

10/11/2022

SCHATZMAYR WELP SA  
Thomas

# Optimized vegetal wools for indoor comfort: coupling fire treatment with acoustic and hygrothermal performances

 **Université  
Gustave Eiffel**



# BIO-BASED MATERIALS



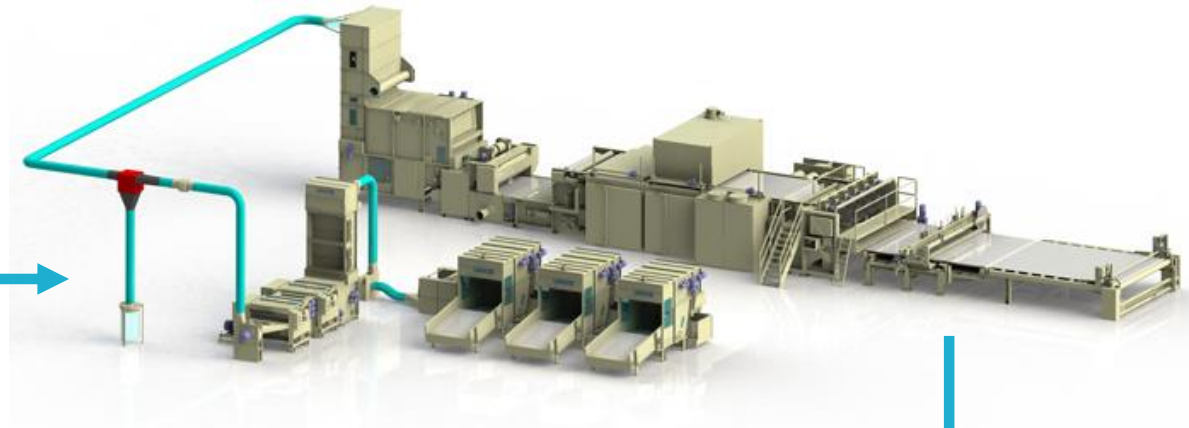
Stem

Vegetal fibers



Polyester fibers

Thermo-binding process



- Sustainable wall insulator 
- Multifunctional properties
  - Acoustic absorption 
  - Thermal insulation 
  - Hygroscopic nature 
- **Low fire resistance** 

# OBJECTIVES

## Objective 1

Evaluate the alternatives and the application methods of the fireproof material in the vegetal wools

