 ISSN 2362-0412

Study on the Suitability of Artificial Floating Wetlands to Purify Eutrophic Water Bodies

W.A.K. Pushpajith, S.R. Amarasinghe, R.H.G.B. Prabhashini and N.Y. Hirimuthugoda

Faculty of Agriculture, University of Ruhuna, Sri Lanka

Corresponding author: yasho@ansci.ruh.ac.lk

The tropic state of a water body is important to maintain its sustainablity. Nitrogen and phosphorus are the main nutrients which determines the tropic levels. The eutrophic water bodies host large quantities of organisms, including algal blooms (Cyanobacteria). Cyanobacteria is observed in nature similar to the other algae species in all eutrophic aquatic ecosystems. Cyanobacteria is well recognized for its effective toxins such as Microcystins and Cylindrospermopsins. In July, 2020, the Microcystins levels of *Allewella* and *Lenabatuwa* lakes in Kamburupitiya area were 2 μgL^{-1} and 1.7 μgL^{-1}, respectively, which exceeds the WHO recommendation of 1 μgL^{-1}. Therefore, efficient and cost effective method for controlling eutrophication is timely essential. An artificial floating wetland is an innovative method which has been successfully practiced all over the world. The present study focused on the purification of a tank in the Faculty of Agriculture, University of Ruhuna, Kamburupitiya with artificial floating wetland consisted with three plant species; *Ipomoea aquatia (*Kangkung*), Acorus calamus (*Wada kaha*)* and *Bacopa monnieri (*Lunuwila*).*The main objective is to find the most suitable plant species for water purification based on absorption and biomass accumulation of N and P in each species. The experiment was conducted for three and half months as a randomized complete block design with three replicates and 36 plants per each replicate from each species. One week old plants were established in the 2m x 2m styro foam structure. Water quality parameters (pH, Temperature, DO, NH_4^+-N, NO_3^--N, PO_4^{3-}, Zooplankton and Phytoplankton) were tested twice during the study period to identify the water quality in the particular tank. Plant parameters (Total N and P, plant height and root shoot ratio) were measured and were analyzed by one-way ANOVA using SAS software. According to the results Wada kaha has the significantly ($P < 0.05$) highest nitrogen absorption capacity (0.098 ppm) and Kang kung (0.042 ppm) and Lunuvila (0.019 ppm) are followed by more to less absorption capacity. As phosphorus absorption, Wada kaha has significantly higher ($P < 0.05$) capacity (0.21 ppm) and Lunuvila (0.09 ppm) is with second highest absorbance treatment and Kang kung (0.06 ppm) is with the least. The findings of the present study reveal that the artificial floating wetlands are suitable for removing nitrogen and phosphorus from eutrophic water bodies.

Financial assistance: Southern Province Irrigation Department

Keywords: Biomass accumulation, Cyanobacteria, Eutrophication, Wada kaha, Water purification,