

Accepted Manuscript

Title: Sodium alginate adhesives as binders in wood fibers/textile waste fibers biocomposites for building insulation

Authors: Clément Lacoste, Roland El Hage, Anne Bergeret, Stéphane Corn, Patrick Lacroix



PII: S0144-8617(17)31424-8
DOI: <https://doi.org/10.1016/j.carbpol.2017.12.019>
Reference: CARP 13081

To appear in:

Received date: 6-9-2017
Revised date: 10-11-2017
Accepted date: 10-12-2017

Please cite this article as: Lacoste C, Hage RE, Bergeret A, Corn S, Lacroix P, Sodium alginate adhesives as binders in wood fibers/textile waste fibers biocomposites for building insulation, *Carbohydrate Polymers* (2010), <https://doi.org/10.1016/j.carbpol.2017.12.019>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Sodium alginate adhesives as binders in wood fibers/textile waste fibers biocomposites for building insulation

Clément Lacoste^{a*}, Roland El Hage^b, Anne Bergeret^a, Stéphane Corn^a, Patrick Lacroix^c

^a Centre des Matériaux des Mines d'Alès (C2MA), Ecole des Mines d'Alès, 6 Avenue de Clavières, F-30119 Alès Cedex, France

^b Laboratoire de Chimie-Physique des Matériaux (LCPM), Université Libanaise, Faculté des Sciences II, Fanar, Lebanon

^c Greenpile, 30 rue Pierre Brasseur, 77100 Meaux, France

*Corresponding author: Tel. +33 466 785 344; e-mail address: clement.lacoste@mines-ales.fr

HIGHLIGHTS

- Fibers reinforced composite with sodium alginate binder were prepared for the first time
- Wood fibers and recycled cotton fibers were mixed in various proportion to manufacture composites with different softness
- Addition of crosslinkers in the sodium alginate matrix provides more rigid composites
- These new biocomposites have low thermal conductivity, high thermal capacity and medium bending and compressive strength

Abstract: Alginate derived from seaweed is a natural polysaccharide able to form stable gel through carbohydrate functional groups largely used in the food and pharmaceutical industry. This article deals with the use of sodium alginate as an adhesive binder for wood fibres/textile waste fibres biocomposites. Several aldehyde-based crosslinking agents (glyoxal, glutaraldehyde) were compared for various wood/textile waste ratios (100/0, 50/50, 60/40, 70/30 and 0/100 in weight). The fully biomass derived composites whose properties are herewith described satisfy most of the appropriate requirements for building materials. They are insulating with a thermal conductivity in the range 0.078-0.089 W/m/K for an average density in the range 308-333 kg/m³ according to the biocomposite considered. They are semi-rigid with a maximal mechanical strength of 0.84 MPa under bending and 0.44 MPa under compression for 60/40 w/w wood/textile waste biocomposites with a glutaraldehyde crosslinking agent.

Download English Version:

<https://daneshyari.com/en/article/7783802>

Download Persian Version:

<https://daneshyari.com/article/7783802>

[Daneshyari.com](https://daneshyari.com)