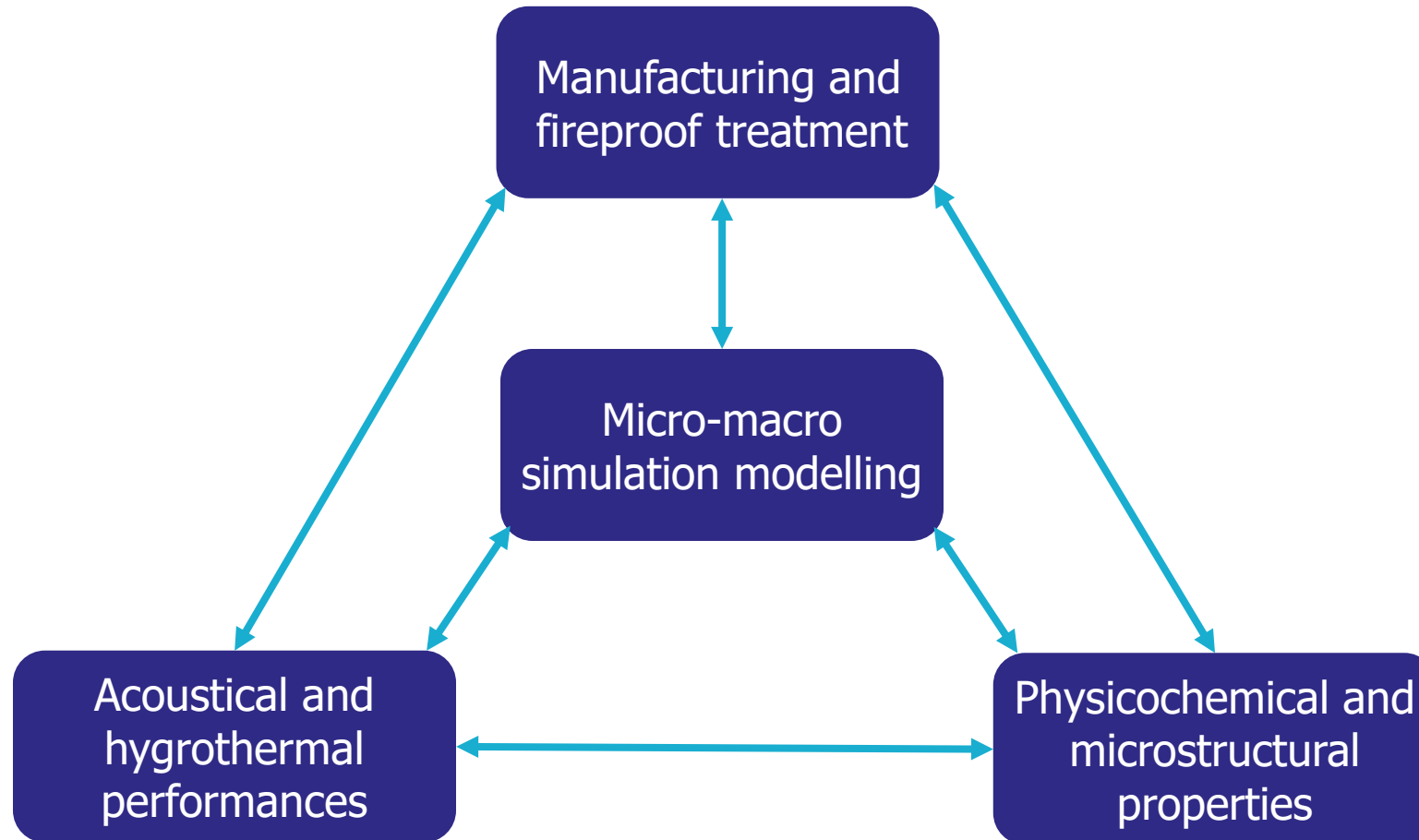
## Objective 2

Comprehend the influence and optimize the fireproof treatment on the fibers and microstructure of the vegetal wools

## Objective 3

Develop modelling methods to simulate the impact of the fireproof treatment on acoustic and hygrothermal properties of the vegetal

