Control and traceability of ISPM 15
Heat Treatment HT

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Since 2005, the ISPM15 is necessary for the wood packaging travel across the world.

No control tool exists to check wood packaging that enter to the territory.

Some manufacturers mark the wood packaging without heat treatment.

Some wood packagings with ISPM 15 mark have pest and represent a risk for the forestry.
DeCoNIMP15 project
Development of tool to control the ISPM 15 treatment

• The French Agriculture and Forestry Department ask FCBA (French Institute of Technology for Forest-based and Furniture sectors) to develop a portable control tool for wood packaging was mark ISPM15 (HT).

• Based on the Near Infra-Red Spectroscopy (NIRS) technology FCBA work on the development of prediction model based on NIR analysis spectrum to determine if the wood was correctly treated.
DeCoNIMP15 Project
Materiels and methods

• 2 groups of wood species
  – Softwood with Maritime pine, Radiata pine and scots pine
  – Poplar with 2 different clone (light and heavy)

• 3300 samples (6 x 6 x 60 cm) for 66 different heats treatments (50 samples per treatment)

• 3 variables for the treatment
  – Treatment temperature (55, 60 and 70°C)
  – Treatment time (15, 30, 60 and 120 min)
  – Gradient temperature rise (5, 7.5 and 10°C/h)
DeCoNIMP15 Project
Materiels and methods

Some exemple 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
Materiels and methods

- Near-Infrared Spectrometer
- LabSpec 4 design by ASD
- Optical fiber probe
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 repetition for each point
→ 39600 spectrums per group
DeCoNIMP15 project
Results for softwood

The question is:
The wood will be treated accordingly with ISPM15 or not?

Prediction models based on NIRS
How old are the treatment?
(Which sepcies we have?)
The Treatment is Conform or not?
## DeCoNIMP15 project
### Results for softwood

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Conform</th>
<th></th>
<th>Not conform</th>
<th></th>
<th>Not classified</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Detection</td>
<td>Reliability</td>
<td>Detection</td>
<td>Reliability</td>
<td></td>
</tr>
<tr>
<td>Individual spectrum</td>
<td>83,8%</td>
<td>83,81%</td>
<td>76,98%</td>
<td>76,97%</td>
<td>--</td>
</tr>
<tr>
<td>2 spectrum with same answer per sample</td>
<td>88%</td>
<td>86%</td>
<td>80%</td>
<td>83%</td>
<td>2%</td>
</tr>
<tr>
<td>All spectrum with same answer per sample</td>
<td>94%</td>
<td>92%</td>
<td>88%</td>
<td>90%</td>
<td>36%</td>
</tr>
</tbody>
</table>
DeCoNIMP15 Project

What else?

• End of project in april 2017

• New project to continu:
  – Other species of wood (beech, fir, oak...)
  – Validate the current results on softwood and poplar with different geographical origin.
  – Which element choose to control pallet?