

Sustainable use of Cassava plant waste (branches) as raw material for bio-composite development: Particleboard properties due to plant maturity

Abstract

This research is to study the sustainable use of Cassava *Manihot Esculenta* Crantz waste from branches parted as a raw material for bio-composite development. Bio-composite is component phase that derived from biological origin for both reinforcement (fiber) and matrices (resin) with significantly different physical, mechanical and chemical properties. In this research, bio-composite use is natural fibers or bio fibers derived from cassava plants with polymer matrices which is polyurethane. Cassava plant is a woody perennial shrub, the composite product created is from wood fiber. Fiber of cassava plant used is in the particle form to create particleboard. This research focuses on the comparison of the most suitable age of cassava plant waste for making particleboard by comparing the final product chemical, mechanical and physical properties using density, moisture content, water absorption, thickness swelling, XRD (crystallinity percentage of fiber) and bending tests (modulus of rupture and elasticity). The manipulated variable is 3 different ages of white cassava plant waste and only one age of yellow cassava varieties of trees.

Keywords; Bio-composites; Cassava branch; Mechanical properties; Thickness swelling; Water absorption