



# Development of an infra-red spectroscopy tool for ISPM 15 compliance test



68<sup>th</sup> FEFPEB CONGRESS  
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# A reminder of FEFPEB 2016 Brussels Congress

## DeCoNIMP15 Project Materials and methods

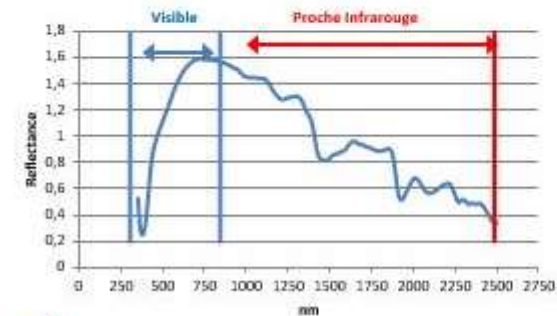
Some example of heat treatment conditions

- 20 min at 52° C on the wood
- 60 min behind 56° C on the wood with air temperature at 70° C
- 15 min at 56° C on the wood with air temperature at 60° C



## DeCoNIMP15 Project Materials and methods

- Near-Infrared Spectrometer
- LabSpec 4 design by ASD
- Optical fiber probe





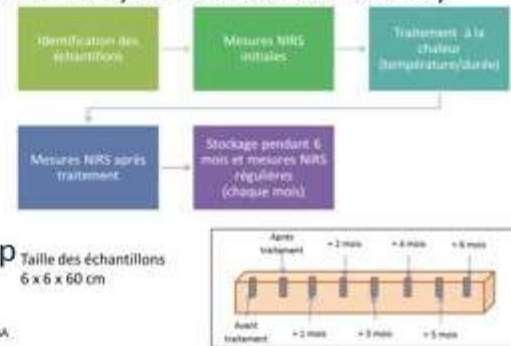
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## DeCoNIMP15 Project Materials and methods

- For each sample,
  - 1 measure before heat treatment and 1 just after treatment
  - 1 measure each month during half year with 3 different storages conditions (inside, outside, outside under cover)

→ 8 measurement points per sample with 3 repetitions for each point

→ 39600 spectrums per group



## DeCoNIMP15 project Results for softwood

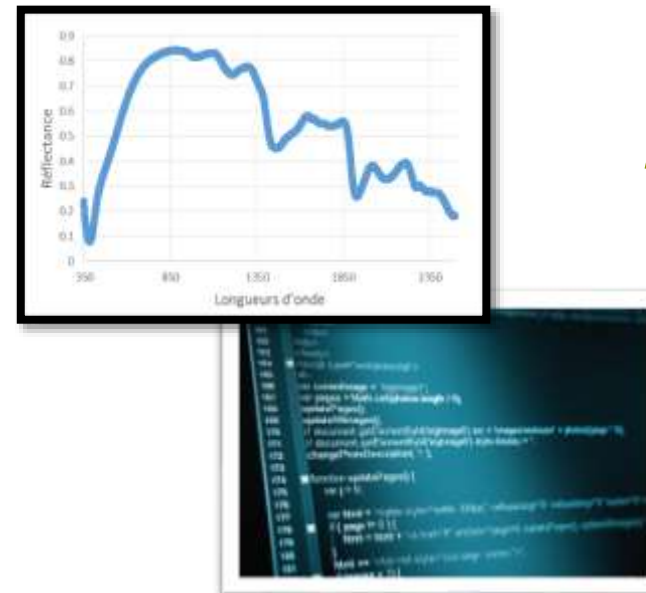
Analysis	Conform		Not conform		Not classified
	Detection	Reliability	Detection	Reliability	
Individual spectrum	83,8%	83,81%	76,98%	76,97%	--
2 spectrum with same answer per sample	88%	86%	80%	83%	2%
All spectrum with same answer per sample	94%	92%	88%	90%	36%

# Global approach adopted to validate the feasibility

Constitution of a near infra-red spectrum database thanks to a laboratory heat treatment on pine and poplar



Development of a prediction model based on the statistical analysis of this database



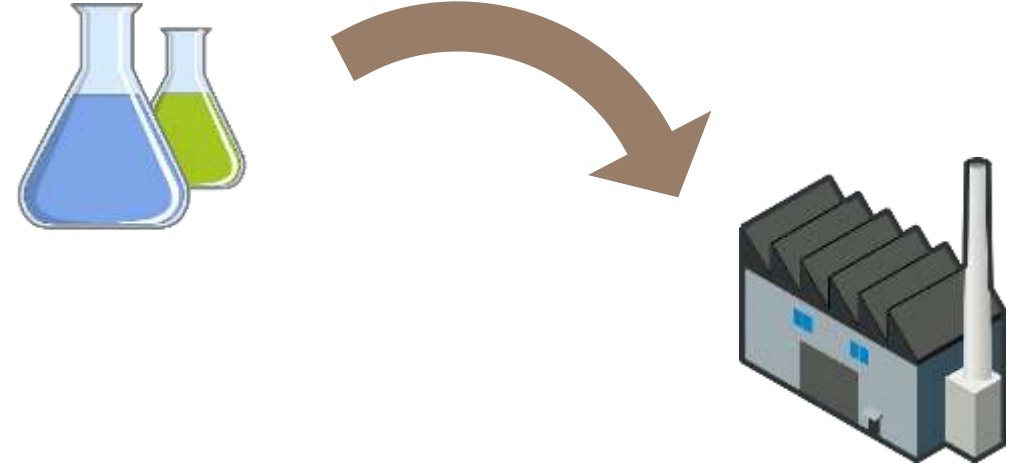
Test of the prediction model on industrial pallets treated in compliance, or not, with ISPM15



