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Characterization of dioxane-based and soda-based extraction of lignin from oil palm empty fruit bunches as reinforcement in polylactic acid bio-composite

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Abstract

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Abstract

The study aims to compare the lignin extraction methods of OPEFB using different solvents; soda and dioxane solvent, and the reinforcement effects in polylactic acid (PLA) bio-composite. Different extraction method has been found to produce lignin with different properties and purity. The extraction yield also highly dependent on the types of solvents used in extraction process. Soda

treatment had shown a good removal of lignin with 17.4 % of extraction yield, but only 8.08 % for dioxane treatment. In contrast, lower soda lignin content was observed compared to dioxane lignin with 89.65 % and 62.04 % respectively, suggesting lower purity of lignin obtained using soda treatment. Consequently, better performance was shown by PLA/ dioxane lignin compared to PLA/soda lignin. Better interfacial bond of higher purity dioxane lignin had increased around 48 % and 38 % for tensile modulus and tensile strength as opposed to only 25 % and 29 % for PLA-soda lignin film. © 2022 Elsevier Ltd

Author keywords

Biomass waste; Dioxane lignin; Oil palm empty fruit bunch; Polylactic acid (PLA); Soda lignin

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