BANIPANEL: Rice Hulls and Banana Fiber as Alternative Materials in Natural Fiber-Reinforced Composite Panel Fabrication

Liza May V. Amador

[1] *De La Salle-College of Saint Benilde, Philippines*

Abstract

The Philippines is known to be an agricultural country that compromises 13.23 million hectares of agricultural land employing 30% of the Filipino workforce. The country's main agricultural crops are rice, corn, coconut, sugarcane, bananas, pineapple, coffee, mangoes, tobacco, and abaca. Crops are commonly generated into food and textile. Despite the increase in production, only 75% of the crops are fully generated into highly commercial valuable products, leaving 25% of agricultural residues that convert into large amount of untapped biomass.

Rice and banana are the topmost crops that produce large number of under-utilized by-products. Rice hulls are commonly used as fertilizer but majority are largely dumped into landfills and discarded into disposal. Moreover, most of the bananas are cultivated mainly for their fruits, thus creating several tons of underused fibers coming from the pseudostem. These crop residues are an excellent source of highly valuable raw materials to produce bio-composite products. The potential properties of rice hulls and banana fibers can be utilized as an alternative material to replace synthetic fibers due to its strength, environment friendly quality, cost effectiveness and easy availability.

Rice hulls and banana fibers are cellulose fibers that exhibit potential mechanical properties founded on the material components of natural fiber-reinforced composites. Presence of high amount of silica content and ash content in rice hulls makes it a suitable material for the production of composites. Furthermore, banana fibers manifest to be a good material reinforcement due to its good elastic properties and high tensile strength. These agricultural wastes can be a marketable alternative medium as natural fiber, to produce building construction materials.

Utilization of these agricultural wastes as raw materials will introduce new ways on innovating natural fiber-reinforced composite panel for long-term valuable commercial production. It will also help find solutions for the waste management problem of crop residues.

Keywords— *Agricultural wastes, banana fibers, natural fiber-reinforced composite panel, rice hulls*

Professional Biography (100-150 words)

I am Liza May V. Amador, a 21 years old graduate of Bachelor of Science in Architecture at De La Salle-College of Saint Benilde. I have a strong interest in sustainability techniques, construction administration, building materials and systems. These propel my passion to research on the usage of natural fibers from crop residues, innovating it into natural fiber-reinforced composite panel which was published as my prime undergrad thesis. The need for more efficient and eco-friendly material has a significant value on the exploration of building material development. These factors motivate my drive to further implore the beauty in agricultural wastes.



Email Id: lizamayamador@gmail.com