



NONCONVENTIONAL COMPOSITE MATERIALS BASED ON AGRO-INDUSTRY BYPRODUCTS FOR HOUSING APPLICATIONS

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Abstract: The agro-industry residues represent interesting resources for building materials in the present context of the growing demand for housing in the next decades and the strong concerns for sustainability. Amongst the different potential applications of these residues, two are considered in this study: 1) fabrication of particleboards, and 2) composites made with inorganic matrix reinforced by vegetable fiber. For any material including vegetable resources, the treatment of the fiber is a fundamental question for the composite characteristics and durability. For particleboards made with sugarcane bagasse and coir fiber (as well as other agricultural byproducts), evaluation of the durability and performance of particleboard exposed to natural and accelerated aging is considered a crucial topic. The best performance after aging was achieved by those panels protected with a coating of natural resins. For inorganic matrix/vegetable fiber composites, the three main aspects are considered: 1) thermal and mechanical (nanofibrillation) treatment for the fibers, 2) matrix modification (using agroindustrial wastes, e.g.) or appropriate curing procedures and 3) composite performance and durability. Degradation is crucial for the evaluation of the durability of the resulting materials and components in real applications exposed to different environmental conditions as roofing, partitioning or ceiling elements. More sustainable and high performance components based on engineered natural raw materials for civil construction can bring new contributions for the affordable housing in the near future.

Keywords: nonconventional materials, fiber reinforced composites, agroindustry residues, eco-friendly construction, sustainable buildings.