SUSTAINABLE TEXTILE FIBRES

This first issue of the NeoCel Newsletter gives an overview of the project and the process, and a closer look at the activities around techno-economy and sustainability.

THE NEOCEL PROJECT

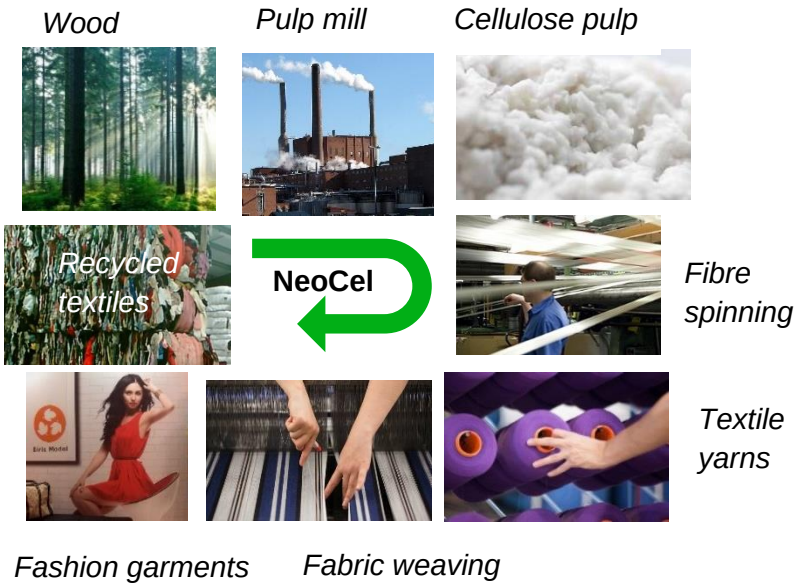
The dominating textile fibres today, cotton and polyester, cause huge environmental impact during their production. Cotton plantations require pesticides and large amounts of water and land usage. Polyester supports the world's dependence on oil production and causes problems with microplastics in the oceans. The growing demand for textiles worldwide calls for sustainable alternatives. Regenerated ("man-made") cellulose fibres are chemically similar to cotton fibres, and a highly interesting bio-based alternative. But today´s production of such fibres – for example viscose, modal and lyocell – involve chemicals that are hazardous to workers and the environment.

The NeoCel project aims at developing a sustainable textile fibre based on wood and/or cotton textile waste. The fibres will have a quality matching today´s commercial fibres and will not need hazardous chemicals.

The project runs between 2016–2019 with a budget of 3.66 M€. The consortium includes industry actors and research expertise covering the whole value chain: AB Enzymes, AkzoNobel, Andritz, Domsjö Fabriker, F.O.V. Fabrics, Katty Fashion, LIST Technology, Maurer**,** Re:newcell, Roal, Söktaş, RISE Research Institutes of Sweden and VTT Technical Research Centre of Finland. Program Manager is Mattias Wennerstål at RISE.

THE NEOCEL PROCESS

The bio-based raw material is wood – and cotton textile waste can also be processed. A pulp mill converts the wood into cellulose pulp that is dissolved and spun into regenerated fibres in a spinning plant. Each process step is addressed within the NeoCel project in order to optimize economy and sustainability of the whole value chain.



NeoCel uses a new water-based cold alkali process for the pulp fibre dissolution, together with recent advances on the reactivity of cellulose pulp.

Chemicals used are recycled in the processes. The spinning plant is integrated with the pulp mill for efficient use of materials and energy.

A closer look at…

TECHNO-ECONOMY AND SUSTAINABILITY

NeoCel Workpackage 5 (WP5) deals with system integration, energy efficiency and sustainability. WP leader Marta Lopes at RISE explains what this means in practice:

– The system analysis is made by means of theoretical model mills. The models are built from blocks representing different unit processes, even chemical reactions are included. The outcome of process simulations with these virtual factories are mass and energy balances that are used for the economic and environmental assessments. Some model building blocks and data already exist from earlier work. New input data that are specific for the NeoCel process are collected from the experimental work within the project.

Marta Lopes

One important goal of NeoCel is to replace the toxic carbon disulphide used today in cellulose dissolution by adapting the pulp for dissolution in cold alkali instead. Core process stages that need careful evaluation in WP5 are therefore the steps from dissolving pulp to regenerated textile fibre:

Dissolving pulp

Adaption of pulp › Dissolution of cellulose › Spinning of fibres ›

Textile fibre

Another important issue for the economy and sustainability of the NeoCel process is the recovery of chemicals used in its different stages and the benefit of energy integration with an existing dissolving pulp mill.

STATUS OF THE TECHNO-ECONOMIC AND ENVIRONMENTAL EVALUATION

What has WP5 accomplished so far?

Marta Lopes wants to highlight one area: – We have started evaluating three versions of the NeoCel process. The results are compared with a state-of-the-art viscose process. This early evaluation indicates that the operating costs and environmental impact can indeed become lower than that of the state-of-the-art viscose process. Investment costs are also about to be estimated. – The models are now to be updated with new results from the experimental part of the project, concludes Marta Lopes.

Learn more and follow our work at neocel.eu
Contact: contact@neocel.eu

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