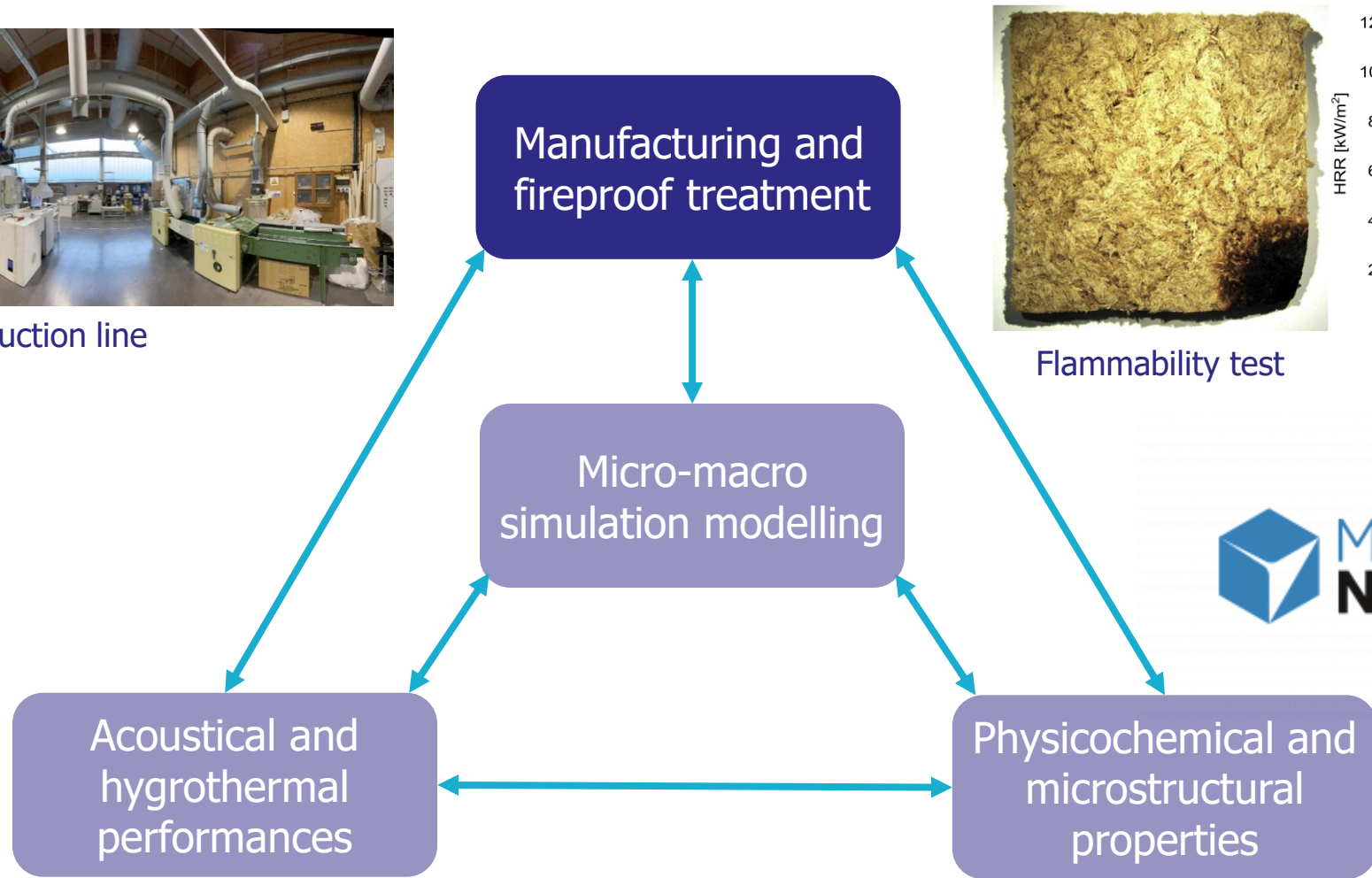
# METHODOLOGY



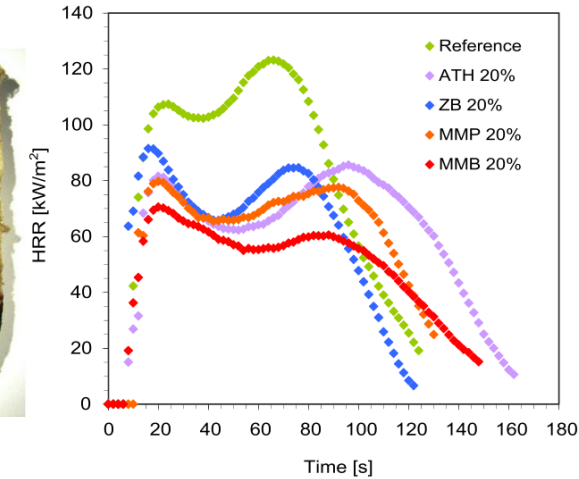
