TITLE: DEVELOPMENT OF BIOCHAR FROM COCONUT SHELL; PYROLISIS PROCESS

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2023

ABSTRACT

Biochar is a high-carbon material. It can be used as a renewable fuel as well as an addition to improve soil quality. Coconut shell waste will cause environmental problem if it is not treated appropriately. The main purpose of this study is to formulate and prepare biochar and to perform the study on pore size and adsorption of methylene blue and water of the prepared biochar. The effect on pore size and adsorption of methylene blue and water at various time (3 hours, 4 hours, 5 hours, 6 hours) at temperature 700℃ were evaluated. Based on the result, pyrolysis process in 6 hours is the best duration for process biochar. After that, for biochar, the physical and chemical properties such as pore size and adsorption of methylene blue and water were being tested. The results showed that long time for pyrolysis process, had higher pore size surface area, and higher adsorption of methylene blue and water as compared to those of short time for pyrolysis process.

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CHAPTER ONE
BACKGROUND

1.1 Introduction

A quality agricultural product from the Asia-Pacific region is coconut. Hainan is the main coconut-producing region in China (Hasanah et al., 2012). Coconut shell is an agricultural waste that pollutes the environment badly and puts human health and the ecosystem at danger (Ting et al., 2016). These biowastes have benefits for the environment over standard reinforcing fillers like glass and carbon, including low density, low cost, decreased pollution, good thermal characteristics, high toughness, reduced tool wear, and biodegradability (Oksman & Clemons, 1503).

Biochar is a high-carbon material. It can be used as a renewable fuel as well as an addition to improve soil quality (Lehmann & Joseph, 2009). The main cause of the high stability is the nature of carbon structures (Lehmann et al., 2011; Nguyen et al., 2010). In comparison to other aromatic structures of soil organic matter, such lignin, biochar has a lot higher proportion of aromatic C and condensed aromatic structures, which is the most obvious chemical difference between biochar and other organic matter (Schmidt & Noack, 2000).

There are several ways to make biochar, including gasification, quick pyrolysis, and slow pyrolysis. The pyrolysis of biomass results in the production of biochar. The first known method of biomass thermal processing is pyrolysis (Tomczyk et al., 2020a). Liquid pyrolysis oil, solid charcoal, and combustible gas are the three primary by-products of biomass pyrolysis. Methane, which is frequently found in natural gas, biogas, and coal mine gases, is present in the gas product. It is a quality gas fuel that serves as a crucial raw material in the production of syngas and several chemical products. In addition to being used as a raw material for chemicals, liquid goods can be refined to create liquid fuels or value-added products. Adhesives, phenol, and liquid fuel or resin are among the end products of making liquid biomass pyrolysis (Trinh et al., 2013).