process compared to the regular lignocellulosic feedstocks

1) Sun et al, 2015, Bioresource Technology, 200. 2) Liang et al, 2017, RSC Advances, 36585.
3) Li et al, 2017, Biotech. Biofuel. 2017, 10, 13. 4) Yan et al, 2019, ChemSusChem.