

## **Kenaf MDF Panels with Soy Based Adhesive. The Influence of Preparation Parameters on Physiomechanical Properties**

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**Abstract :** Soybean concentrate is abundant material and renewable product that is recently been explored as an alternative to conventional formaldehyde based resins in wood based products. The main goal of this study is to evaluate the technical feasibility of manufacturing environment friendly MDF panels from renewable resources. The panels are made by using kenaf bast fibers (KB) as wood substitute and soy based adhesive as bonding material. Second order response surface regression models are used to understand the effects and interactions of resin content (RC) and pressing time (PT) on the mechanical and water soaking properties of kenaf panels. The mechanical and water soaking properties are significantly improved as the RC increased and reached at the highest level at maximum resin loading (12%). The effect of pressing time is significant in the first phase when the pressing time increased from 4 to 6 min; however the effect was not as significant when pressing time further increased to 8 min. The second order regression equations further confirm that the variation in process parameters has strong relationship with the physiomechanical properties. The MDF panels the minimum requirements of internal bond strength, modulus of rupture and modulus of elasticity as recommended by US wood MDF standard specifications for G110, G120, G130 and G140 grade MDF panels. However, the thickness swelling results are considerably poorer than the recommended values of general purpose standard requirements. This deficiency can be counterbalanced by the advantage of being formaldehyde free panels made from renewable sources and by making them suitable alternative for less humid environment applications.

**Keywords :** kenaf, Medium density fibreboard, soy adhesive, mechanical properties, water soaking properties

**Conference Title :** ICMSME 2014 : International Conference on Materials Science and Mechanical Engineering

**Conference Location :** Bangkok, Thailand

**Conference Dates :** December 18-19, 2014