ADSORPTION OF CHROMIUM AND CADMIUM FROM WASTEWATER OF TEXTILE INDUSTRY BY USING EGGSHELL

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ABSTRACT

Based on Cinzia and Toetti 2009, the textiles industry is one of the industry that contribute to the water pollution. This is because the wastewater of the textiles contains a few heavy metals at high concentration but in this experiment just focusing to the chromium and cadmium. The process treated wastewater from textiles industry is adsorption by using the eggshell. The waste of eggshell is the higher in the Malaysia due to the consumption of eggshell is higher at Malaysia. This research is focusing on the determination of the concentration of chromium and cadmium in the waste water from textile, compare the effectiveness of natural eggshell and calcined eggshell by determine the adsorption rate and determine the isotherm that match the adsorption process. The waste water will be obtained from the Textile Course of Art and Design UiTM Shah Alam, Selangor. The eggshell will be obtained from the restaurants around this area. The eggshell will be washed, dry and crushed by crusher. For the process to make the natural eggshell absorbent it has finished. To make activated carbon, the eggshell will be placed in the furnace at 800°C for 2 hours. The waste water from the textile industry will be undergo the adsorption process using this two adsorbent and it will be tested the concentration of chromium and cadmium using AAS. The result from the experiment show that the wastewater contains higher concentration of chromium and cadmium and it must be treated first before can be released to the stream. The results also show that the activated carbon eggshell has higher efficiency of adsorption compared to the eggshell. Activated carbon eggshell can adsorb the concentration of chromium and cadmium twice better than eggshell. From the value of R^2 obtain, the Langmuir isotherm is the best to describe this adsorption process because it has the higher value of R^2. So, the conclusion that can be made that the wastewater of the textile industry should be treated carefully before it discharged to avoid adverse effect to the human and environment.

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CHAPTER 1

INTRODUCTION

1.1   Research Background

Textile industries are one of the industries that effluents the water pollution in the world (Jaishree *et al.*, 2014). Textile have diverse process that involve heavy metals such as metal complex dyes, dye stripping agents, oxidizing compounds, antifungal, odour-preventive agents and mordant reactive (Mustafa *et al.*, 2008). The waste from textile industries are trace have several heavy metals such as calcium, cadmium, chromium, copper, lead, zinc, nickel, and iron (Jaishree *et al.*, 2014). This because the textile is one of the principle enterprises in creating nations and the quality of textile productions is very important for export and achieve what customer need. Customers must want to be able to buy clothing, bedding and household textiles that have been tested and are not dyed in any way with harmful substances. The reactive and pigment dyes contain high level of heavy metal that may be health risks for human even at low concentrations in textile products (Mustafa *et al.*, 2008).

Heavy metals can be released naturally such as weathering, erosion of bed rocks, ore deposits and volcanic activities (Kifayatullah *et al.*, 2013). The groundwater and surface water in agricultural areas in most countries of the world are at a serious risk of metal pollution due to rapid industrialization and urbanization,