

Fabrication of Medium Density Fibreboard From Enzyme Treated Rubber Wood (*Hevea Brasiliensis*) Fibre and Modified Organosolv Lignin

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ABSTRACT

Lignin is considered as a potential substitute for formaldehyde based adhesive due to its phenolic based composition and huge availability. In the present work, rubber wood fibres were treated with the laccase enzyme to improve the fibre surface and to generate an active lignin solution. Lignin solution was collected from wood fibres. The collected solution, called organosolv lignin (OSL), was concentrated until the solution had reached 3% solid content. Treated fibre OSL and concentrated OSL (Con-OSL) solution was analysed using FTIR. Con-OSL showed a lower stretching energy in the benzene range as compared to OSL that indicates polymerisation during heating. The X-ray diffraction reveals 9% increase in the crystallinity index (CrI) as compared to the untreated fibres. Differential scanning calorimetry (DSC) results confirmed that curing pattern of OSL was similar to the UF adhesive. Medium density fibreboards (MDF) of 6 mm and 810 kg/m³ were prepared from a 10% Con-OSL solution. The MDF boards exhibited higher mechanical strength and passed the standard ASTM D1037 for internal bonding and modulus of rupture.

KEYWORDS: Crystallinity index; Differential scanning calorimetry; Urea formaldehyde; Fourier transform infrared

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