

Analysis of Char Prepared by Pyrolysis of Dabai (*Canarium odontophyllum*) Nutshells as a Potential Precursor of Biocarbon Used for Wastewater Treatment

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Dabai (*Canarium odontophyllum*) nutshells have considerable potential to be used as a viable precursor for biomass-based activated carbon. The material was carbonized at a temperature of 700 °C for 2 h, at a heating rate of 10 °C/min under nitrogen gas flow. The char was analyzed the following ways: percentage of yield, percentage of ash content, Fourier transform infrared spectroscopy, scanning electron microscopy with energy dispersive x-ray analysis, and Brunauer, Emmett, and Teller surface area. The char had a maximum Brunauer, Emmett, and Teller surface area of 428 m²/g and the nitrogen adsorption-desorption isotherm of the char that was similar to a Type I adsorption isotherm, based on IUPAC classifications. The char also had a high carbon content (up to 93.6%) and a low ash content (3.67%). Therefore, dabai nutshells were found to be a suitable lignocellulosic precursor for the synthesis of activated carbon.

Keywords: *Canarium odontophyllum*; Nutshell; Carbonization; Activated carbon; Adsorption

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INTRODUCTION

Water is a basic need for humans, as it is approximately 60% of total human weight. In addition, its losses through different metabolic and excretory cycles must be compensated by enough intake. Water may contain dangerous impurities, which can influence human health and the environment (Siong *et al.* 2014). Therefore, wastewater treatment plants play a crucial role in both safeguarding the sources of drinking water and providing an alternative production supply of water and treated wastewater. This requires an increased degree of water treatment depending on its uses. The monitoring and removal of trace pollutants are two of the biggest challenges of wastewater treatment plants (WWTPs). As such, WWTPs have created new adaptations in the form of the development of existing and new wastewater treatment systems, which reduce costs and maximize resources use (Campinas *et al.* 2016). Wastewater treatment utilizes filters and adsorbents for reducing the amount of pollutants or pollution levels in the discharge before being released into the environment. A similar approach is also applied to water supply treatment, before being channeled to domestic and industrial users.

Activated carbon (AC) is a material with various usages, ranging from quality