

(198)

Assessment of the Phytoremediation Capacity from Natural Wetlands in Kundasale, Central Province in Sri Lanka

Dinethra H.A.P.^{1*}, Ranasinghe D.M.S.H.K.¹, Dissanayake M.²

¹*Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

²*Lakeland College, Canada*

**prashanthi.dinethra@gmail.com*

Abstract

Phytoremediation is known as plant based clean up. It is the use of plants to remediate sites contaminated with organic and inorganic pollutants. Phytoremediation has the potential to be the most sustainable wastewater treatment option for developing countries which is cost effective and environmentally friendly. Variety of organic and inorganic compounds are amenable to the phytoremediation process. The success of phytoremediation depends on the availability of plant species which could absorb pollutants. Plants promote the removal of pollutants by uptake and concentration, transformation of pollutants, stabilisation and rhizosphere degradation. The present study was carried out to assess the effectiveness of natural wetlands in treating the wastewater from an urban area and also to identify the effectiveness among plant species and plant parts in the phytoremediation. The experiment was carried out in the existing natural wetlands in the site of the Nation Builders Association, Kundasale, Central Province of Sri Lanka which receives storm water from the City. The predominant plant species in the two wetlands studies were *Lassia spinose* and *Dieffenbachia seguine*. In addition to these Rampe, Wathupaalu were present in lesser numbers. Water samples were collected from the collection pond, inlets and outlets of the wetlands and the final collection pond. Plants of the aforementioned species were also collected at the inlet areas and outlet areas; roots and leaves separated. The sampling was done to coincide with the dry and wet periods of the year. Parameters tested in the water samples were Temperature, pH, BOD (mg/l), COD (mg/l), TDS (mg/l), TSS (mg/l) Phosphate (mg/l), Nitrate (mg/l) and heavy metals (Cr, Zn, Pb and Cu). With regards to the plant samples, they were separated into roots and leaves and tested for Total Nitrogen Phosphorus, Heavy metals (Cr, Zn, Pb and Cu). According to the results, with regards to the water samples, all parameters including BOD, COD and heavy metals showed a significant decrease once they have passed through the wetlands. With regards to the plant species, both roots and leaves showed higher concentrations of parameters which are correlated to those in the inlets. Further roots were able to retain higher concentrations compared with the leaves in all the species. With regards to the species, *Lassia spinose* showed higher concentration of all the pollutants compared with *Dieffenbachia seguine* and other species. In conclusion it can be emulated that natural wetlands are able to clean the inlet waters. Among the species *Lassia spinose* showed higher performance in trapping the pollutant in their plant parts compared with *Dieffenbachia seguine*. Roots perform much better than leaves in this function of retaining pollutants.

Keywords: Natural wetlands, Pollutants, Phytoremediation, Heavy metals