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Isolation and Characterization of Soda Lignin from OPEFB and Evaluation of its Performance as Wood Adhesive

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Abstract

The purpose of this study was to explore the mechanical properties of plywood panels that had been bound with lignin-phenol formaldehyde (LPF) resin. To do this lignin was extracted from oil palm empty fruit bunch (OPEFB) fiber by soda pulping method, and characterized by FT-IR, [1]HNMR, and TGA analysis. Then, various compositions of soda lignin (10-50 wt %) was used as phenol substitute in lignin-based phenol-formaldehyde (PF) resin synthesis. The characteristics of the synthesized resin were compared to the properties of PF resin. Plywood was fabricated with LPF and its mechanical properties were studied and evaluated using industry standards. Increasing the substitution of phenol with soda lignin up to 40%, improves the mechanical properties of plywood. This research demonstrated that the lignin is used as a renewable replacement of phenol in PF resin synthesis.

Keywords: Soda lignin; Lignin phenol formaldehyde resin; Plywood performance; Formaldehyde emission; Tensile strength.