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Properties of medium density fiberboard (MDF) based on Napier grass fiber

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In this study, Napier grass fiber was used for medium density fiberboard (MDF) manufacturing. The purpose of this work was to examine the effects of sodium hydroxide (NaOH) solution as an alkali pretreatment and ozone exposure in determining the best condition for lignin removal in Napier stem. The treatments were conducted using NaOH concentrations of 0.5, 3.0, 5.5, 8.0, 10.0 and 10.5 wt.%. Then, ozonolysis process was carried out on the pretreated Napier grass fiber from the greatest condition in alkali pretreatment stage with ozone flow rate at 5 liters per minute for 30 minutes. The effect of alkali pretreatment with or without ozone flow on the tensile and flexural properties and morphology of the fibers were investigated. The morphology of the fibers was observed using scanning electron microscope. To fabricate the Napier MDF boards, Napier grass fiber (treated and untreated) and urea formaldehyde resin were used as the reinforcing material and MDF matrix, respectively. The tensile and flexural properties of the Napier MDF boards were studied. This study showed that all the MDF panels made from Napier fibers treated with NaOH at 10.0 wt.% and ozone yielded the highest strength among the other types of panels for general purpose boards. In addition, this study showed that the best condition for the removal of lignin in Napier grass was 10 wt.% NaOH solutions with ozone contact.

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