Experimental comparisons of three submerged plants for reclaimed water purification through nutrient removal

Xiaoqin Zhou, Zifu Li*, Ruixue Zhao, Ruiling Gao, Yupan Yun, Mayiani Saino, Xuemei Wang

Beijing Key Laboratory of Resource-oriented Treatment of Industrial Pollutants, School of Civil and Environmental Engineering, University of Science and Technology Beijing, Beijing 100083, P.R. China, Tel./Fax: +86 10 62334378; emails: zhouxiaoqin025@163.com (X. Zhou), zifulee@aliyun.com (Z. Li), 642823393@qq.com (R. Zhao), gaoruiling1988@126.com (R. Gao), yun_19850601@163.com (Y. Yun), enolesaino@gmail.com (M. Saino), wangxuemei0000@126.com (X. Wang)

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ABSTRACT

Submerged aquatic plants have attracted increasing attention as an advanced component for wastewater treatment. This study performed a laboratory-scale investigation using three submerged plants, namely Myriophyllum verticillatum, Potamogeton perfoliatus, and Najas minor to determine the response of submerged plants to seasonal changes and intermittent reclaimed water amendment. The three plants were pre-selected from seven commonly used submerged plants. Reclaimed water from a wastewater reclamation plant was used as raw water. The total phosphorus (TP), total nitrogen (TN), ammonium, chemical oxygen demand, and dissolved oxygen were monitored during the experiments to investigate their resistance to changes in water conditions. With seasonal changes from April to June, the water temperature ranged between 19 and 23˚C, and the TN and TP removal efficiencies were negatively affected. The highest TN and TP concentrations in the tanks with M. verticillatum and P. perfoliatus were reached on day 14. However, N. minor exhibited sustained growth, and the water quality remained in good condition. The TN and TP removal efficiencies were 81 and 62%, respectively. In addition, the intermittent reclaimed water amendment tests on the three plants yielded similar results. The TN and TP removal efficiencies of N. minor were 55 and 93%, respectively. N. minor proved to be a promising plant for water purification.

Keywords: Landscape ponds; Purification efficiency; Reclaimed water; Submerged plants

*Corresponding author.

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