

PHYTOREMEDIATION: TREATING EUTHROPHIC LAKE AT KotaSAS LAKESIDE, KUANTAN BY AQUATIC MACROPHYTES

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Abstract. This investigation was embraced ex-situ to investigate the capability of the submerged plants' water hyacinth (*Eichornia crassipes*) and water lettuce (*Pistia stratiotes* L.) as phytoremediation aquatic macrophytes for nutrients removal from a eutrophic lake situated at KotaSAS Lakeside surrounded by residential area as the risk of algae bloom can be avoided. The present of mankind activities such as sewage runoff and agricultural towards water bodies, the eutrophication process being speed up. The capability of these plants to evacuate certain parameters not just supplements while additionally including BOD₅, COD, TSS, Turbidity, and heavy metals. The technique for investigation of lake water was alluded by Standard Method for Examination of Water and Wastewater. Water lettuce displayed extraordinary nitrate removal effectiveness up to 94% however this plant species shrivelled from week 2 of the examination because of an absence of nitrate supply and caused an expansion in phosphorus concentration. Then, water hyacinth indicates relentless evacuation productivity with a normal of 82% for nitrate and phosphorus. Other than that, water hyacinth indicates 88% and 72% of TSS and turbidity expulsion effectiveness which can improve the clarity of lake water. With this accomplishment gained in phytoremediation innovation utilizing water hyacinth, it is of most significance for this innovation to be executed in bigger scales in the future.

1. Introduction

Eutrophication can be defined as a process of the aggressive growth of algae on the surface of water, as caused by excessive richness nutrients through surface runoffs that carry down by fertilized agricultural areas, sewage form cites, and industrial waste [9]. All the water bodies will undergo eutrophication naturally, but it is slow. Cultural eutrophication is the involvement of mankind activities such as urbanization, industrialization and intensifying agricultural production which

- [9] Mamun, M and An, KG 2017 *Major nutrients and chlorophyll dynamics in Korean agricultural reservoirs along with an analysis of trophic state index deviation. Journal of Asia-Pacific Biodiversity*, **10**, 183–191, 10.1016/j.japb.2017.04.001.
- [10] Mayo, AW and Hanai, EE 2016 *Modeling phytoremediation of nitrogen-polluted water using water hyacinth (Eichhornia crassipes). Physics and Chemistry of the Earth, Parts A/B/C*, **100**, 170–180, 10.1016/j.pce.2016.10.016.
- [11] Ng, YS and Chan, DJC 2016 *Wastewater phytoremediation by Salvinia molesta. Journal of Water Process Engineering*, **15**, 107–115, 10.1016/j.jwpe.2016.08.006.
- [12] Nivetha, C, Subraja, S, Sowmya, R and Induja, NM 2016. *Water Lettuce for Removal of Nitrogen and Phosphate from Sewage*. **13**, 98–101, 10.9790/1684-13020198101.
- [13] Rezania, S, Ponraj, M, Talaiekhosani, A, Mohamad, SE, Md Din, MF, Taib, SM, Sabbagh, F and Sairan, FM 2015 *Perspectives of phytoremediation using water hyacinth for removal of heavy metals, organic and inorganic pollutants in wastewater. Journal of Environmental Management*, **163**, 125–133, 10.1016/j.jenvman.2015.08.018.
- [14] Suhendrayatna, Marwan, Andriani, R, Fajriana, Y and Elvitriana 2012 *Removal of municipal wastewater BOD, COD, and TSS by phyto-reduction: a laboratory-scale comparison of aquatic plant at different species Typha latifolia and Saccharum spontaneum. International Journal of Engineering and Innovative Technology (IJEIT)*, **2**, 333–337.
- [15] The Star 2014 *Ill effects of nitrogen overdose* Available at: <http://www.thestar.com.my/news/environment/2014/06/30/ill-effects-of-nitrogen-overdose/>.
- [16] Ugya AY, ITS and TSM 2016 *The Role Of Phytoremediation In Remediation Of Industrial Waste*, 10.20959/wjpr20161275.

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