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Response of Lemna Minor and Salvinia Natans as Bio-Sequester and Removal Agents Toward Fe, Cu And Zn Toxicities Through in Vivo Model System

Razanah Ramya[1] --- Rashidi Othman[2] --- Maheran Yaman[3] --- Zainul Mukrim Baharuddin[4] --- Farah Ayuni Mohd Hatta[5]

[1,2,3,4,5] International Institute for Halal Research and Training (INHART), Herbarium Unit, Department of Landscape Architecture, Kulliyyah of Architecture and Environmental Design, International Islamic University Malaysia

Abstract

A lack of macrophytes in aquatic ecosystem may suggest a reduced population of wildlife whereas the absence of macrophytes may indicate problems in water quality. However an overabundance of macrophytes may due to excessive nutrients, organic or heavy metals interference. Aquatic macrophytes are well known as a good accumulator for heavy metals in phyto-technologies approach since the last decades. Therefore this study aimed to assess heavy metals sequestration rate of Lemna minor and Salvinia natans at three different concentrations ranging from low, medium and high (1 mgl^{-1}, 2 mgl^{-1} and 5 mgl^{-1}) of three types of heavy metal (Cu, Fe and Zn) at four different period of time (week 1 until week 4) through in vivo model system. The results established that there were significant differences between the sequestration rate of both species. S. natans ability and resistance over 3 types of heavy metal toxicity were much more higher and stable compared to L. minor and the capability of both species were varied and depending on the plant tolerance or resistance mechanism itself. Thus, the high correlation between metal removal in water and aquatic plant species indicates that those plants can effectively use for the removal of heavy metals from polluted or contaminated aquatic ecosystem of different concentrations.

Keywords: Lemna minor, Salvinia natans, Aquatic macrophytes, Heavy metals, Bio-sequester, Model system

Contribution of Study: First time isolate having biosurfactants producing bacteria potential along with phenanthrene degaradation was isolated from oil contaminated soil with very low CMC value (120 mg/L) compared to commercial available surfactants. Isolate has great potential for biodegradation of phenanthrene (51%) within 3 days of incubation study.

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Sadeeq Block, Near Fawara Chowk, Abbasia Town,
Rahim Yar Khan - 64200, Punjab, Pakistan
Contact Number: +923146715528, +92685900477
Email: editor@aessweb.com, editor.aess@yahoo.com
Website: www.pakinsight.com