

Mould resistance of insulation boards made from tropical wood fibre residues

CANDELIER Kévin, DAMAY Jérémie, HALTER Claudia, LEHNEBACH Romain, AUDOUIN Marie, VIGNON Pierre, COUREAU Jean-Luc, DAY Arnaud, BOSSU Julie



julie.bossu@cnrs.fr
kevin.candelier@cirad.fr



HEat insulating PANels produced from the valorisation of Residual wood Resources in French Guiana

Formulations & Process

Ressources

Wood residuals

Dicorynia guianensis (Dg)
Sextonia rubra (Sr)
Lecythis persistens (Lp)

Plantations species

Bagassa guianensis (Bg)
Simarouba amara (Sa)

Fast growing species

Cecropia obtusa (Co)
Virola michelii (Vm)

Composition

93 %

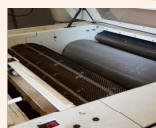
Wood fibres
[0.1 to 1 mm]



Polypropylene / low density
polyethylene
[6 mm - long]

7 %

Process



Laroche ® napper opener

Rotating spiked roller for carding and air-stream opener

Wood / Synthetic fibers mixture mat

Consolidation by hot-pressing

Mould resistance - Test Methods

[ASTM D3273-00 (2005), with some adaptations]

Aspergillus terreus Thom (1918)



γ-rays (25-50 kGy)
sterilization



Aspergillus terreus spore
suspension diluted in
distilled water
(2 Petri dishes / 400 mL)



Spraying of 2 mL of
Aspergillus terreus spore
suspension



Incubation on a malt-agar
culture medium
6 weeks, in the dark, at
27 ± 2 °C - RH > 75 %

Weekly evaluation and estimation of the mold growing + water spraying

After 6 weeks:

- Visual rating assignment to the samples, according to ASTM D3273-00 (2005).
- Determination of the Moisture Content of the samples.

Rating score	Criteria from ASTM D3273-00 (2005)	Interpretation
0	No visible mould/discolouration	Resistant to mould infestation
1	Some traces of mould visible only microscopically	
2	Mould/discolouration on a maximum of 25% of the total surface area	Moderate sensitivity to mould infestation
3	Mould/discolouration on between 25% and 50% of the total surface area	Sensitive to mould infestation
4	Mould/discolouration on more than 50% of the total surface area	

Mould resistance - Results



Reference	Final Moisture Content (%)	<i>Aspergillus terreus</i>		
		Classification number for mould growth, according to ASTM D3273-00 (2005) standard criteria	Comments	Visual appearance
Dg	44.4 ± 1.6	2	Moderate sensitivity to mold infestation	
Sr	48.5 ± 1.5	2	Moderate sensitivity to mold infestation	
Lp	39.8 ± 3.3	1	Resistant to mold infestation	
Lp-bark	44.1 ± 3.4	2	Moderate sensitivity to mold infestation	
Bg-bark	55.7 ± 9.5	4	Sensitive to mold infestation	
Sa	78.8 ± 9.4	4	Sensitive to mold infestation	
Co	68.3 ± 6.4	4	Sensitive to mold infestation	
Co-bark	61.2 ± 6.4	4	Sensitive to mold infestation	
Vm	45.8 ± 7.9	4	Sensitive to mold infestation	
Vm-bark	60.1 ± 0.7	4	Sensitive to mold infestation	
Pine-control	35.0 ± 3.0	4	Sensitive to mold infestation	
Beech-control	46.1 ± 7.0	4	Sensitive to mold infestation	
Commercial	129.8 ± 3.6	4	Sensitive to mold infestation	

- Hemicellulose/lignin ratio and extractive content have an important effect on final moisture content and the resulting mold sensitivity.
- Mould colonization is clearly favored by a high amount of hemicellulose.
- Extractives and volatiles act as antifungals, especially in tests carried out in closed glass bottles.

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