

Determination of Mn and Pb uptake by vetiver grass (*Vetiveria zizanioides*) with different shoot length in artificial running water system

Nor Amidiniewani Ibrahim^a, Ferdaus Mohamat-Yusuff^{a,*}, Faradiella Mohd Kusin^a
and Zelina Zaiton Ibrahim^b

^aDepartment of Environmental Sciences, Faculty of Environmental Studies,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor.

^bDepartment of Environmental Management, Faculty of Environmental Studies,
Universiti Putra Malaysia, 43400 UPM Serdang, Selangor.

Abstract

Vetiveria zizanioides has been known as a phytoremediation agent and widely uses in water conservation works. However, there is a need to improve performance of this plant in removing pollutant in water system. Therefore, this study was conducted to measure Water Quality Index (WQI) improvement in the system installed by vetiver grass (VG) with trimmed and untrimmed shoot, identify rate of metal uptake and visual changes of VGs exposed in high concentration of lead (Pb) and Manganese (Mn). Artificial water system was setup by installing Class III water samples taken from pond within Universiti Putra Malaysia (UPM). Plants were exposed to 15 mg/L of Pb and Mn (192 h) and harvested at different time intervals. The WQI of water samples has improved to class II after treated with VGs. Independent sample T-test found that no significant different of Pb and Mn concentration between trimmed and untrimmed plants, but there were significant different of those metal concentration between root and shoot of VGs ($p < 0.05$). Higher concentration of Pb detected in root while in shoot, higher Mn concentration. Chlorosis of the plant leaves was seen on day 6 for trimmed and day 7 for untrimmed. No chlorosis observed on VGs in control experiment. This study found that VG have great potential in improving WQI for running water and have good tolerance ability to high level of Pb and Mn despite no differences in metal uptake between plants with trimmed and untrimmed shoot. Metal accumulation in different organ varied significantly depending upon the role of the metal.

Keywords: Vetiver, Water Quality Index, phytoremediation, metals, lead, manganese.

*Corresponding author: ferdius@upm.edu.my