



Chaire de recherche industrielle  
CRSNG – Canlak en finition des  
produits du bois d'intérieur



# Parametric Study on a Wood Impregnation Process

July - 2020

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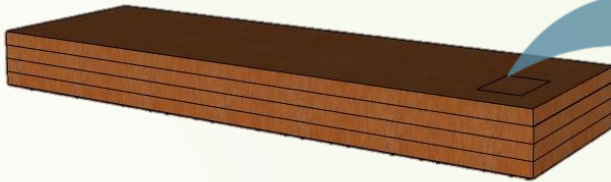
# Objective

- Identify the parameters involved on the impregnation process of hardwood's tangential surface
  - Vacuum level, monomer viscosity, anatomical features...
- Potential applications:
  - Act on a surface of interest for interior products such as flooring and furniture;
  - Allow an optimized process: faster manufacturing!



# Methods

1

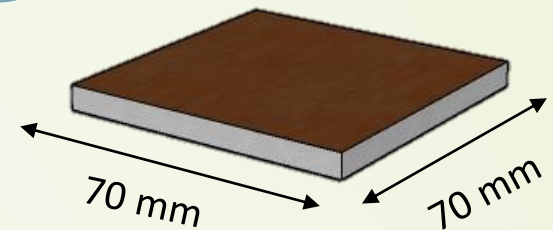


Yellow birch sawn  
veneers

8% Moisture content

120# sandpaper

2



70 mm x 70 mm x 4 mm  
(L x T x R)

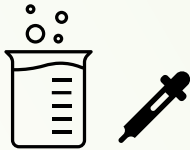
Sealed with Aluminum  
tape

15 repetitions



# Methods

3



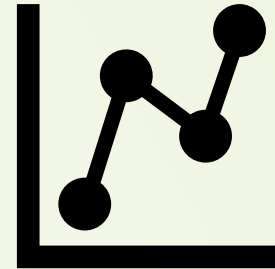
35.1 cP, 112.8 cP, 330.6 cP  
(*in situ* polymerization)

50 mbar, 250 mbar, 500mbar

40 seconds  
under vacuum

2 minute  
impregnation

4



Weight gain

Micro tomography

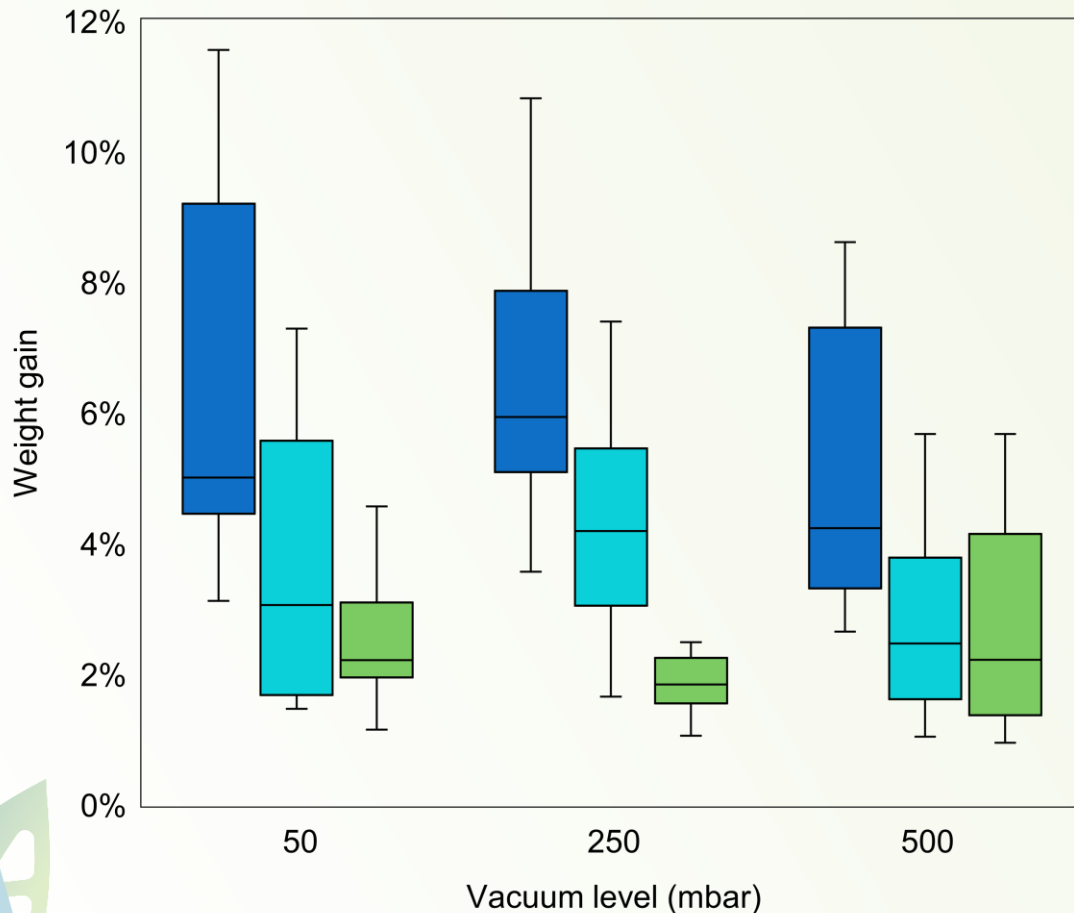
Statistical analysis  
(ANOVA)



