



Application of biological island grids in wastewater treatment and its microbial mechanisms

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ABSTRACT

Biological island grid system (BIGS) is a new type of biological floating island which allows for larger bacterial population to grow in the system. In this study, the nutrient-removal efficiencies of two different BIGS, constructed with *Oenanthe javanica* and *Iris pseudacorus* were investigated. Molecular technique was used to study the microbial mechanisms of pollutants removal. Results showed that BIGS had an excellent long-term removal performance compared with conventional biological floating island. The NH_4^+ -N-removal efficiencies of BIGS were 89.5 and 91.2%, which were 16.3 and 16.9% higher than the control, respectively. Over 75% of chemical oxygen demand (COD) was removed in both BIGS while the COD-removal efficiencies were only 71.4 and 69.1% in the control. Analysis of DGGE pattern showed that the diversity index of the elastic space in BIGS was 1.93–2.65. Furthermore, month played a main role in microbial community structures. About 46.2% of the microorganisms in the system belonged to *Proteobacteria*, followed by uncultured bacteria. There were lots of nitrogen-fixing and nitrate-degradation bacteria among them, which might play an important role in the nitrogen removal from the polluted water. The present study proved that BIGS was an effective approach to improve water quality.

Keywords: Biological island grid system; Removal efficiency; Microbial mechanisms

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