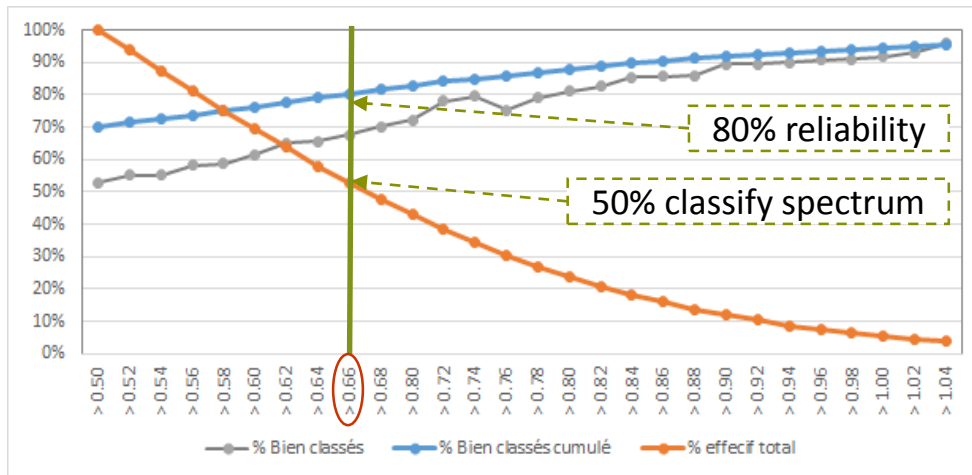
# Global approach adopted to validate the feasibility

## Laboratory results

		Pine	Poplar
By spectrum	Reliability	70%	80%
	% classify spectrum	50%	62%
With filter	Reliability	80%	90%



## Filter value



## Industrial results with laboratory model

		Pine	Poplar
By spectrum	Reliability	68%	63%
	% classify pallet	100%	50%
By pallet with filter	Reliability	72%	78%

# Global approach adopted to validate the feasibility

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**Feasibility ?**

**YES**

**One prediction model for all species?**

**NO: one model for each species (or group, like pine)**

**Transferability from a laboratory model to an industrial use?**

**NO: not reliable enough to enable an effective control**

# Next step: development of a usable tool

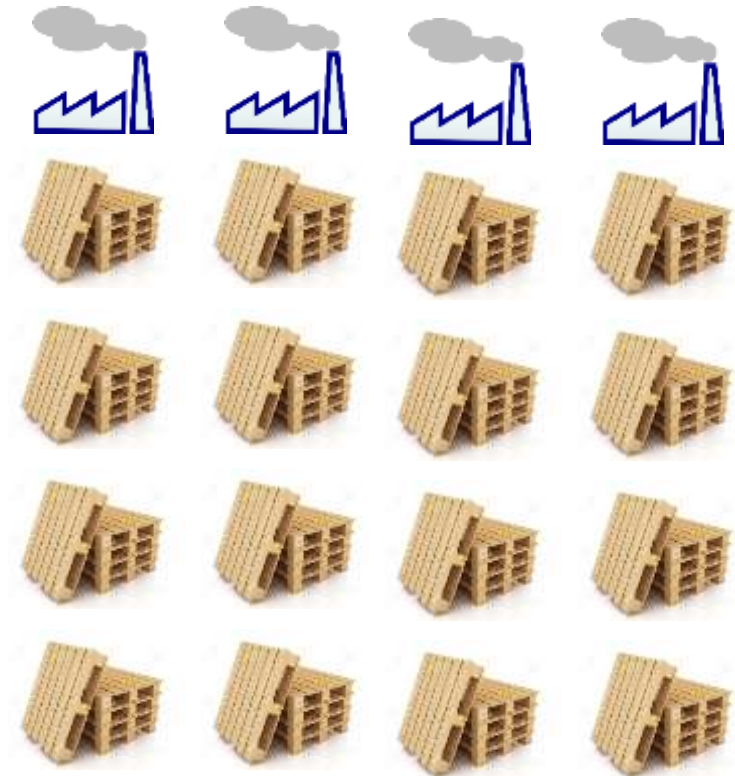
- ✓ Constitution of a spectrum database with industrially treated pallets
- ✓ Development of a prediction model based on this database
- ✓ Integration of prediction models into a software for instantaneous responses



What species?

		Sitka		Fir		Radiata pine
		Black pine				
Ash			Spruce		Poplar	
Eucalyptus		Beech				Larch
			Douglas			
		Oak				
		Alep pine				
						Maritime pine

What is needed to validate the prediction model for each species?



# Next step: development of a usable tool

- ✓ This project can become a European project
  - If you support it through the National and European federations
  - If the NPPO and EPPO support it to the European commission







# Thank you

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