UNIVERSITI TEKNOLOGI MARA

DEVELOPMENT OF BIOCHAR USING NON-DIRECT FIRING SYSTEM FROM GAHARU-CHEMICAL PROPERTIES

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ABSTRACT

Biochar production is used as part of modern agenda for agricultural used and to offset some greenhouse gas emissions. The experiment conducted by using different pyrolysis temperature to determine chemical properties of biochar. Under elemental analysis, TGA and FTIR analysis, it will characterized the biochar produced at 400, 500 and 600°C. Biochars derived from wood exhibit a high carbon content especially when pyrolysis temperature increased. The observation made through elemental analysis proved that carbon content increased while O/C and H/C decrease because of evaporating volatile matter in the process. TGA analysis provided that the weight of the sample is indirectly proportional to the pyrolysis temperature. Lastly, the functional group for each of the sample will be decided through FTIR analysis. The results demonstrated that production temperature acted as predominant factor which determined the properties of biochars.

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CHAPTER 1
INTRODUCTION

1.1 Research Background

Humanity has faced many kinds of threat and opportunities from its environment. This phenomena has urged us to response to this new challenges. For all that to happen is generally from the success of humanity itself where it is claimed as the biggest threat of all. Presently, increasing population growth has been accompanied by unexpected decline in other species. Since the emergence of biochar production, the world consistently demand this material because of realization of its benefits. Essentially, charcoal, biochar, pyrogenic organic materials and pyrogenic carbon derived from incomplete combustion (Vieira, 2018).

Biochar research for multipurpose used is even more recent. Therefore, analytical information is still needed to attain right evaluation according to International Biochar Initiative Standards (IBI). Characteristics of biochar depends on how the process conditions is being determined. Therefore, development of biochar need to be carefully done and evaluated according to their standards.

1.2 Problem Statement

Starting at 18^{th} century, the human started to invent a lot of things including technologies which mostly required coal as it source. It is cool fact at first but unfortunately the effect of the invention was bad where the emissions of carbon dioxide (CO_2) and other gases has induced global warming issue in the world. Hence, the problem arising nowadays are sometimes involving concerns over greenhouse gas (GHG) emissions and related climate change. Not only that, rise in energy cost because of increasing population and the source of non-renewable nature of fossil fuels declining have pushed the researchers to come up with solutions (Ronsse, van Hecke, Dickinson, & Prins, 2013). The research seem to bring out the speciality in agriculture field by using the conversion of biomass into biofuels and other renewable products. Somehow, there are many research involve the use of pyrolysis techniques because of the concerns over GHG emissions. Pyrolysis is a simple technique where it can be applied to any organic product. It use high temperature in the absence of oxygen through the whole heating process and conquers abundant of energy content. Moreover, it has become a