Abstract No: 171 ***Physical Sciences***

PHYCOREMEDIATION OF METHYLENE BLUE

B.M.N. Lakmini[1], W.G.M. Lakmali[2], S.N.P. Athukorala[2] and K.B. Jayasundera[1*]

[1]Department of Chemistry, Faculty of Science, University of Ruhuna, Matara, Sri Lanka
[2]Department of Botany, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka
[*]keerthibj@chem.ruh.ac.lk

Industrial dyes are a major contributor towards pollution of natural water bodies. Accumulation of these molecules in higher concentrations in the environment is harmful for all living organisms. Removal of such synthetic dyes from industrial effluents when present at low concentrations is difficult and expensive. Currently, adsorption-based methods using activated charcoal and polymeric material are widely used. Biomass originated from higher plants or microorganisms provides alternative low-cost adsorbents. While dry biomass can only adsorb pollutants, live biomass is capable of adsorption as well as degradation of molecules to less toxic substances. Phycoremediation utilizes algae for the removal or biotransformation of pollutants including nutrients and xenobiotics from wastewater. Among many different types of microorganisms, microalgae are more practically useful for bioremediation due to ease of handling and adaptability to environmental conditions. This study was focused on using two live microalgae species; *Chlorococcum aquaticum* and *Chlorella* sp. isolated from polluted water bodies in Sri Lanka to remove methylene blue in water. The factors affecting the bio-removal process, adsorption models and kinetics were studied in detail. *C. aquaticum* showed 75.54% decolorization within seven days with a dosage of 6.4×10^{1} mg mg^{-1} of cell culture in 150 min whereas *Chlorella* sp. showed 71.10% decolourization within seven days with a dosage of 1.2×10^{2} mg mg^{-1} of cell culture in 150 min. *C. aquaticum* - methylene blue adsorption processes showed a fit to the Langmuir adsorption isotherm whereas *Chlorella* sp. - methylene blue adsorption system fitted to the Temkin adsorption isotherm model. Both the adsorption systems were well fitted to the pseudo second order kinetics. This study revealed the adsorption of methylene blue by growing *Chlorococcum aquaticum* and *Chlorella* sp. introducing a potential eco-friendly, and low-cost alternative for the removal of methyl blue from industrial effluents.

Keywords: Adsorption kinetics, Bioremediation, *Chlorella* sp., *Chlorococcum aquaticum*, Methylene blue