



## Evaluation of *Ulva reticulata* for the bioremediation of nutrients from Kelung River, Penang, Malaysia

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### Abstract:

Urban, agriculture, aquaculture and industrial wastewater are rich in nitrogen and phosphorus, and it is necessary to reduce the concentrations of these nutrients in the effluent before wastewater can be discharged into the environment. This study examined the use of *Ulva reticulata* to remove nutrients from water that collected from Kelung River in the Bayan Lepas Free Industrial Zone, Penang, Malaysia. *Ulva reticulata* was exposed to water, and its nutrient uptake was measured at different times. The maximum ammonium and phosphate uptake rates occurred during the first hour of exposure ( $V_{300\mu\text{M}}^{0-1\text{h}} = 32$  and  $V_{50\mu\text{M}}^{0-1\text{h}} = 4 \mu\text{mol g}^{-1} \text{fw h}^{-1}$ , respectively). *U. reticulata* had removed 92.4% of the ammonium and 90% of the phosphate from water by 24 and 48 h, respectively. The growth rate of *U. reticulata* ranged from 3.24 to 4.0% day<sup>-1</sup>. Our results revealed that *U. reticulata* is an effective biofilter for ammonium and phosphate and will grow quickly in water that contaminated with nitrogen and phosphorus.

**Keywords:** Nutrient removal, *Ulva reticulata*, bioremediation, uptake rate