ReNEW
Resource innovation Network for European Waste

Valuable Products from Waste paper

Investing in Opportunities
This project has received European Regional Development Funding through INTERREG IV B.
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INTERREG IVB

Transnational Demonstration Process

The Problem

Large amounts of paper waste are generated each year that vary from office paper to cardboard and product packaging. Proportions of the paper waste are recovered and segregated as part of the waste processing cycle and are used to produce recycled papers, such as newsprint or recycled packaging. Other fractions, however, are not easily segregated and are recovered mainly in the form of low grade mixed paper wastes or as part of mixed 'black bin' wastes.

The source of the waste and the separation process will determine the properties of the waste, which can range from reasonably dry fractions to very wet ones from mixed household waste.

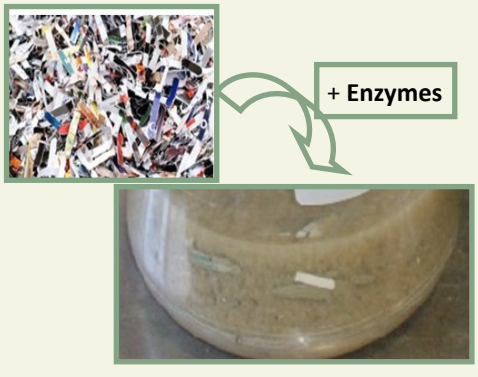
The Solutions

The current solution: the low grade mixed paper waste forms part of low grade refuse used for renewable energy or Refuse Derived Fuel.

The innovative solution: low grade paper waste is a potential feedstock source for conversion to added value chemicals. Paper wastes are comprised mainly of cellulose and hemicellulose, from which readily fermentable sugars can be obtained through the application of enzyme technologies. The sugars can then be used as starting material for a variety of bioconversion processes in which micro-organisms convert the sugars into platform chemicals, intermediates, biochemical, bioplastics or biofuels.

Aim

The aim is to generate valuable products from low grade mixed paper waste. High value products include solvents (e.g. butanol, acetone), volatile fatty acids, biofuels (ethanol, bio-oils), organic acids (succinic acid, lactic acid, citric acid), and many other organic products with different industrial applications like polymers, plastics, cosmetics, foods and feeds. Hence, the need for technologically and economically viable solutions.



Technology Approach

As opposed to burning the waste paper for energy purposes, the (hemi)cellulose content is valorized through sequential enzymatic depolymerisation to single sugars, bacterial fermentation of the single sugars to valuable organic chemicals, and recovery of the chemicals through use of separation technologies. The residuals from these processes can be valorized for renewable energy generation.

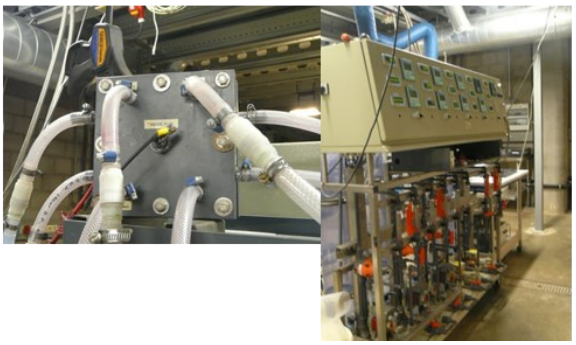
Enzymatic pretreatment

Separation

vito
vision on technology

Fermentation

Université de Liège



Economic barriers/drivers for market introduction of this output stream:

The targeted products, such as bio-based succinic acid, ethanol and butanol, are already produced at large scale from pure sugar streams instead of waste materials. Therefore, the market exists and is expanding. Our approach to start from organic waste material as an alternative feedstock for commonly used pure sugars is highly desired in the bio-based economy to avoid competition with food and feed.

Main technological barriers for market introduction:

Substrate and downstream processing are major cost factors in fermentation processes. Current applications mainly use pure sugar media as starting material for fermentation. Shifting from pure sugar substrates to organic waste streams saves on substrate costs. However, the higher separation and purification requirements due to a complex feed and product mixture may lead to increased downstream processing costs.

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Case study produced by the ReNEW Project under Action 13 (Demonstration, Promotion & Dissemination Activities) examining how facilities for scale up, testing and training are a vital part of developing processes for resource recovery.

For further information:
www.renew-network.eu