

**LEACHATE TREATMENT BY USING DIFFERENT SIZES OF
CHARCOAL AS ADSORPTION MEDIA**

By

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ABSTRACT

A study was conducted to assess removal and adsorption capacity of charcoal as adsorption media of raw leachate from Pulau Burung Landfill Site (PBLS) located in Penang, Malaysia. Under room temperature condition, removal of three parameters which are Chemical Oxygen Demand (COD), suspended solid, and color in leachate was investigated. Influence of particle size effect of charcoal in range of 150 μm to 2 mm and different pH of leachate in range of pH 2 to pH 10 were pursued. The result indicated that the maximum removal of color (17.3%) and suspended solid (42.6%) is at charcoal with size 2 mm. Charcoal with size 600 μm was suitable to remove COD (92.9%). Moreover, the most appropriate pH to remove suspended solid was pH 10 (41.3%), for COD was pH 9 (92.9%), and for color removal was pH 2 (80.4%).

CHAPTER 1

INTRODUCTION

1.1 General Introduction

The contaminated groundwater emanating from landfill sites (landfill leachate) is a persistent problem that requires careful management and treatment to prevent pollution of surrounding land and water. The term “leachate” refers to liquids that migrate from the waste carrying dissolved or suspended contaminants. Leachate results from precipitation entering the landfill and from moisture that exists in the waste when it is disposed. Contaminants in the buried refuse may result from the disposal of industrial waste, ash, waste treatment sludge, household hazardous wastes, or from normal waste decomposition. The degradation of the organic fraction of the wastes in combination with percolating rainwater leads to the generation of a highly contaminated liquid called “leachate” (Kurniawan et al., 2005). If uncontrolled, landfill leachate can be responsible for contaminating ground water and surface water.

Adsorption is a physical process in which the gas molecules are attracted to the surface of a solid and held by molecular bonding forces. The adsorbent is usually a granular, porous material (for example charcoal or activated carbon) with a very high surface area-to-volume ratio (Jerry, 2003). Lakshmi and Hilary, 2000 have defined the adsorption as a process of attraction of chemicals to the surface. Adsorption is "the collection of a substance onto the surface of adsorbent solids."