

**HEAVY METAL REMOVAL OF INDUSTRIAL WASTEWATER
USING CONSTRUCTED WETLAND**



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ABSTRACT

Heavy metals, such as lead, nickel, zinc, cadmium, mercury, and copper are a potentially toxic component of many wastewater effluents. Nowadays, constructed wetland (CWs) has become an alternative method in term of cost saving and low maintenance to remove this heavy metal in wastewater. Therefore, the aim of this study were to determine the effectiveness of constructed wetland in treating heavy metal wastewater treatment with determining the parameters of heavy metal wastewater such as pH, dissolved oxygen, conductivity, COD as well as heavy metal ions of the selected wetland species. Besides that, this study also aimed to determine the feasibility of the *Ipomoea aquatica* as the vegetation species applied in constructed wetland for heavy metal wastewater treatment and to study the effect of aeration in Surface flow system (SF) of constructed wetland. In this study, the artificial pollutant used was potassium chromate (K_2CrO_4) and three laboratory-scales of SF units were developed and evaluated. The first unit was blank (without pollutant) and another two were fed with K_2CrO_4 with the concentration of 0.0476 g/L. In contrast with Unit 2, Unit 3 was installed with an aerator in order to study the effect of aeration on heavy metal removal. All the units were run outdoor and continuously for five consecutive days where the influents were circulated throughout the experiment. The parameters studied were pH, temperature, conductivity, Dissolved oxygen (DO), Chemical oxygen demand (COD), chromium ion and ammonium ion. After five days of experiment, Unit 3 showed the highest value of COD removal was 16.43% with chromium and ammonium ions concentrations were 2.125 ppm and 2.03 mg/L, respectively. Meanwhile, the conductivity value was 335 $\mu S/cm$ with pH was 8.41 and DO was 8.82 mg/L. From this study, it can be summarized that *Ipomoea aquatic* in SF of CWs had a small potential in COD and heavy metal removals from wastewater. Therefore, it demonstrated that this kind of vegetation species exhibited very low uptake efficiency of the contaminants from the water system. It also demonstrated that the COD was successfully removed even in a small quantity. It was resulted from the aeration effect been introduced which promoted a high oxygen transfer rate and also probably due to easily-oxidized organic matter by the supplied oxygen