

PHYTOREMEDIATION OF NITRATE AND PHOSPHATE BY *Salvinia molesta* Mitchell

W.M.K.E.H. Wijesinghe^{1,3*}, N.M Wickramage², D.M.R.E.A. Dissanayake^{1,3},
S.S. Iqbal⁴, M.C.M. Iqbal¹

¹National Institute of Fundamental Studies, Hantana Road, Kandy

²Faculty of Agriculture, University of Ruhuna, Kamburupitiya

³Postgraduate Institute of Science, University of Peradeniya, Peradeniya

⁴Department of Chemistry, Open University of Sri Lanka, Nugegoda

Phosphate and nitrate are two essential nutrients required by plants. Due to the over use of phosphate and nitrate fertilizers, the excess is runoff to nearby freshwater bodies resulting in eutrophication. Phytoremediation is a cost-effective green technology which uses living plants to remediate large contaminated sites. The objective of this study is to investigate the potential of a free-floating aquatic fern, *Salvinia molesta* for nitrate and phosphate removal from an aqueous medium. Samples of *S. molesta* were introduced to nitrate and phosphate solutions separately and 25 mL solution was withdrawn separately at predetermined time intervals for 30 hours. The solutions were analysed for nitrate concentration using a nitrate probe and for phosphate using UV-Vis spectrophotometer. The removal of anions was further studied by varying the initial pH values (3.0 – 10.0) of the anion solution, the mass of the plant (100.0–250.0 g) and with a series of initial anion concentrations (nitrate concentration varied between 1.0 –15.0 mg L⁻¹ and phosphate concentration from 10.0 –100.0 mg L⁻¹). Nitrate removal increased gradually and reached a maximum value (62.30%) in 21 h while phosphate removal increased gradually and reached equilibrium (92.87%) in 42 h. The optimum pH range for nitrate removal was from pH 3-7 and for phosphate pH 3-10. When the mass of plant is increased, the anion removal percentage increased. Both anions showed higher removal percentage at low anion concentration and their removal decreased gradually with increasing anion concentration. *S. molesta* showed more tolerance towards higher phosphate concentrations than towards nitrate concentration. Therefore, this species is more favourable for the uptake of phosphate.

Financial assistance from National Research Council (Grant 15-022) is acknowledged.

Keywords: Nitrate, Phosphate, phytoremediation, *Salvinia molesta*

*Corresponding author: email- hirunikawije@gmail.com