UNIVERSITI TEKNOLOGI MARA

THE POTENTIAL OF EGGSHELL AS AN ADSORBENTS IN REMOVAL OF HEAVY METAL IN LEACHATE FROM ULU MAASOP LANDFILL

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Declaration by Student

Project entitled "The Potential of Eggshell as Adsorbents in Removal of Heavy Metal in Leachate from Ulu Maasop Landfill" is a presentation of my original research work. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due reference to literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Project Supervisor Dr. Shantakumari Rajan. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

Student's Signature:

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ABSTRACT

The Potential of Eggshell as Adsorbents in Removal of Heavy Metal in Leachate from Ulu Maasop Landfill.

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Leachate is considered as the greatest environmental concern. In this study, the leachate characterization has been discussed and compare to the limit set in Environmental Quality Control of Pollution from Solid Waste Transfer Station and Landfill Regulations 2009. The main aim of this study is to investigate the adsorption of heavy metal (Cd, Ni and Cu) using Non-activated carbon derived from waste eggshell (NACE) Activated carbon derived from waste eggshell (ACE), so as to comparatively evaluate the effectiveness of both adsorbents for the purpose of removing Cd, Ni and Cu from leachate from Ulu Maasop Landfill. The concentration of metal ions was determined using atomic adsorption spectrophotometer (AAS). Effects of contact time have been investigated in this study as well as the heavy metal removal percentage is determined to measure the potential for both adsorbents. The results shows that the optimum contact time for maximum removal of Cd, Ni, and Cu are 60 minutes, 90 minutes and 60 minutes, respectively. The results indicate that a maximum percent removal of 88.24% for cadmium, 75.51% for nickel, and 91.46% for copper was obtained by using ACE as adsorbent. Thus, the best removal of Cd was achieved in the presence of ACE with the 60 minutes contact time. However, the data statistical has proved that NACE and ACE has similar efficiency in removing the copper and nickel from landfill leachate.

Keywords: heavy metal, egg shell, landfill leachate, adsorption