# METHODOLOGY



Cetelor production line

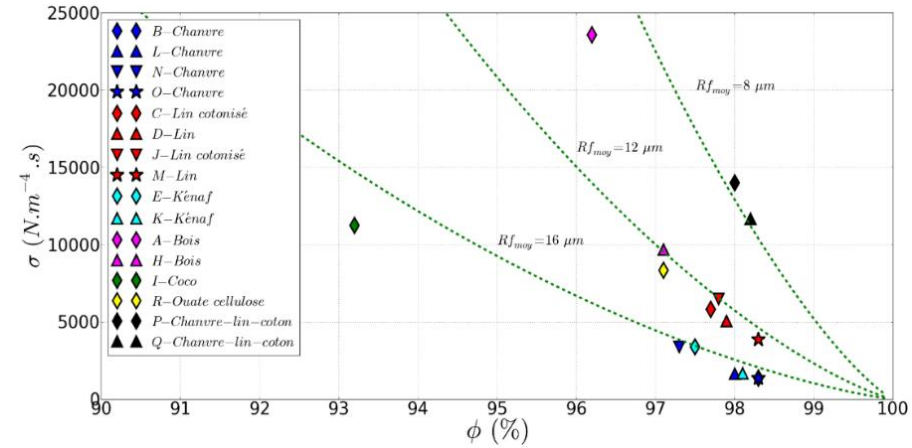


