UNIVERSITI TEKNOLOGI MARA

PROPERTIES OF HIGH DENSITY FIBREBOARD (HDF) FROM *LEUCAENA* AND RUBBERWOOD

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ABSTRACT

Rubber plantation is one of the popular plantations in Malaysia since last decade. However, rubber plantation has become less popular and plantation owners more intrested with oil palm plantation. This phenomena give affect to wood manufacturers in Malaysia because rubberwood is one of their main material. Introduction of fast growing species such as *Leucaena leucocephala* to mix with rubberwood as alternative matrial is very important to make sure enough feed stock to the industry. The main objective of the study is to determine the physical and mechanical properties of high density fibreboard (HDF) from *Leucaena leucocephala* and rubberwood. Meanwhile, physical properties, chemical properties and fibre morphology of *Leucaena leucocephala* had been studied. In manufacturing of high density fibreboard (HDF), *Leucaena leucocephala* wood and rubberwood were used as a wood material and urea melamine formaldehyde (UMF) resins as a binder. This study involved three factors of age, ratio and resin content. Quality of the boards were evaluated by determining the bending properties (modulus of elasticity and modulus of rupture), internal bond (IB) strength and thickness swelling (TS). Test specimen preparation and evaluation of the board were carried out according to Japanese Standard (JIS A 5905: 2003). From this study, the statistical analysis revealed that age was found to significantly affect on physical properties of wood. Fibre morphology indicated that, the fibre length and slenderness ratio had positive significant correlation with age. In the chemical analysis of *Leucaena leucocephala,* age was found to affect ash content. In the manufacture of HDF, age of *Leucaena* tree was found to affect MOR and IB only. While, factor of ratio were found not affect all the properties of HDF. The physical properties of HDF were found to be significantly affected by resin content with increase of resin content from 15% to 20%. Increased in the ratio of *Leucaena* wood had contributed to better mechanical properties of HDF. Two variables show a better result with three year old *Leucaena* and 20% UMF resin dosage. This study had proven that it is suitable to used *Leucaena leucocephala* wood and technically possible to use a short rotation *Leucaena leucocephala* for the manufacturing of HDF which meet the minimum requirement Japanese standard for mechanical properties. Meanwhile, correlations of physical, chemical properties and fibre morphology of *Leucaena* wood had show less association with the board properties.

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