

## Fire Propagation and Strength Performance of Fire Retardant-Treated Hibiscus cannabinus Particleboard.

### ABSTRACT

The fire propagation and strength performance of kenaf (*Hibiscus cannabinus*) core particle board treated with three different commercialized fire retardants were studied using ten percent concentration of fire retardants. The fire propagation test was evaluated using performance index (I), which indicates the heat release of the tested particle boards. Physical and mechanical properties such as water absorption, thickness swelling, Modulus of Rupture (MOR), Modulus of Elasticity (MOE) and Internal Bond (IB) of the treated and untreated boards were also studied. The study showed that diammonium phosphate (DAP) was excellent in reducing the heat release of the boards followed by monoammonium phosphate (MAP) and BPÂ® [mixture of 27-33% boric acid, 67-73% guanylurea phosphate and 0.0-4.2% phosphoric acid]. DAP and MAP were able to delay the maximum early heat release of the boards by about 15 to 16 min and 18 to 20 min, respectively compared to BPÂ® which was only able to delay the maximum early heat release by about 10 to 15 min after ignition. The heat release of the DAP and MAP-treated particle boards started 5 min after ignition, but the heat release of the BPÂ®-treated boards started from the beginning of the test. Boards treated with DAP were found comply with the standard ratings for thickness swelling and water absorption test. MAP-treated boards were found comply with the standard rating for MOR and were found to be the best compared to the other treated boards for MOE and IB. However, treated boards complied with the standard ratings of MOE and IB.

**Keyword:** Kenaf, fire retardants, fire propagation, physical and mechanical