UNIVERSITI TEKNOLOGI MARA

REMOVAL OF COPPER (II) IONS USING ADSORPTION BY CHEMICALLY MODIFIED COCONUT HUSK POWDER

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ABSTRACT

Conventional methods are expensive and not environmental-friendly as the end product of the treatment are in form of toxic sludge which also needs to undergo further treatment before disposal (Alnabriss, 2018; Sun et al., 2012; Ahmaruzzaman, 2011). The conventional process of treating heavy metals in wastewater such as Reverse-Osmosis, Electro-dialysis, and Ion-exchange processes need continuous surveillance and expensive to maintain. In light of this, research on low-cost treatment should be explored widely and execute towards a greener method of heavy metals treatment using bio-adsorbent derived from wastes to adsorb heavy metals pollutants. Chitosan blended with cellulose, banana peel, corn corb are adsorbents derived from food waste (Thilagan & Gopalakrishnan & Kannadasan, 2013: De Gisi, Lofrano, Grassi, & Notarnicola, 2016). Coconut husk, rubberwood sawdust, coconut shell are adsorbent derived from agriculture wastes (Renu, Agarwal, & Singh, 2017; Man, Akinbile, & Jun, 2015; Singh & Waziri, 2019). This study used coconut husk powder that chemically modified using 0.1 M HCl to investigate the effectiveness of it to remove Copper (II) ions in an aqueous solution. The effect of pH (range 2 to 5), adsorbent dosage (0.25-1g), initial concentration of Copper (II) in aqueous solution, and agitation time (10-120 minutes) was investigated. The data was further analyzed using the kinetic adsorption and adsorption isotherm model to determine the best fit model that represents the adsorption of Copper (II) ions in an aqueous solution. Chemically modified coconut husk powder (CMCHP) was found to have good adsorption as a percentage of copper removal above 90%.

Keywords: *Adsorption, Chemically modified coconut husk, Copper, Kinetic Adsorption, Adsorption isotherm.*

CHAPTER 1

INTRODUCTION

1.1 Background

The industrial sector is an important sector in the world where responsible to the economical contribution for improvement of the quality and the people lifestyle with the services and products. Other than important to the economy, industrial sector also important to provide the people needs thus this lead to a rapid industrialization and urbanization (Patnaik, 2018). It do provide us benefits however, there are drawback from the rapid development to the health of environment which also can effect human health (Blokhin, 2020). The waste generation, effluent and gas released to the environment from industrialization could cause soil, water, air and other environmental pollutions. The main concern is release of industrial effluent containing heavy metals to the water body. Water is very important in human life and human depends on water bodies for water usage and food sources.

Naturally, heavy metals do exist in the water body however, high heavy metal constituent more than the amount should be naturally can cause adverse health effect and diseases to the human due to the toxicity of it. Besides, it is also an essential need to human life for biologic functioning. Heavy metals able to accumulate and biomagnified in aquatic organisms which is source of human food such as fish. Furthermore, it can disrupt the function of cells and enzymes in human which