

Strength and Micro-Structural Properties of Wood Chips Composite Panel

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Abstract

Global warming primarily due to deforestation has led to the development of new materials to substitute felling of trees by wood-based industries. The utilisation of wood chips and cassava starch for the production of particle board was the thrust of this research. The chip sizes of 0.85 and 1.7 mm, dosage and types of binders (cassava starch, urea formaldehyde and Glutaraldehyde modified cassava starch) were the variables. The ratio of wood chips to the binders was 1.0:1.5. The boards were formed in rectangular moulds. Water absorption, thickness swelling, flexural tests and material characterisation (using scanning electron microscope (SEM)) were carried out. Data collected was subjected to analysis of variance. The result obtained was subjected to analysis of variance. The particleboards produced with modified cassava starch had the best mechanical properties with the modulus of elasticity (MOE) ranging from 5.90 to 32.32 N/mm² but had a higher thickness swelling values ranging from 3 to 59.37%. There was a significant difference ($p < 0.01$) between the boards manufactured using plain starch and modified starch. These tests results have shown that wood chips, plain cassava starch and modified cassava starch are sources of raw materials in the production of particleboard. The developed particleboard can be used for paneling, partitioning and ceilings.

Keywords: SEM, flexural, global warming, starch.

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