

Cell-U-Value: Creating Circular Chemistry

By developing sustainable chemicals based on tertiary cellulose, the Cell-U-Value initiative aims to reduce carbon emission from chemical industries while remaining economically competitive.



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Project leader(s) Erik Pijlman

E-mail e.pijlman@knncellulose.nl

Partners ISPT, Rijksuniversiteit Groningen, Nouryon, KNN Cellulose BV

Budget 1.600 k€

Duration 2018-2022

Summary

Chemical industries are in need of alternatives for fossil resources. Biomass is the only available alternative for more complex molecules and can be derived from waste and other residual streams which are not in conflict with food.

Based on the low cost, its high abundance in waste and its readily available cellulose chains, the use of tertiary cellulose as a feedstock for chemicals is an attractive opportunity. Additionally, the value of this concept reaches even further, since a (temporary) carbon sink is created when waste is used as a resource for new products instead of energy. The main challenge is to optimise the conversion of tertiary cellulose to market quality bio-based chemicals via hydrolysis in an economical way.

To reach the highest impact, the core partners enable the value chain by bringing together supply, demand and (knowledge of) conversion technology processes and are able to disseminate the knowledge broadly.

Objective

Cell-U-Value aims to develop and utilize the capabilities of tertiary cellulose as a feedstock for biobased and sustainable chemicals to its fullest potential, and also to tackle and overcome the challenges coinciding with these processes. This fits perfectly in the description of ISPT's program line Circularity.

Approach

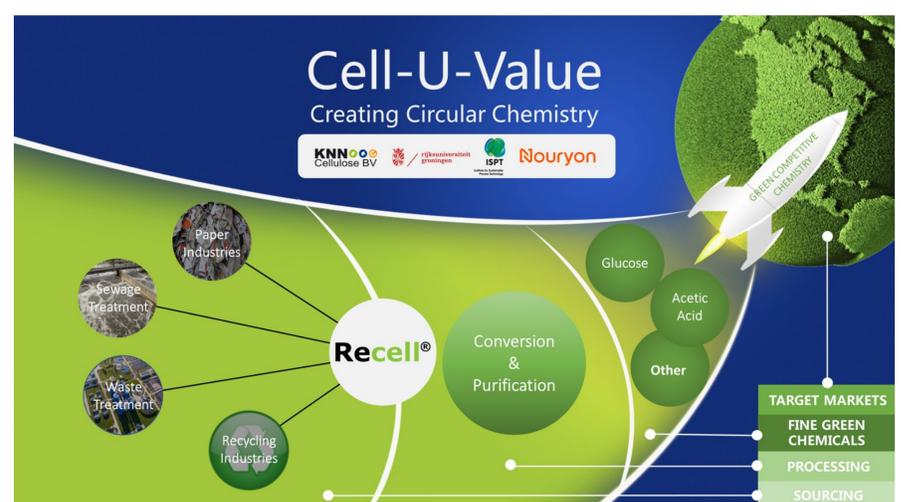
- Functional production process from tertiary cellulose on a technical level, proven at pilot-scale (10 ton/year).
- Lab-scale feasibility demonstration on the tertiary cellulose conversion to acetic acid by fermentation integrated with reactive extraction.
- Strong perspective towards full scale value chain, both economically and environmentally.
- Broad dissemination of knowledge across network.

Results

For the past year now PhD candidate Ms Elchin Jafariyeh Yazdi has been gathering data and arguments making further narrowing of the technical scope possible. The consortium is by Q4 2020 ready to make a fundamental choice regarding the type of conversion technology. That choice will be based on technical criteria such as pre-treatment, conversion rate and downstream processing but also on investment, operational cost and overall environmental impact within the value chain.

Next steps

Based on the consortium's choice, preparations are being made for the pilot-phase: phase 2, starting Q1 2021. In this phase the consortium will build a processing plant with a capacity of 10 tons annually to test and optimize conversion and processing.



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