



Column studies on the removal of dissolved organic carbon, turbidity and heavy metals from stormwater using granular activated carbon

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ABSTRACT

Stormwater pollutants have the capacity to damage aquatic environments if they are discharged untreated. Suspended solids (turbidity), dissolved organic carbon (DOC) and heavy metals removal from stormwater were investigated in batch and fixed-bed column experiments. Field studies revealed that turbidity and DOC in stormwater were effectively removed at filtration velocities of 5, 10 and 11.5 m/h using a 100 cm high granular activated carbon (GAC) filter column. At the higher filtration velocities of 10 and 11.5 m/h, adding a pre-treatment 100 cm high anthracite filter column further improved DOC and turbidity removal. Batch and column laboratory adsorption experiments at pH 6.5–7.2 using GAC showed that the order of removal efficiency for solutions containing single and mixed metals was Pb, Cu > Zn > Ni, Cd. This order was related to the solubility product and first hydrolysis constants of these metals' hydroxides. This study confirmed that GAC filter is effective in removing turbidity, DOC and heavy metals from stormwater.

Keywords: Adsorption; Dissolved organic carbon; Granular activated carbon; Heavy metals; Turbidity

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