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

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68th FEFPEB CONGRESS

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A reminder of FEFPEB 2016 Brussels Congress

DeCoNIMP15 Project
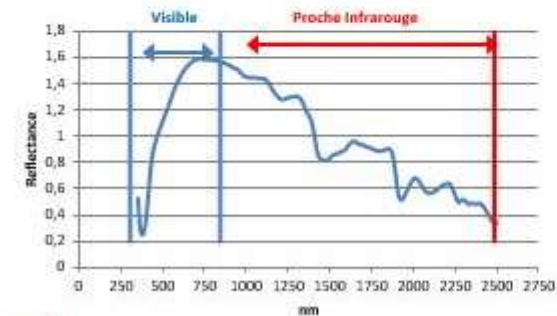**Materials and methods**

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

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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

Taille des échantillons 6 x 6 x 60 cm
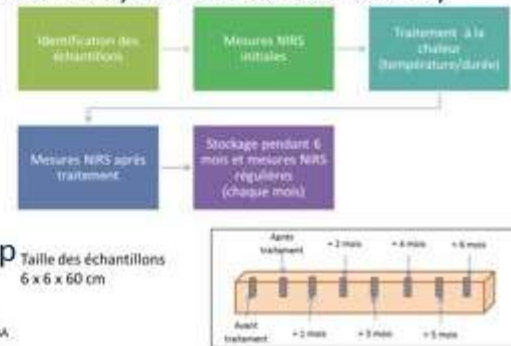
DeCoNIMP15 project
Results for softwood

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

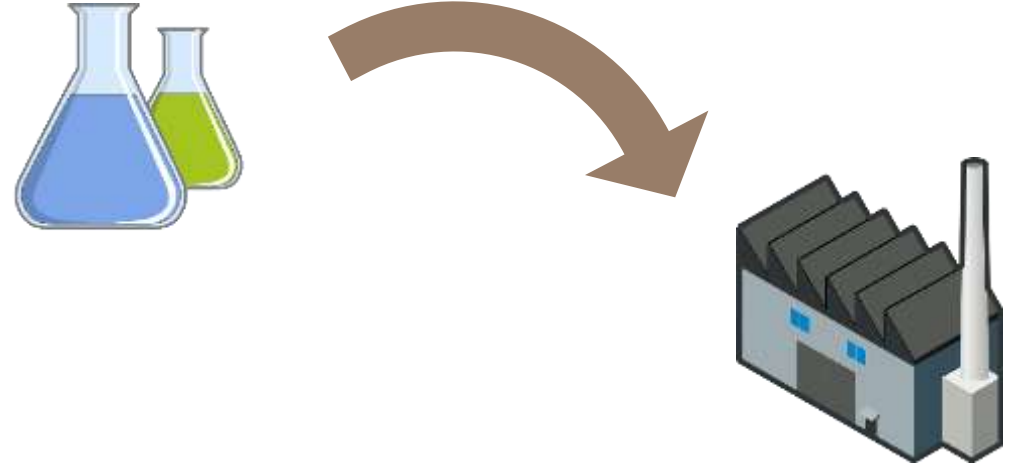Development of a prediction model based on the statistical analysis of this database
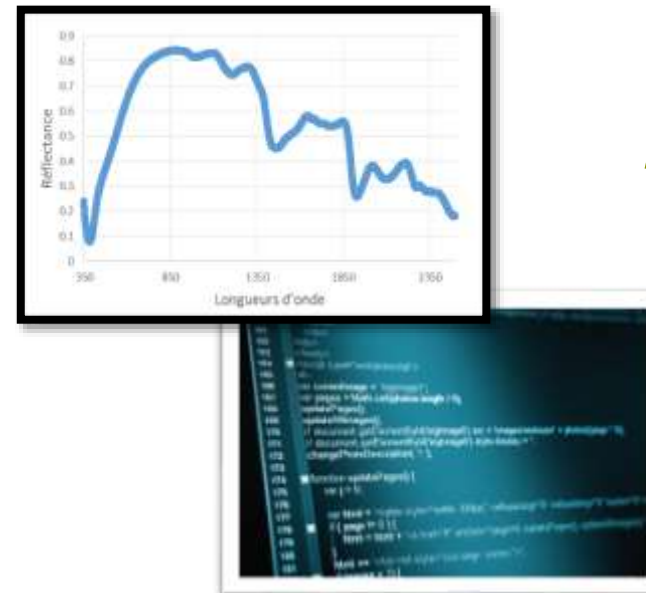
Test of the prediction model on industrial pallets treated in compliance, or not, with ISPM15
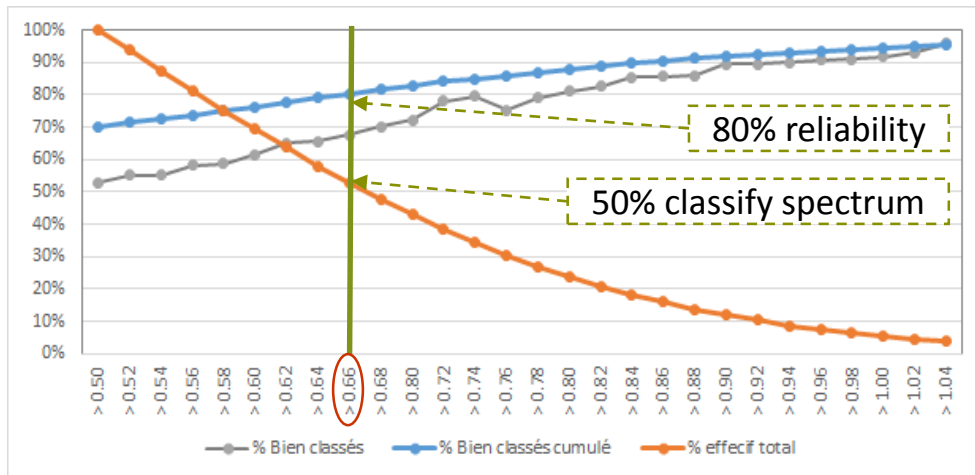
Global approach adopted to validate the feasibility

