

Regeneration of textile fibers from unbleached plant biomass

Organisation

Duration : 5/6 months from February/March 2026 (Remuneration according to current rates)

Location : Laboratoire Génie des Procédés pour la Bioraffinerie, les Matériaux Bio-sourcés et l'Impression Fonctionnelle (LGP2, <https://lgp2.grenoble-inp.fr/>)

Context

The increase in demand for textile fibers and growing concerns about the environmental impact of natural and synthetic sources are creating a need for renewable, low-impact alternatives. One promising solution is to regenerate cellulose fibers from paper pulp. Traditional methods, such as the viscose process, are effective but rely on toxic chemical reagents such as carbon disulfide. Newer technologies (such as Lyocell or Modal) use more environmentally friendly solvents, but involve complex, costly, and energy-intensive processes that still require purified cellulose pulp.

The aim of this project is to avoid these purification steps by working directly with unbleached paper pulp, thereby reducing the chemical and energy inputs associated with the bleaching stages. The approach focuses on mild oxidation methods in aqueous solvents under alkaline conditions to dissolve the oxidized pulp and regenerate it into textile fibers. Any traces of lignin in the regenerated fibers could offer added value due to its antibacterial and antioxidant properties. Based on processes established within the LGP2, the intern will evaluate the impacts of lignin content and oxidative load on textile fiber regeneration processes, as well as on material properties.

Objectives

The intern will be responsible for the following tasks:

- Implementation of oxidation, dissolution, and regeneration processes on different lignocellulosic biomasses
- Study of the impact of different parameters according to an experimental design
- Characterization of the initial material and the oxidized/dissolved/regenerated material using different physicochemical methods and protocols

Desired profile

Master's degree/Final year of engineering school specializing in chemistry and/or polymer materials. Previous experience in lignocellulosic biomass would be appreciated. Strong independence and organizational skills are required, as well as a keen interest in experimental and multidisciplinary research. A good level of written and spoken English is essential.

Contacts

This project will be supervised by:

- Bastien MICHEL (MCF): bastien.michel@grenoble-inp.fr
- Lorette BRAULT (Dr.): lorette.brault@grenoble-inp.fr

Please send your CV and covering letter before 20 November 2025.