Flammability test

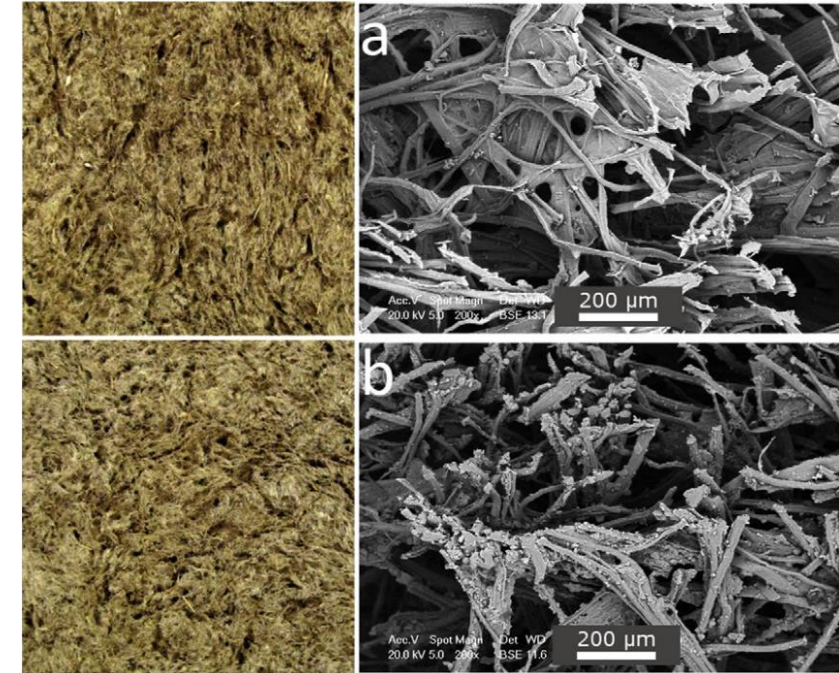
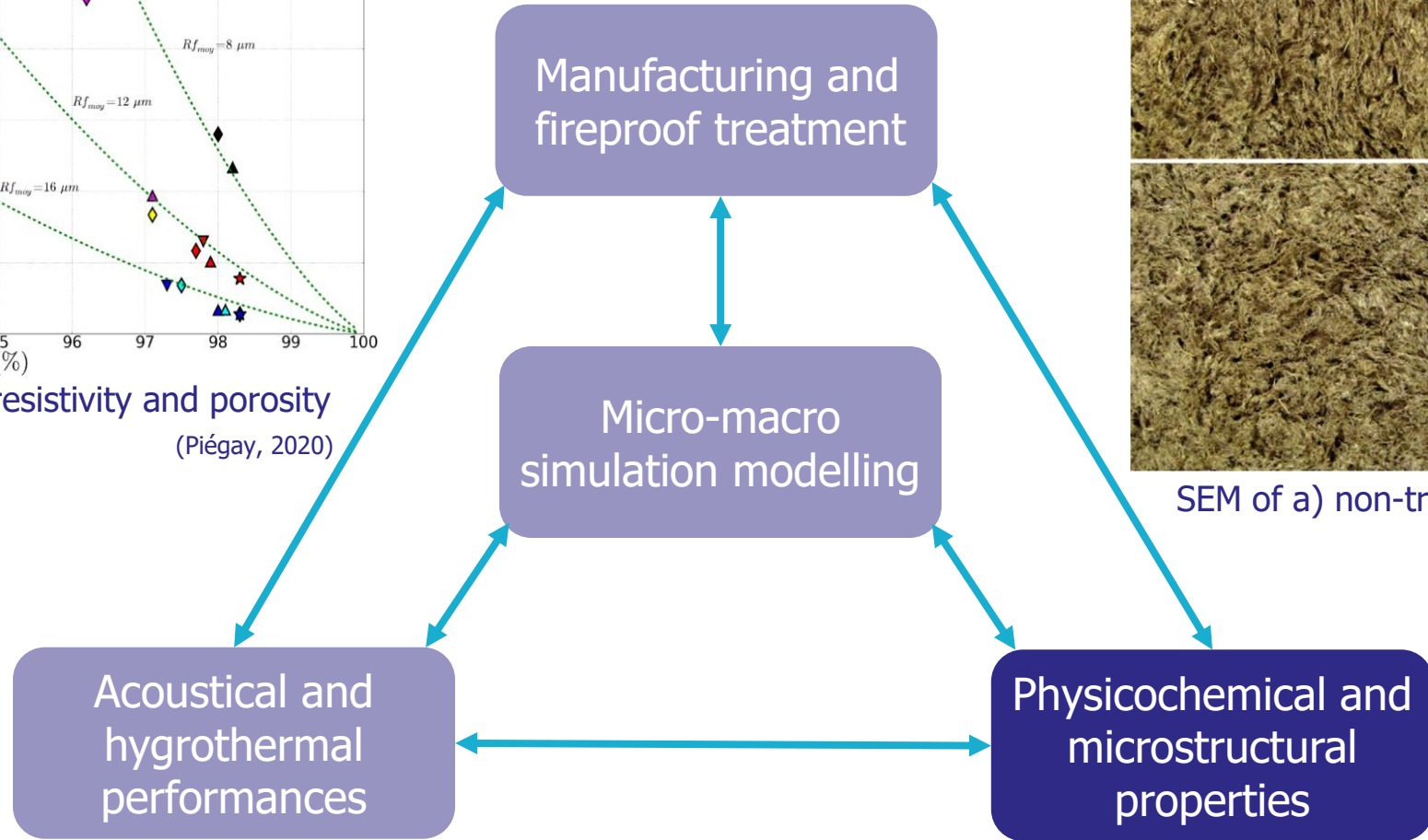