Laboratory results

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

Filter value

80% reliability

50% classify spectrum

% Bien classés   % Bien classés cumulé   % effecif total

Industrial results with laboratory model

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

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Global approach adopted to validate the feasibility

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**
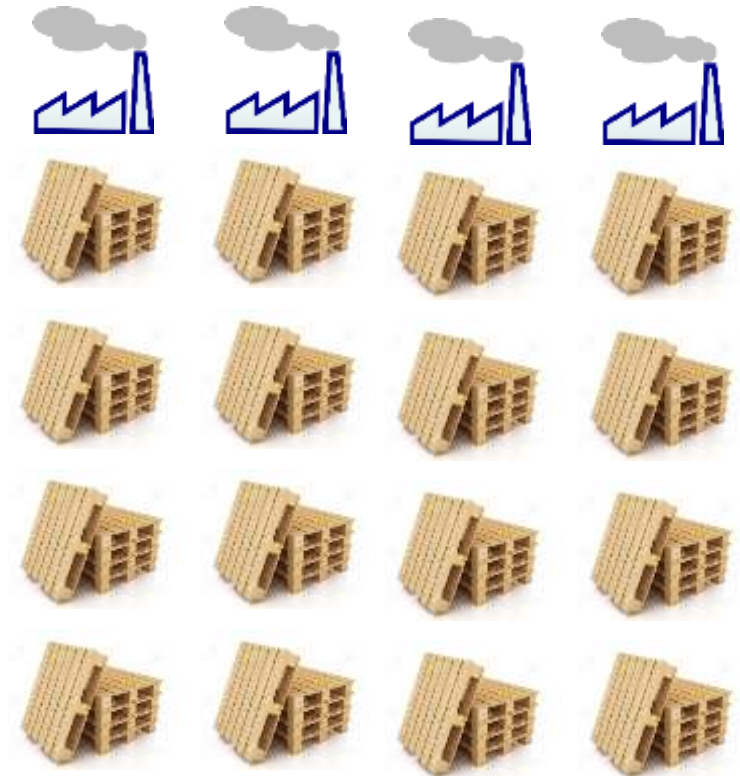
Next step: development of a usable tool

- ✓ **Constitution of a spectrum database with <u>industrially treated pallets</u>**
- ✓ **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

Poplar

Ash

Spruce

Eucalyptus

Beech

Larch

Douglas

Oak

Maritime pine

Alep 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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