

## C617408: MAJOR ENVIRONMENTAL ENGINEERING

KEY WORD: ADSORPTION / HEAVY METAL / LEACHATE / ACTIVATED CARBON

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This research is an elementary study which was conducted to investigate the feasibility of removing mercury and chromium from wastewater by activated carbon. This experiment separates into two phases. The first phase dealt with batch studies to investigate the factors which have an effect on heavy metal adsorption. The factors in this study are pH, contact time and heavy metal concentration. In order to find ability of activated carbons, carbon A, B and C, which are used in this study, isotherm test was conducted. The second phase involved continuous adsorption column studies. In this research, synthetic aqueous chromium and mercury solutions and On-Nocch landfill leachate after passed facultative pond are used. The flame atomic absorption spectrophotometer was used for heavy metals content analyses.

From batch studies, maximum chromium and mercury removal may be achieved in pH range 2-4 for both types of wastewater. In synthetic aqueous, the approximate removal of chromium are 72%, 64% and 39%, and for mercury are 66%, 61% and 55% in consecutive order for carbon A, B and C. In leachate, the removal efficiency for chromium are 86%, 78% and 62%, and for mercury are 88%, 83% and 76% for carbon A, B and C when heavy metal concentration equal 5 mg/l. A significant amount (>50%) of chromium and mercury was adsorbed within 5 minutes of contact time for both aqueous and reduction of removal efficiency occurred when increase heavy metal concentration. The optimum conditions for adsorption chromium and mercury from synthetic solution are pH 4 and 15 minutes contact time, whereas in leachate the optimum conditions are initial pH of leachate (pH 7-8) and 15 minutes contact time. From batch study found that, activated carbon not only remove heavy metal in leachate but it remove COD and color also. From Freundlich adsorption isotherm, carbon A has the best result in removal of chromium and mercury from both aqueous.

From continuous studies, chromium and mercury removal from leachate has more efficiency than from synthetic aqueous in equal volume of treated effluent. The approximate overall efficiency for heavy metals removal from leachate are 90% and 70% for synthetic aqueous. However, clogging on the surface of activated carbon bed in heavy metal removal from leachate was a major problem because of high suspended solids in leachate.

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