# METHODOLOGY



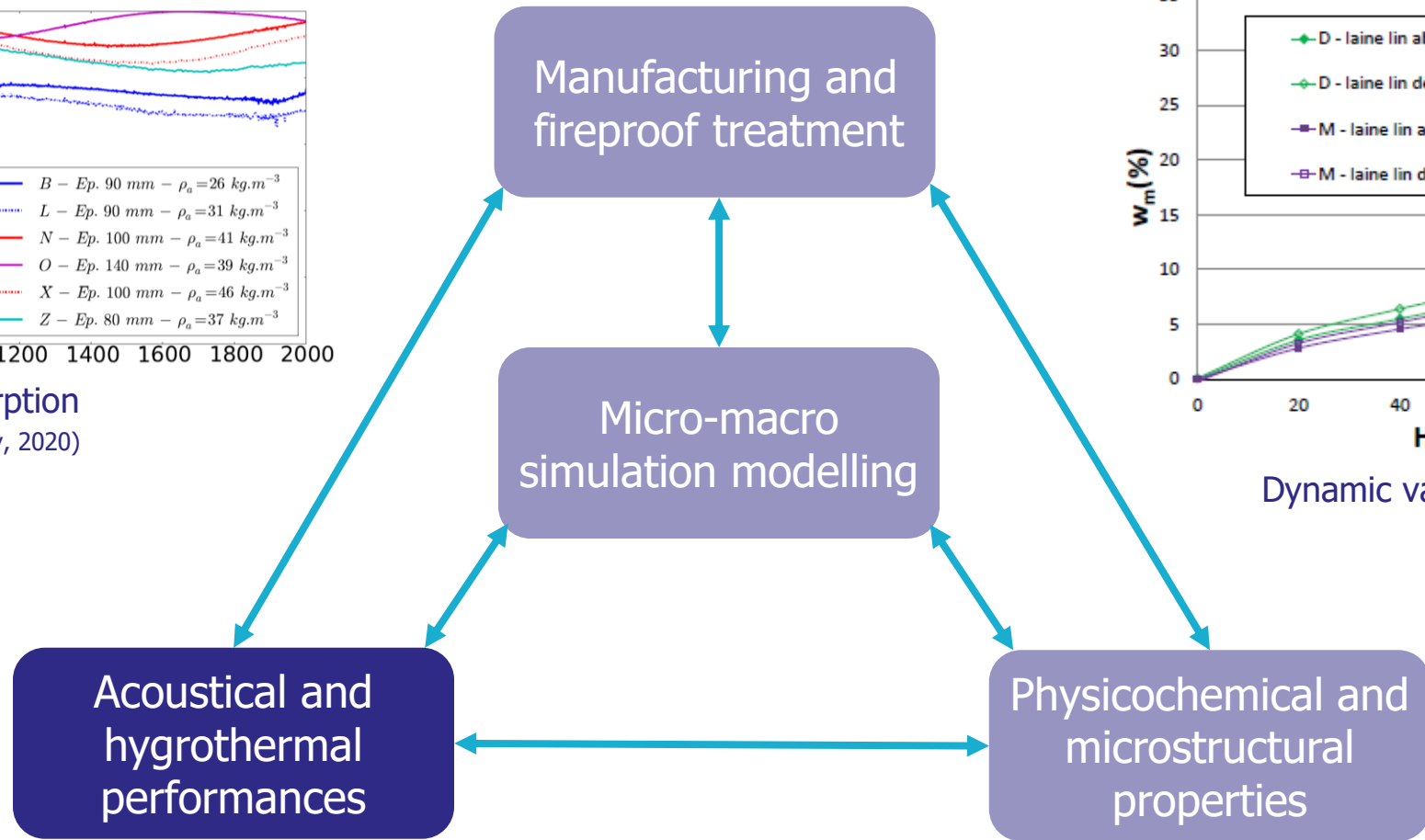
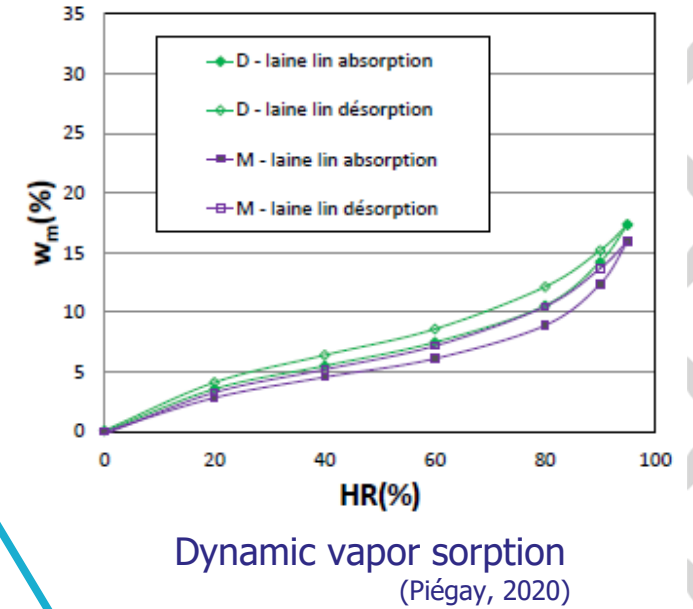
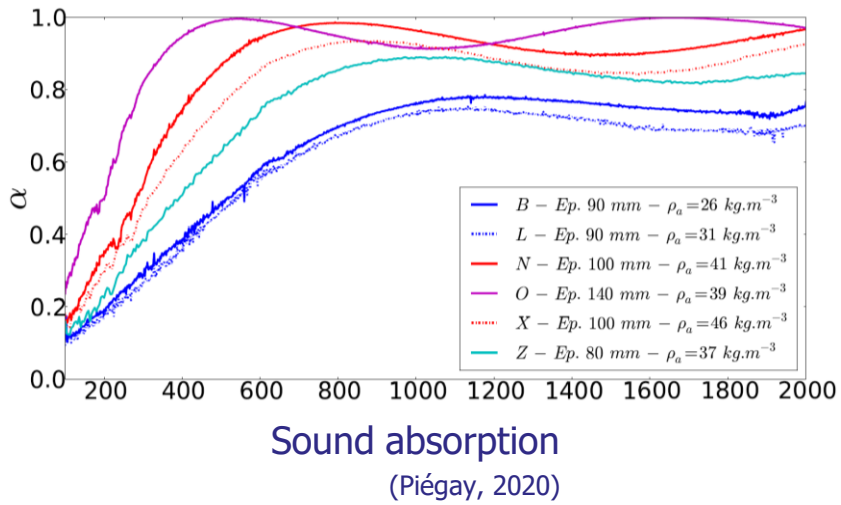
Relationship between air resistivity and porosity  
(Piégay, 2020)



