
# CLEANFIBER: Reducing contamination risk and increasing yields in the production of platform sugars from UK MSW

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***Background***
Fiberight Ltd has created a circular economy solution to recover materials and generate value-added products from municipal solid waste (MSW). The process involves pulping and washing the MSW to produce three main fractions: plastic and metal recyclables, a paper-rich fibre product, and a washwater rich in organic materials. The fibre is subsequently converted into sugars by enzyme hydrolysis, and these can form the building blocks for a wide range of products in a waste-based industrial biorefinery. The washwater is fed to high rate anaerobic digesters to produce biogas, a source of renewable energy, and the cleaned water from the process can potentially be fed back into the process to minimise fresh water inputs.

*Laboratory-scale washing equipment*

*Example of MSW pulp from the washing process*

*Dr Dhivya Puri carries out enzyme hydrolysis experiments*

***Work programme***

The current project is developing innovative methods for process enhancement and improved product yield which are suitable for use on MSW as collected at kerbside in the UK. This could potentially offer an integrated solution to separation of the energy-rich food component in our waste from the cellulose-rich fibre wastes which are now recognised as ideal targets for second generation Industrial bioenergy and biorefinery applications. The concept is to use specialised additives to the MSW washing stage to improve the quality of the washed fibre and increase its sugar yield, and to use a new low-cost agent for pH control in the hydrolysis stage. Both of these measures will contribute to minimising sugar losses. This is as a result of adventitious and undesired bacterial growth, which consumes the desired sugar product and produces an unfavourable environment for continuing efficient hydrolysis. The research will look at different additives as enhancers of the washing process and in doing this improve separation of the MSW into clean fibre and solubilised food waste.

Process improvement may also occur through enhanced and more economic pH control during the hydrolysis process. The research will test the potential for using a secondary low-cost waste material whose properties make it ideal for buffering hydrolysis at the target pH, allowing for efficient use of the enzymes. It is likely that this approach could potentially be used in a wide range of hydrolysis and fermentation processes in other related industries where lactic acid spoilage is potentially a major problem.

*Funding agencies*

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*University partners*

University of Southampton

Faculty of Engineering and the Environment, Southampton

*Industry collaborators*

Fiberight

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