Abstract

Agricultural residuals, such as bagasse, are the renewable resources that can be utilized as raw materials for manufacturing cement-bonded particleboard (CBPB). In this study, it was evaluated the effect of sodium silicate (Na_2SiO_3) as accelerator on hydration process of cement paste. Moreover, it was analyzed modulus of rupture (MOR), internal bonding (IB) and thickness swelling of CBPB made from bagasse as affected by particle size and content of additive (Na_2SiO_3) through using RSM (Response Surface Methodology).It was determined that adding of bagasse meal in cement paste caused to decrease the initial and final setting time. Besides, higher amounts of additives resulted to lower values of hydration temperature peaks (T_{max}) and hydration times. Based on central composite design (CCD), quadratic models were developed to correlate the preparation variables; particle size (x_1), additive content (x_2), to the responses; MOR (y_1), IB (y_2) and TS (y_3). Analysis of variance (ANOVA) showed that particle size was the most significant variable for responses. The optimum preparation conditions for strength properties and thickness swelling were obtained by using particle size of > 6.2mm and additive content of 5.5%, which resulted in modulus of rupture, internal bonding and thickness swelling of 33 9 MPa, 0.25 MPa and 18%, respectively.

Key words: cement-bonded particleboard; bagasse; additive; setting time; physical and mechanical properties

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Evaluation of cement-bonded particleboard properties made from bagasse *(Suger cane)*

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