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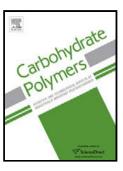
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ACCEPTED MANUSCRIPT

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

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HIGHLIGHTS

- Fibers reinforced composite with sodium alginate binder were prepared for the first time
- Wood fibers and reclycled cotton fibers where 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 strenght

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.

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