CONTINUOUS SYSTEM FOR DECREASING METAL POLLUTION LEVELS USING SEA PANDAN LEAVES ACTIVE CHARCOAL

by Dra.SusilaKristianingrum, M.Si, Ir. EndangDwiSiswani, MT, AnnisaFillaeli, M.Si, Sulistyani, M.Si, Ajeng Delapril Pratiwi, Isnaini Saputri, Nur Hasna Nafiisah

ABSTRACT

This study aims to find out 1) optimum adsorbent period, 2) optimum flow rate, 3) adsorption efficiency and 4) optimum adsorption capacity of Cu^{2+} , Zn^{2+} , Fe^{3+} , and Ni^{2+} by activated charcoal from sea pandan leaves in continuous systems, and 5) adsorption efficiency multi metal ionsof Cu^{2+} , Zn^{2+} , Fe^{3+} , and Ni^{2+} .

The subjects of this study were activated charcoal sea pandan leaves (Pandanus tectorius), while the objects were the efficiency of decreasing levels of heavy metal ions Cu²⁺, Zn²⁺, Fe³⁺, and Ni²⁺, adsorption capacity. The dependent variables in this study were adsorption efficiency and activated charcoal adsorption capacity for heavy metal ions Cu²⁺, Zn²⁺, Fe³⁺, and Ni²⁺, while the control variables in this study were pH, temperature, and volume of adsorbates. In this study optimization of the adsorbent period and adsorbate flow rate. The optimum continuous system conditions obtained are then used to determine the activated charcoal adsorption parameters for multi metal ions samples. The levels of heavy metal contamination were analyzed using a UV-vis spectrophotometer, atomic absorption spectrophotometer for multi metal ions samples.

The results showed that 1) the optimum mass of adsorbent on the adsorption efficiency of Cu^{2+} , Zn^{2+} , Fe^{3+} , and Ni^{2+} metal ions by active charcoal of sea pandan leaves in continuous systems was 0.7; 0.9; 0.7 and 0.7 grams. 2) The optimum flow rate for Cu^{2+} , Zn^{2+} , Fe^{3+} , and Ni^{2+} metal ions was 0.3; 0.2; 0.2 and 0.4 mL / minute. 3) The optimum adsorption efficiency of the active adsorbent of marine pandan leaves on Cu^{2+} , Zn^{2+} , Fe^{3+} , and Ni^{2+} metal ions in continuous systems was 96.6854%; 38.6576%; 99.39% and 47.57%. 4) The optimum adsorption capacity of the active adsorbent of sea pandan leaves on Cu^{2+} , Zn^{2+} , Fe^{3+} , and Ni^{2+} metal ions in continuous systems is 36,2083; 9,6701; 38,2130; 9.4203 mg/g. 5) The biggest adsorption efficiency of activated charcoal of sea pandan leaves on multi metals Cu^{2+} , Zn^{2+} , Fe^{3+} , and Ni^{2+} was 99,606 %; 97,004%; 98,871 %; 56,994 % respectively.

Kata Kunci: activated charcoal, Pandanus tectorius, continuous system, adsorption efficiency, adsorption capacity