The pretreatment of micro-polluted source water through phototrophic biofilms under variant light conditions

Hong-Yi Li[1*], Runze Xu[2, 3*], Ting-Feng Liu[1], Zhi-Xin Hu[1]

[1]School of Environmental Engineering, Nanjing Institute of Technology, Nanjing 211167, China

[2]Key Laboratory of Integrated Regulation and Resource Development on Shallow Lakes, Ministry of Education, Hohai University, Nanjing 210098, China.

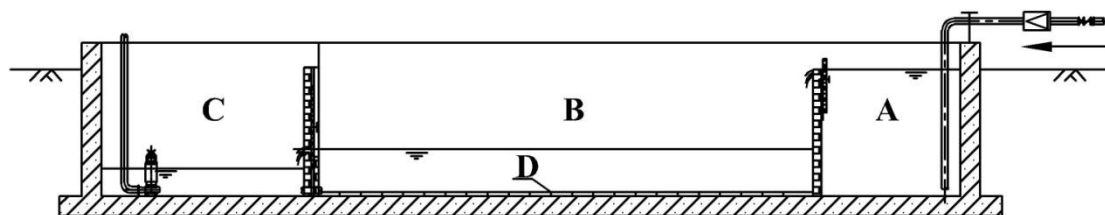[3]College of Environment, Hohai University, Nanjing 210098, China

* **Corresponding authors**:

*Hong-Yi Li, E-mail: hjlihongyi@njit.edu.cn;

