



“Gheorghe Asachi” Technical University of Iasi, Romania



DEVELOPING A HOLISTIC ASSESSMENT FRAMEWORK FOR WATER QUALITY EUTROPHICATION

Kuan Xu

*Wroclaw University of Environmental and Life Sciences, Institute of Environmental Engineering,
Department of Mathematics, pl. Grunwaldzki 24, 50-375 Wroclaw, Poland, e-mail: m18905539917@163.com*

Abstract

This study presents a holistic framework for assessing water eutrophication, which integrates indicators of microbial community interactions, growth dynamics, and nutrient concentration changes. The bacteria-algae symbiotic system demonstrated superior removal rates of TN and TP, achieving 48.2% and 89.7% respectively, compared to the control which only achieved 35.9% and 33.1% removal. The nitrate concentration using this method was 15.06 $\mu\text{g/L}$ compared to 18.51 $\mu\text{g/L}$ for the control group. The results showed that the system was able to track the purification process through compositional and functional indicators. Compared to existing methods for assessing eutrophication, this approach provides a more comprehensive evaluation of both the degree of eutrophication and the effectiveness of water body purification. The model provides another green technology for assessing and managing eutrophication in water bodies.

Key words: eutrophication, symbiosis of bacteria and algae, biofilm, water quality, colony relationship

Received: October, 2023; Revised final: March, 2024; Accepted: March, 2024; Published in final edited form: July, 2024
