UNIVERSITI TEKNOLOGI MARA

MECHANICAL AND PHYSICAL PROPERTIES OF RECONSTITUTED BOARD FROM RICE HUSK

NUR AFIDAH ABU BAKAR

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ABSTRACT

The potential of agricultural residue as raw material in particleboard manufacturing industry is globally investigated. This study is an attempt to evaluate the possibility of producing particleboard from rice husk, an abundant source from rice milling industry. Several chemical analyses were conducted including ash, lignin, holocellulose, alpha-cellulose, alkali solubility and alcohol toluene solubility. From the experiment, rice husk determined to have large amount of ash content (15.06%). Particleboards were produced by mixing rice husk with a commercial binder called urea formaldehyde (UF) at three different density levels namely as 650 kg/m^3, 700 kg/m^3 and 750 kg/m^3. Two levels of resin content (10% and 12%) and two different particle sizes (0.5 mm and 1.0 mm) were employed. The mechanical and physical tests were performed on the boards conforming to the European Standard (EN 310:1996, EN 317:1996 and EN 319:1996). Board from 1.0 mm particle size provided the highest value of modulus of elasticity (MOE) (1823.04 MPa) and modulus of rupture (MOR) (8.26 MPa) at 750 kg/m^3 density level with 12% resin content. Highest performance of internal bond strength (IB), water absorption (WA) and thickness swelling (TS) were obtained from the smaller particle size was 0.83 MPa, 46.69% and 19.26%, respectively. This study revealed that most boards were not able to satisfy the minimum requirement by European Standard (EN 312-3:1993). Rice husk board still has the potential to be applied as specific end usage and further study needed to enhance the performance.

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