Physical and Mechanical Properties of Flame Retardant-Treated Hibiscus Cannabinus Particleboard

ABSTRACT

Physical and mechanical properties of flame retardant-treated kenaf particleboards were studied using physical tests such as water absorption, thickness swelling and mechanical tests such as modulus of rupture (MOR), modulus of elasticity (MOE) and internal bond (IB). The kenaf core particles were treated with 10% concentrations of three types of flame retardants namely diammonium phosphate (NH4)2HPO4), monoammnium phosphate (NH4)HPO4) and BP® [mixture of 27-33 % boric acid, 67-73 % guanylurea phosphate and 0.0-4.2 % phosphoric acid]. The study showed that DAP-treated particleboards complied with the thickness swelling and water absorption of British-European standard [BS EN 317:1993] requirements. BP®-treated particleboards were found to have performance values superior than the British-European standard requirement values for MOR [BS EN 310:1993] and MOE [BS EN 310:1996]. MAP-treated particleboards surpassed the standard requirement value for IB [BS EN 319:1993]. However, all treated particleboards complied with the standard requirement value of MOE except DAP-treated particleboards. The untreated particleboards complied with all the standard requirements of the physical and mechanical tests. Overall, the flame retardants affected the physical and mechanical properties of the kenaf core particleboard

Keyword: Kenaf, Fire retardants, Hot and cold, Water absorption, Thickness swelling, Modulus of rupture, Modulus of elasticity, Internal bond