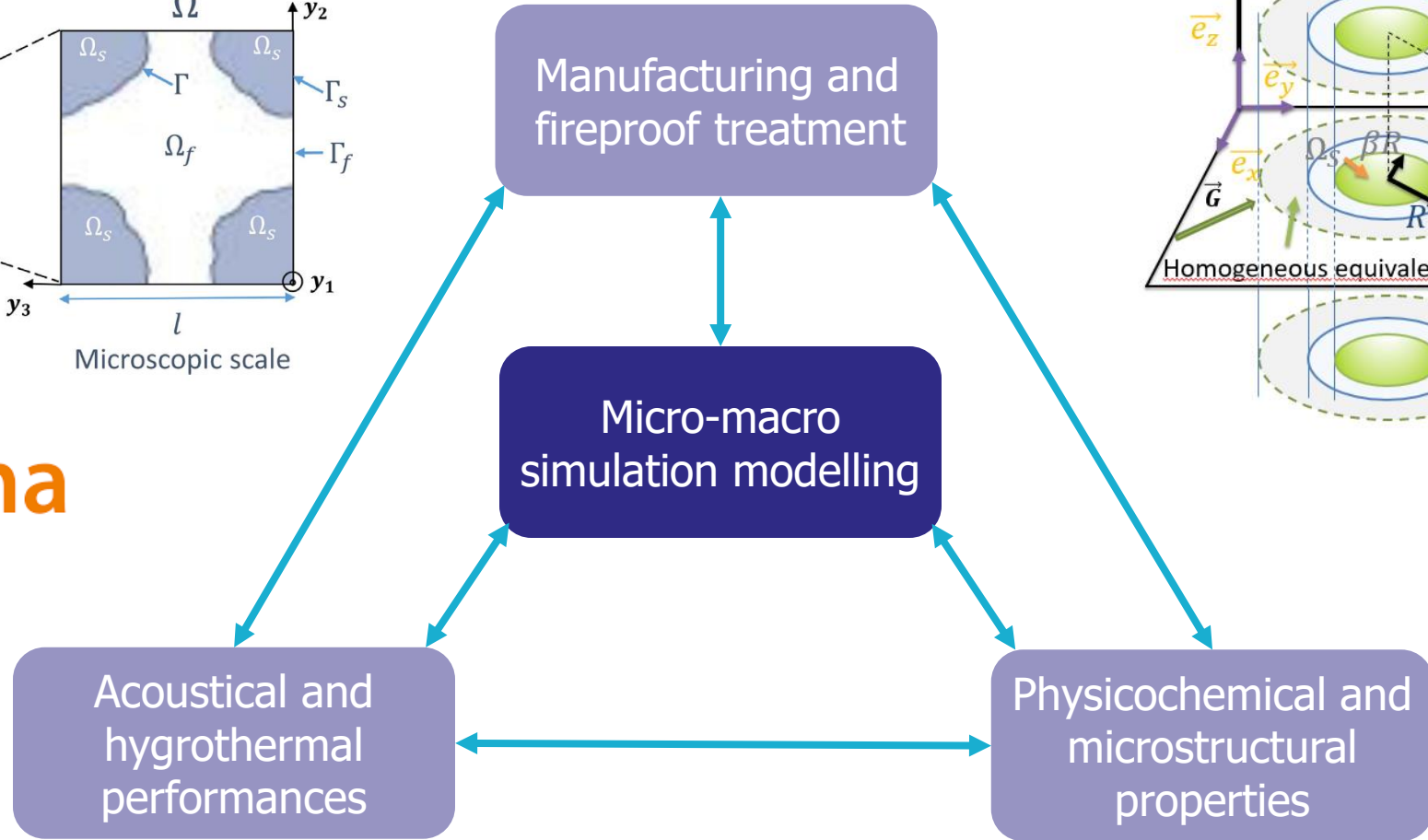
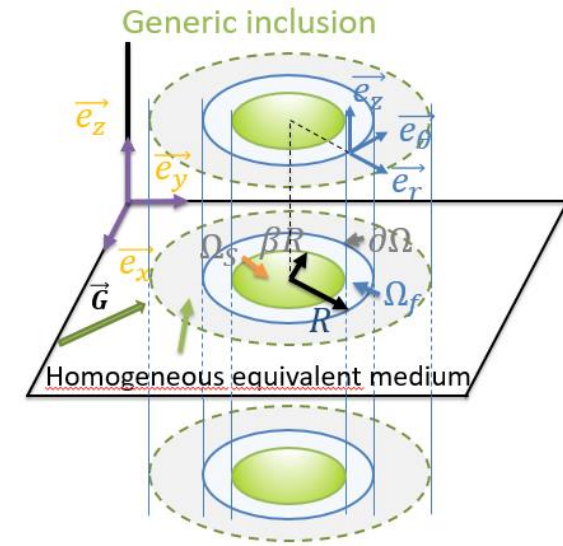
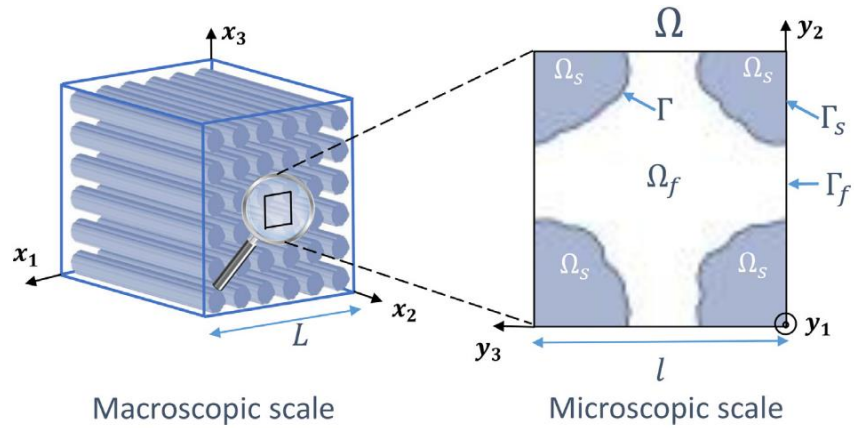
SEM of a) non-treated flax fibers; b) treated flax fibers

(Lazko *et al.* 2013)

# METHODOLOGY



# METHODOLOGY





# ORGANIZATION OF THE THESIS

## Supervision

### **S. Marceau**

Physicochemical and microstructural characterization

### **C. Piégay**

Acoustic and thermal performances

### **E. Gourdon**

Acoustic performances

### **P. Glé**

Acoustic performances

## Partners

### **CEREMA**

Thermal and acoustics modelling

### **CETELOR (Epinal)**

Vegetal wool manufacturing

### **Materia Nova (Mons, Belgium)**

Ignifugation treatments and fire resistance

### **CLEAR-Doc**

Funding institution