# Results

Vacuum level x Weight gain

■ 35.1 cP ■ 112.8 cP ■ 330.6 cP



- An increase **viscosity** causes a decrease in the **monomer intake**
- Changes in the **vacuum level** do not impose significant effects on **monomer intake**
- Between 112.8 cP and 330.6 cP there is no significant difference



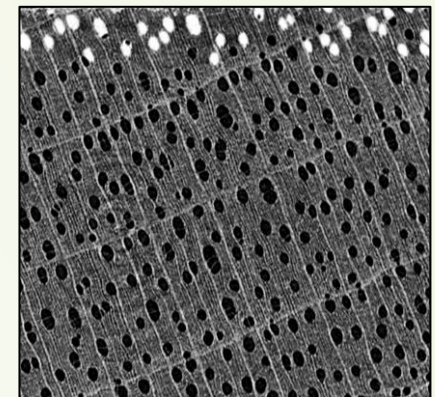
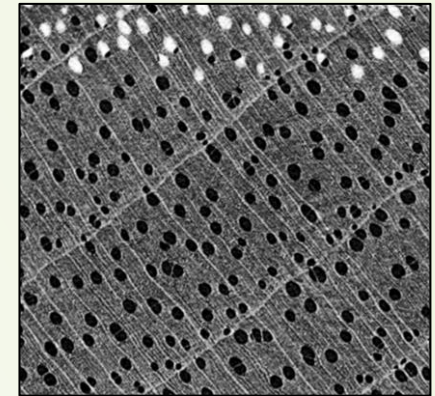
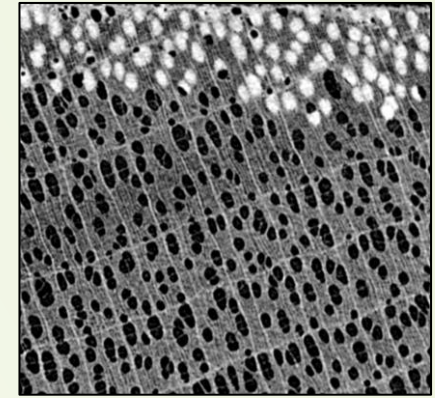
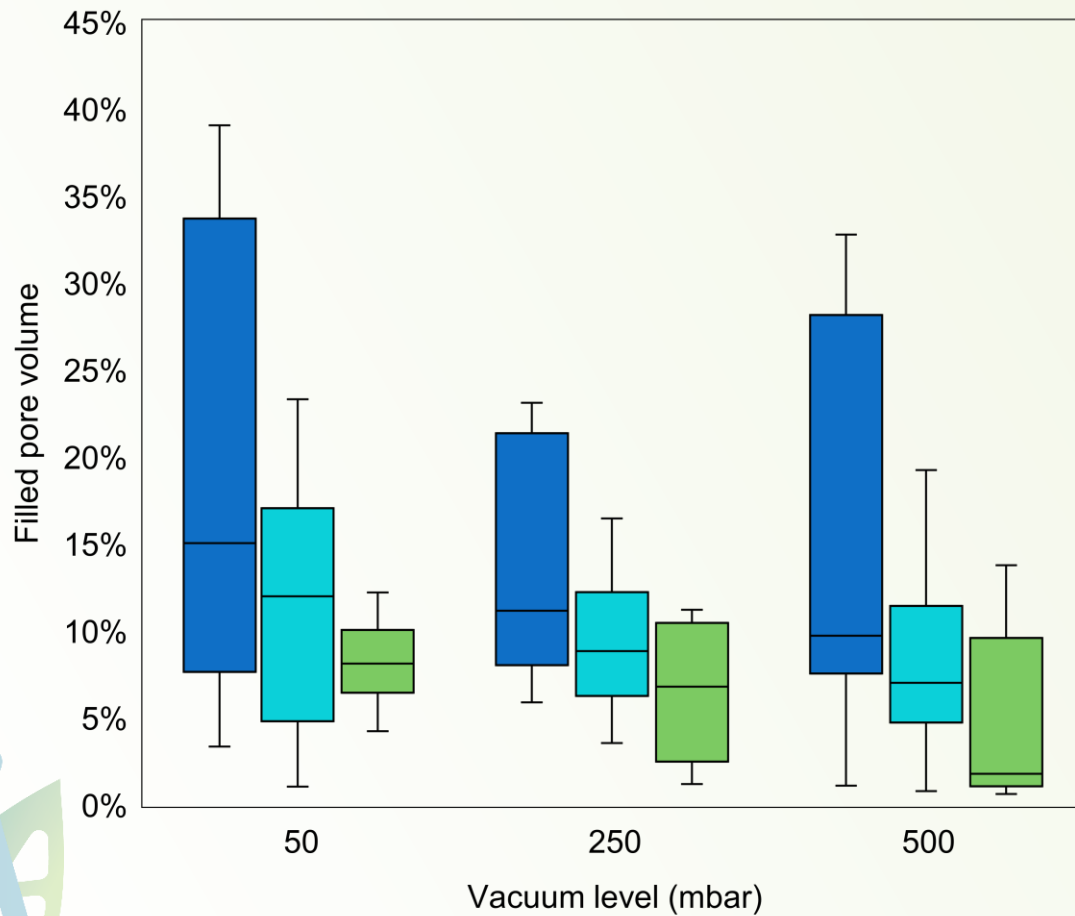
Suggests there is an optimal point where **viscosity decrease** starts considerably **increasing monomer intake**



