

(181)

Controlling Algal Blooms in Beira Lake, Colombo: Evaluating the Effect of the Effective Microorganism Preparation 'Bokashi® Balls' and *Eichhornia Crassipes*

Karunaratne U.T.^{1*} and Nanayakkara C.M.²

¹Department of Zoology, University of Colombo, Sri Lanka

²Department of Plant Sciences, University of Colombo, Sri Lanka

* uthpalakarunaratne@gmail.com

Abstract

A study was conducted to determine the use of effective microorganisms (EM) in the form of Bokashi® balls, and *Eichhornia crassipes* plants in controlling the algal blooms, which is a major health concern for the people living around the Beira Lake located in the Colombo city. For the experiment, Beira water was collected into clean glass fish tanks (apprx. 50 L). Three replicates were used for each simulation: Beira water with Bokashi® balls; Beira water with Bokashi® balls and *Eichhornia crassipes* as floating wetlands; Beira water with *E. crassipes* as floating wetlands; Beira water alone.

Weekly, samples were collected and tested for the parameters; physical parameters—temperature and turbidity; chemical parameters—dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), pH, total nitrogen, phosphorus, potassium concentrations and electrical conductivity; biological parameters—algal density, and bacterial density.

Data were analyzed using ANOVA and the results indicated a significant reduction in algal density from 6250-43.33±30.14 cells/mL in 10 weeks in the treatment that used Beira water with Bokashi® balls (p=0.000). The treatment that used Bokashi® balls in combination with *E. crassipes* showed the next lowest algal density compared to the Control and *E. crassipes* alone treatment. The turbidity and BOD of the treatments were significantly reduced when using Bokashi® balls alone, from 128-5.97±1.24 NTU and from 4.92-0.48±0.24 mg/L, respectively. Electrical conductivity of the water was also reduced significantly in the presence of Bokashi® balls (from 340-284±26.06 µS/cm). *E. crassipes* plants exhibited the ability to reduce nitrogen and phosphorus concentrations of the treatments significantly (p=0.001) (0.42±0.17 in week 2 to 7.14±0.25 mg/L in week 10, and 1.91±0.39 mg/L in week 2 to 0.37±0.15 mg/L in week 10, respectively).

Based on the results Bokashi® balls can be successfully used to reduce the algal density, turbidity, BOD and electrical conductivity in polluted water. *E. crassipes* plants were more effective in reducing the nitrogen and phosphorus content and hence important in preventing recolonization of algae. However, none of the treatments were effective in reducing the COD, total dissolved solids or potassium concentration.

Keywords: Algal blooms, Beira Lake, Bokashi® balls, Effective microorganisms, *Eichhornia crassipes*, Floating wetlands, Water pollution