



**Jahan GOLESTANI**

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LGP2 (C. CHIRAT, D.  
LACHENAL)

# Purification processes of wood based cellulose by coupling chemical and enzymatic reactions

*Procédé de purification de la cellulose issue du bois par couplage de réactions enzymatiques et chimiques*

## Context

### Hemicelluloses Extraction from Kraft Pulp

- Hemicelluloses constitute approximately 20–30% of wood-based materials, and 15 to 30% of chemical pulps
- Hemicelluloses are a complex of polymeric carbohydrates.
- Enzymes are powerful and highly specific catalysts.

### Challenges

- Due to extensive modification of hemicelluloses during Kraft process, removal of hemicelluloses left in pulp is highly challenging.
- Hemicelluloses' structures in various kinds of wood is different, That's why selection of a unique method is challenging.

### Advantages

- Cost reduction
- No cellulose degradation
- Facilitation of next bleaching steps
- Valorisation of Hemicelluloses

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## Objectives

### Removal of Hemicelluloses

- Through enzymatic treatments with different enzymes considering different conditions, combinations and arrangements

### Characterization and Quantification of Hemicelluloses Left in Treated Pulp

- Main challenge: extracting hemicelluloses without degrading them
- To find out the reason why the residual hemicelluloses still stay in pulp

### Characterization and Quantification of Hemicelluloses Extracted

- Valorization of hemicelluloses

## Methods

### Enzymatic Treatment of Pulps

- Main Enzymes: Xylanase, Mannanase
- Main Feed Pulps:
  - Kraft Pulps
  - Softwood and Hardwood
  - Bleached and Unbleached

### Characterisation of Feed Pulp

- Extraction of hemicelluloses
- Analysis of extracted hemicelluloses through SEC, HPAEC, MALDI-TOF

### Characterisation of Treated Pulp

- Extraction of hemicelluloses through CCE and DMSO procedures
- Analysis of extracted hemicelluloses through SEC, HPAEC, MALDI-TOF

### Characterisation of Solubilised Extracts

- Analysis through SEC, HPAEC, MALDI-TOF

