

**PROPERTIES OF HYBRID PARTICLEBOARD PRODUCE FROM
ACACIA AND LUDAI**

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ABSTRACT

PROPERTIES OF HYBRID PARTICLEBOARD PRODUCE FROM ACACIA AND LUDAI

The study evaluated the physical and mechanical properties of a hybrid particleboard produced from admixture of Acacia and Ludai with different particle ratio and different particle sizes. Currently, raw material supply for particleboard manufacturing is decreasing and limited in resources. Various studies regarding alternative raw material had been done. The objective of this study is to determine the physical and mechanical properties of board regarding the effect of particle ratio and particle sizes toward the particleboards produce from Acacia and Ludai and to identify the potential of Ludai and Acacia as alternative raw material in particleboard industry. The hybrid boards were manufactured with two different percentage of ratio which are 70:30 (70% Ludai and 30% Acacia) and 50:50 (50% Ludai and 50% Acacia). Particleboard from 100% Ludai and 100% Acacia also had been produced in order to determine the potential of the species itself as raw material in particleboard industry. All boards were manufactured with three different particle sizes which are 0.5mm, 1.0mm and 2.0mm. The target density of this hybrid particleboard is 600kg/m^3 with applied 8% of Melamine Urea Formaldehyde (MUF). The board quality was evaluated by determining bending properties of the board including modulus of rupture (MOR), modulus of Elasticity (MOE), internal bonding (IB) strength, thickness swelling (TS), and water absorption (WA) based on MS1036:2006. The results show that the mechanical strength (MOE, MOR, IB) increase with decreasing in admixture of Ludai species. The mechanical strength also increases due to increasing in particle size. The highest value for MOE and IB results was obtained from particleboard with ratio 50:50 which are 1737MPa and 3.38MPa respectively. Particleboard with 2.0mm particle sizes has the highest value for MOE (1980 MPa) and IB (2.93 MPa). The objective of identifying the potential of Ludai and Acacia particles as raw material replacement in particleboard industry had been observed. Ludai is suitable for raw material replacement with ratio of 50% Ludai and 50% Acacia as it is the most optimum to produce comparable MOE, MOR, and IB strength. While Acacia particles is most suitable for raw material replacement as it had been used as commercial timber due to its strength.