# Results

## Vacuum level x Filled pore volume

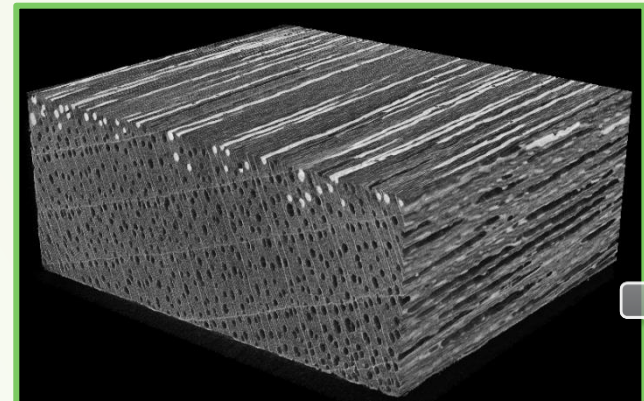
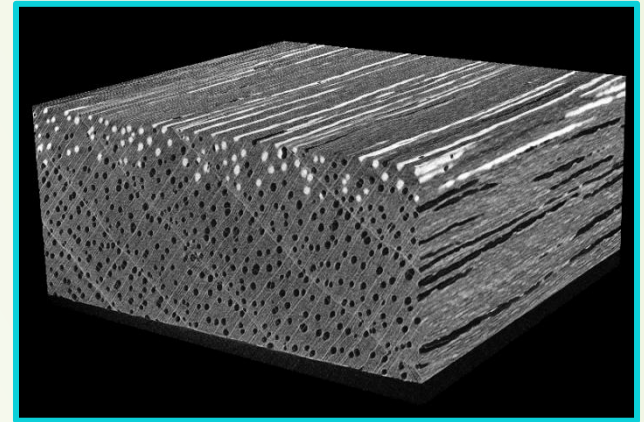
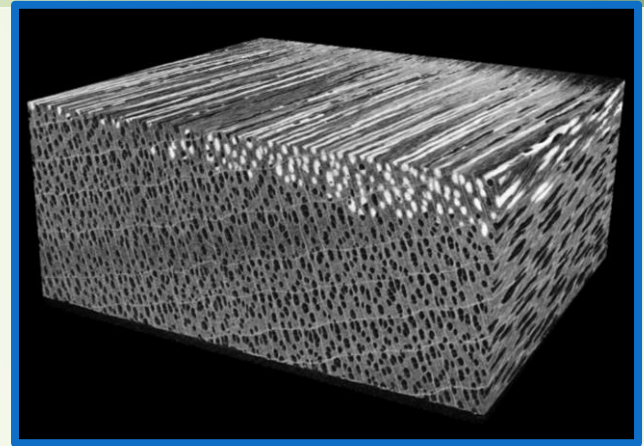
■ 35.1 cP ■ 112.8 cP ■ 330.6 cP





# Results

- **Anatomical features** have significant influence on **monomer intake**
- **Grain slope** seems to determine preferential penetration paths
- Fluid tends to fill vessels longitudinally before penetrating further into wood's pores





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