CHEMICALLY MODIFIED BAMBOO CHARCOAL USING TWO DIFFERENT CHELATING AGENTS (ASPARTIC ACID AND ETHYLENEDIAMINE): CHARACTERIZATION AND ADSORPTION CAPABILITY

NURUL ASYURA BINTI JAHARIN

BACHELOR OF SCIENCE (Hons.) APPLIED CHEMISTRY
FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA

AUGUST 2023

This Final Year Project entitled "**Chemically Modified Bamboo Charcoal Using Two Different Chelating Agents (Aspartic Acid and Ethylenediamine): Characterization and Adsorption Capability"** wassubmitted by Nurul Asyura Binti Jaharin in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Science, in the Faculty of Applied Sciences, and was approved by

Dr. Sharizal Bin Hasan
Supervisor
B. Sc. (Hons.) Applied Science
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau
Perlis

Dr Siti Nurlia binti Ali
Project Coordinator
B. Sc. (Hons) Applied Chemistry
Faculty of Applied Science
Universiti Teknologi MARA
02600 Arau
Perlis

Dr. Nur Nasulhah binti Kasim
Head of Programme
B. Sc.(Hons.) Applied Chemistry
Faculty of Applied Science
Universiti Teknologi MARA
02600 Arau
Perlis

Date : August 2023

TABLE OF CONTENTS

ABSTRACT

CHEMICALLY MODIFIED BAMBOO CHARCOAL USING TWO DIFFERENT CHELATING AGENTS (ASPARTIC ACID AND ETHYLENEDIAMINE)

The adsorption performance from treated bamboo charcoal as adsorbent for removal of heavy metal from aqueous solution was investigated. The main focus in this study is batch experiment which contains various parameters that need to be studied. Based on the result, the equilibrium of adsorption increased with the increasing of initial concentration. During this experiment, it was performed under operating condition which is the optimum adsorbent dosage for Ni (II) adsorption by mb-AA and mb-EDA was 3 g and 4 g, respectively. Meanwhile, 2 g was sufficient for Co (II) adsorption by mb-AA and 3 g was sufficient for mb-EDA. The optimum time required to remove metal ions from mb-EDA was 40 minutes. Meanwhile, the optimal removal of Ni (II) and Co (II) ions by mb-AA takes place after 60 and 50 minutes, respectively. It was also found that higher initial metal concentration resulted in lower percentage removal of metal ions. The optimum initial Ni and Co concentration for adsorption by mb-AA and mb-EDA was 24 884 mg/L (0.1M) and 9963.2 mg/L (0.04M). The effect of pH study showed that mb-AA and mb-EDA presented different optimum adsorption performance at different pH. The highest percentage removals of Ni (II) and Co (II) achieved mb-EDA which were 91.48% at pH 8 and 93.07% at pH 6, respectively. The results showed that mb-EDA was a more effective adsorbent than mb-AA. Based on the analyzed data, equilibrium data was fitted with the Freundlich isotherm model with adsorption correlation coefficient nearly to the experimental value. The adsorption isotherm indicates the relation between the amount adsorbed by the adsorbent and the concentration. The Freundlich isotherm explains the effective physical adsorption of the solute particle from the solution on the adsorbent and Langmuir isotherm gives an idea about the effect of various factors on the adsorption process.