UNIVERSITI TEKNOLOGI MARA

PHYSICAL CHARACTERISTIC OF BRIQUETTE CHARCOAL DERIVED FROM CARBONIZATION OF FOOD WASTE VIA MICROWAVE TECHNIQUE

NABIHAH BINTI AZRON

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ABSTRACT

Deforestation and landfill recently is the most crucial environmental issue occurs in Malaysia. Illegal harvesting for firewood and improper disposal of food waste at landfill have concern the people and government in this country. An alternative created to transform food waste into beneficial product such as briquette charcoal using microwave pyrolysis technology. This research investigates the potential of solid char from food waste to become briquette charcoal with addition of binder. The main objective in this study is to investigate the effect of different binder and blending ratio on the physical characteristic of briquette charcoal. A number of test have been conducted to achieve this objective which are calorific value test, moisture content, compressive strength and impact resistance. Physical characteristic is important in making quality briquette due to possible damages during processing, handling and transporting the material. Broken pieces of briquette makes the appearance bad and difficult to ignite fire. The result from those investigation shows food waste char indeed has potential in briquette charcoal industry but it must have a binder to ensure the solid char particle stick together. Briquette charcoal with 10% CMC is the most ideal to become a quality briquette due to its suitable calorific value (21.171 MJ/kg), moisture content (6.2312%), compressive strength (0.813 MPa) and impact resistance (99.81%). In conclusion, expanding the research on combustion characteristic will help in determining prospective of briquette charcoal from food waste as a good briquette product.

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INTRODUCTION

1.1 RESEARCH BACKGROUND

Recently, green technology is vital to Malaysia since environmental issue keep blooming throughout the years. Pollution rapidly occurs from land, water to the air due humans act. Common environmental deterioration in this country are Deforestation and landfill. Deforestation is uncontrollable cutting down trees for agricultural, logging, harvesting for charcoal, mining, and urban development. In terms of source of energy, human tend to cutting down trees for production of charcoal. This illegal act have concern government and people to think of an alternative to overcome this problem. The idea is to produce charcoal briquette from biomass and reduce production of charcoal from woods.

Landfill in Malaysia become a crucial environment issue because of improper municipal solid waste (MSW) management since a long time ago. According to Fauziah (2010), disposal of MSW into the landfills is more than 10.40 million tonnes annually. MSW can be classified into two categories which are organic and inorganic. Example for organic materials are food waste and wood waste. About 50% of MSW comes from food waste that are disposed at the landfill sites as stated by Nadzri (2013).

There are few technologies have been implemented in Malaysia to manage MSW which are recycling, composting, incineration and landfill. For food waste cases, type of disposal is dumping the waste at landfill. However, this method causes a lot of environmental issue which are greenhouse effect, soil pollution and air pollution. Greenhouse effect occurs when methane gas produce from landfill site due to decomposition of food waste. This methane gas contribute to climate change and global warming.

Continuation of these unsolved problem, many research have been developed technology on converting waste product into useful product that not harmful to the environment. One of greatest innovation is microwave pyrolysis whereby organic and inorganic waste transformed into three phase; solid char, liquid and gas. This study will introduce food waste to microwave pyrolysis technique to produce charcoal briquette.