

# ADVANCES IN MATERIALS ENGINEERING

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## Volume 2

Edited By:  
Md Abdul Maleque  
Iskandar Idris Yaacob  
Zahurin Halim



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ENGINEERING  
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## Fabrication of Biomass Pellet from Mesocarp Fiber

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**Keywords:** Biomass, Pellet, Oil Palm, Fiber, Mesocarp

**Abstract.** Palm pressed fiber (PPF) is a by-product from oil extraction of oil palm fruits. It is a form of recovered fiber from pressed palm fruit. In the bio-based economy, the availability of biomass as feedstock for energy and products depend partly on residues from the agro-food chain. The concept to increasing the sustainability of the palm oil value chain is to produce certifiable sustainable biomass [1]. It is shown that combined utilization of both the appreciated edible oil and biomass residues will result in a more sustainable value chain. This means that it should be environmentally sound, economically viable and socially acceptable. In order to utilize biomass wastes efficiently, the following drawbacks about biomass compared to fossil fuels must be solved properly; High energy consumption for collection, heterogeneous and uneven composition, low calorific value and raw material difficult to transport. There are a few options to solve this; the major ones are pelletization, liquefaction and gasification of biomass. Though pelletization is the least expensive option, there are some problems associated with it; lower heat value and quality deterioration by moisture (pellet disintegration, moss growth and bioorganic decomposition). In recent investigations, a low temperature treatment at 200 to 300°C under an inert atmosphere was found to be effective for improving the energy density and the shelf life of biomass.

### Introduction

Biomass pellet is a type of wood pellet. They are made from wood waste/ by product materials that are condensed into pellets under heat and pressure. Basically, natural plant lignin holds the pellets together without glues or additives. Wood pellets are of uniform size and shape (between 5-30 mm by approximately 6-12 mm inches in diameter), making them as easy to store and use as traditional fossil heating fuels. Wood pellets also take up much less space in storage than other biomass fuels because they have a higher energy content by due to their densified nature and low-moisture content (typically between 4-6 percent moisture by weight [2]).

There are a large number of different biomass materials than can be used to make heating pellets. Not only limited to wood by products or wood waste, but there are many other sources available such as sawdust, wood waste, waste paper, or any number of different types of biomasses - grasses, nut shells, hay, straw, or dried distillers grain for instance. The biomass pellet has several advantages over fuel oil or natural gas. It can be made from free materials, will produce little ash, can be easily stored, made from renewable raw materials, has highly efficient fuel source, it is carbon neutral and extremely low cost/ton. Biomass power is likely to become a more cost-effective and sustainable supply of energy in the foreseeable future. After the last huge increase in energy prices, especially for fuel oil and