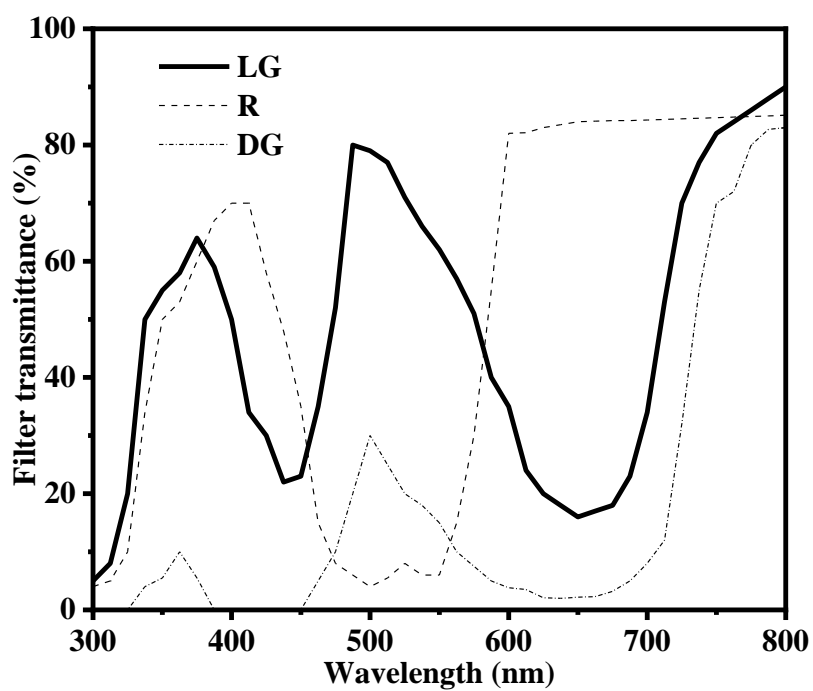*Run-Ze Xu, E-mail: runzexu@hhu.edu.cn.
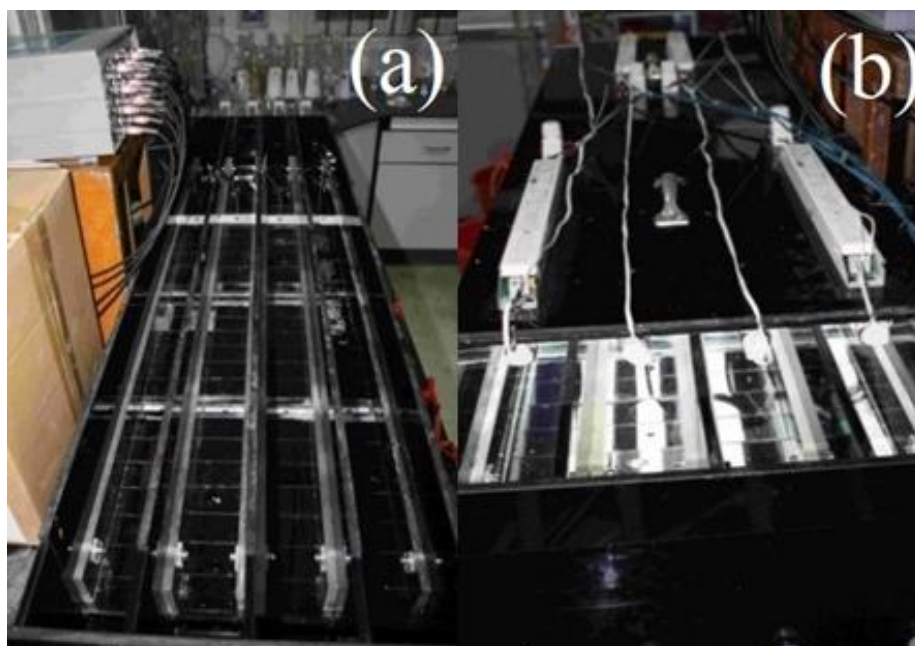
Figure S1 The prototype of the photobioreactor used to culture the phototrophic biofilms: (a) the flow lane of photobioreactor, (b) dimming device.
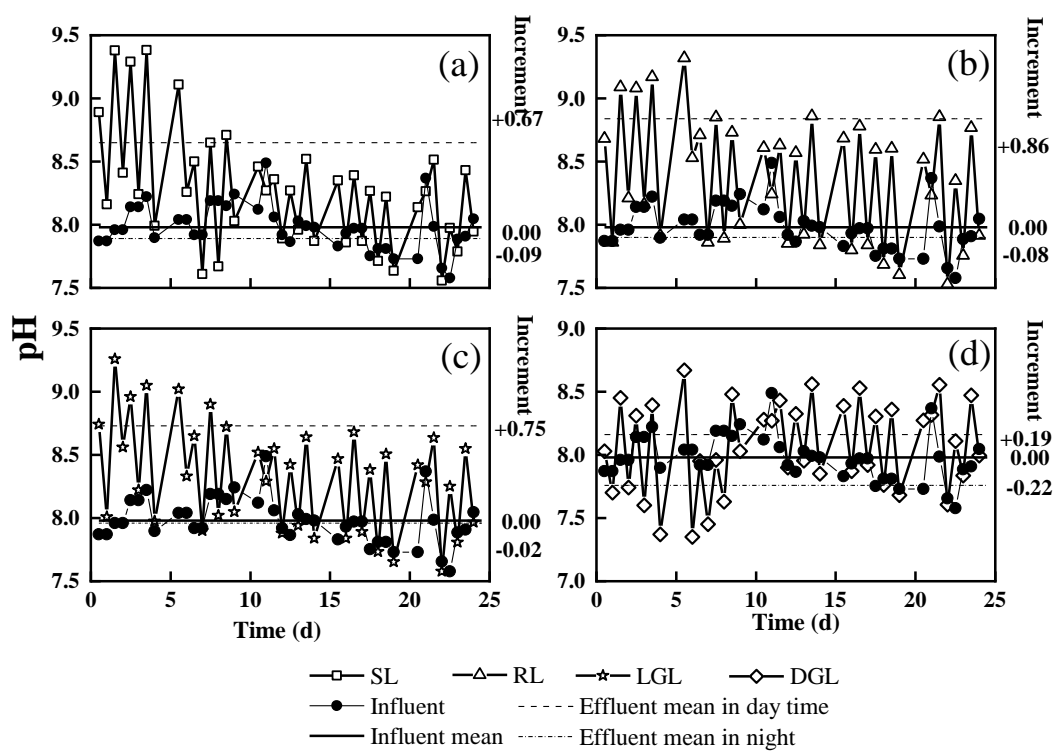
A. Pre-sedimentation zone B.Reaction zone C. Drainage zone D.Flat carrier

**Figure S2** The schematic of pilot-scale equipment for cultivating phototrophic biofilms.

Figure S3 The transmittance of different light filter membranes. LG: light green, R: red, DG: dark green.

