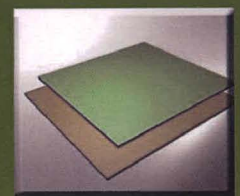


ADVANCES IN COMPOSITE MATERIALS



Iskandar Idris Yaacob
Md Abdul Maleque
Zahurin Halim



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Characteristics of Oil Palm Biomass via Mixture of Empty Fruit Bunch (EFB) Fiber and Mesocarp Fiber

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Abstract: There is widespread concern that observed increases in the concentration of carbon dioxide and other greenhouse gases in the earth's atmosphere will ultimately lead to changes in the earth's climate. Basically, the atmospheric concentration of carbon dioxide is increasing and that the increase is being driven in large measure by the burning of fossil fuels (coal, oil, and natural gas). Recognizing that fossil fuels play a very important role in the economies and lifestyles of people throughout the world, and acknowledging that great uncertainty exists regarding the climatic consequences of burning fossil fuels, it is reasonable for today's industry to find for the alternative energy system. Thus, biomass fuels used in efficient ways might provide a sustainable source of such energy. From the test done on both empty fruit bunch (EFB) and mesocarp pellet, the ash content of EFB pellet is in the range of 3.65-5.18% compared to almost 10% of ash content for mesocarp pellet. Lower ash content will result in minimum dust emission during combustion. In contrast, in term of calorific value which is a measurement on how much chemical energy is stored within the material which is then liberated as heat during combustion, mesocarp pellet showed better properties. Therefore, fabrication of these two types of fiber is aimed to enhance the physical properties of the pellet.

Introduction

Malaysia, with its huge oil palm plantations generates abundant palm biomass. In spite of the huge production, the oil consists of only about 10% of the total biomass produced in the plantation [1]. The oil palm biomass including EFB and mesocarp fiber is burnt as fuel in the boiler to produce steam for electricity generation as well as processing of palm oil fruits [2]. However, only a small proportion of these by-products are being used as fuel because of their high moisture, high polymorphism and low energy density. These troublesome characteristics increase costs of transport, handling and storage, making the use of biomass as a fuel impractical [2]. Some of these drawbacks can be overcome through densification of biomass fiber for pellet production.

Densification or pelletize is the process of compacting the biomass by-product like EFB and mesocarp fiber into a uniform solid fuel called pellet. It has higher density and energy content and less moisture compared to its raw materials. Pelletize of biomass can be done using various techniques, either with or without binder addition. Biomass pellets are mostly used for cooking, heating, barbecuing and camping in countries such as USA, EU, Australia, Japan, Korea and Taiwan [3]. In the developing countries, biomass briquettes are mainly for household usage only.