

New EFB refining system using structural units of EFB lignin

ABSTRACT

In order to achieve sustainable conversion of lignocellulosics through the phase-separation process, p-hydroxybenzoic acid (p-HBA) attached to core lignin through ester linkage was used as a reagent for lignin conversion. During the phase-separation treatment with p-HBA, the viscosity of reaction mixture was higher, compared with the phase-separation treatment with p-cresol. By centrifugation of the reaction mixture, the thick interfacial solid materials were formed. The yields of lignophenol, its low molecular weight fraction (separated to the organic layer) and the interfacial solid fraction were about 30%, 30% and 40%, respectively. In case of phase-separation treatment with p-cresol, the yields of lignophenol and its low molecular weight fraction (separated to the organic layer) were about 73% and 27%, respectively. The peak ratio of phenol to guaiacol plus syringol in the pyrogram of lignophenol (p-HBA type) was higher than those of lignophenol (p-cresol type) and Klason lignin. The peak of non-conjugated carbonyl group in the FT-IR spectrum of lignophenol (p-HBA type) was higher than that of the material synthesized without p-HBA. These results indicated that p-HBA was grafted to EFB lignin. The lignophenol (p-HBA type) had higher thermal stability, compared with lignophenols (p-Cresol type). The interfacial solid material between the organic and aqueous layers had higher thermal stability than sulfuric acid lignin. These results suggest the formation of lignin network through p-HBA.

Keyword: Oil palm; EFB (empty fruit bunch); Phase-separation system; Lignophenol; Resource circulation