Figure S4 The fluctuation of pH in effluent under four light spectra: (a) sunlight (SL), (b) red light (RL), (c) light green light (LGL), (d) dark green light (DGL). The pH value was directly recorded from pH equipment without error bar.
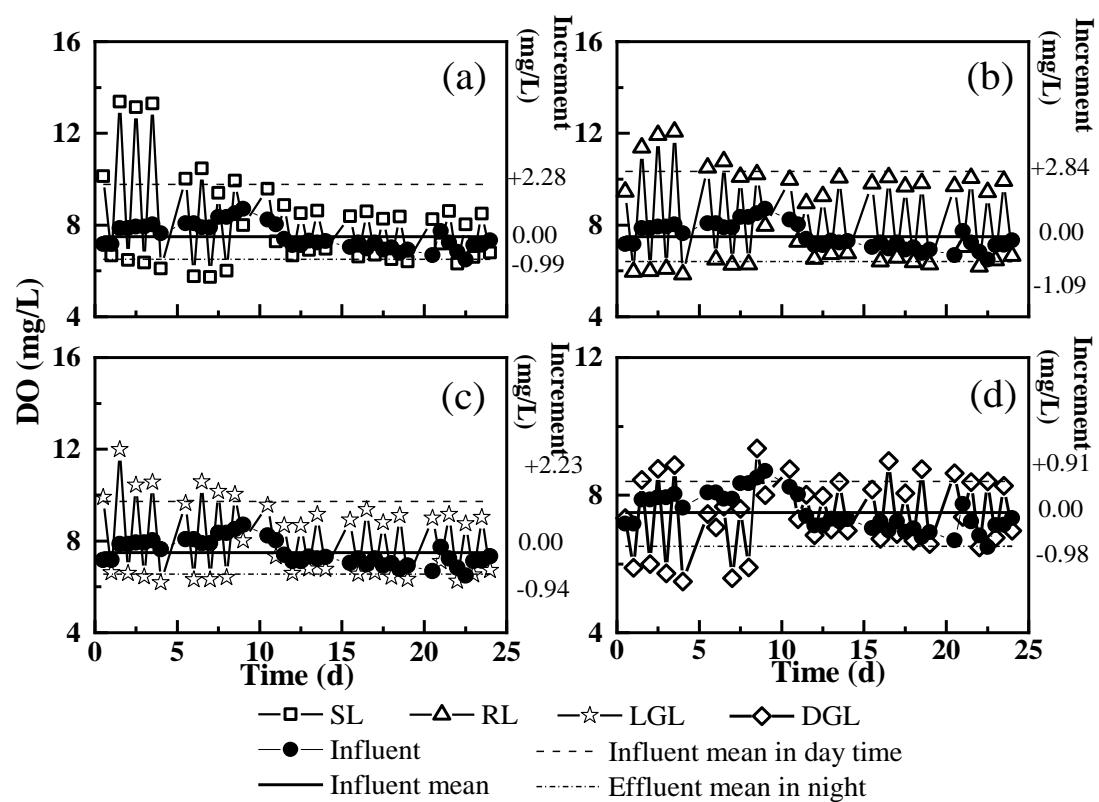
Figure S5 The fluctuation of DO in effluent under four light spectra: (a) sunlight (SL), (b) red light (RL), (c) light green light (LGL), (d) dark green light (DGL). The DO value was directly recorded from DO equipment without error bar.
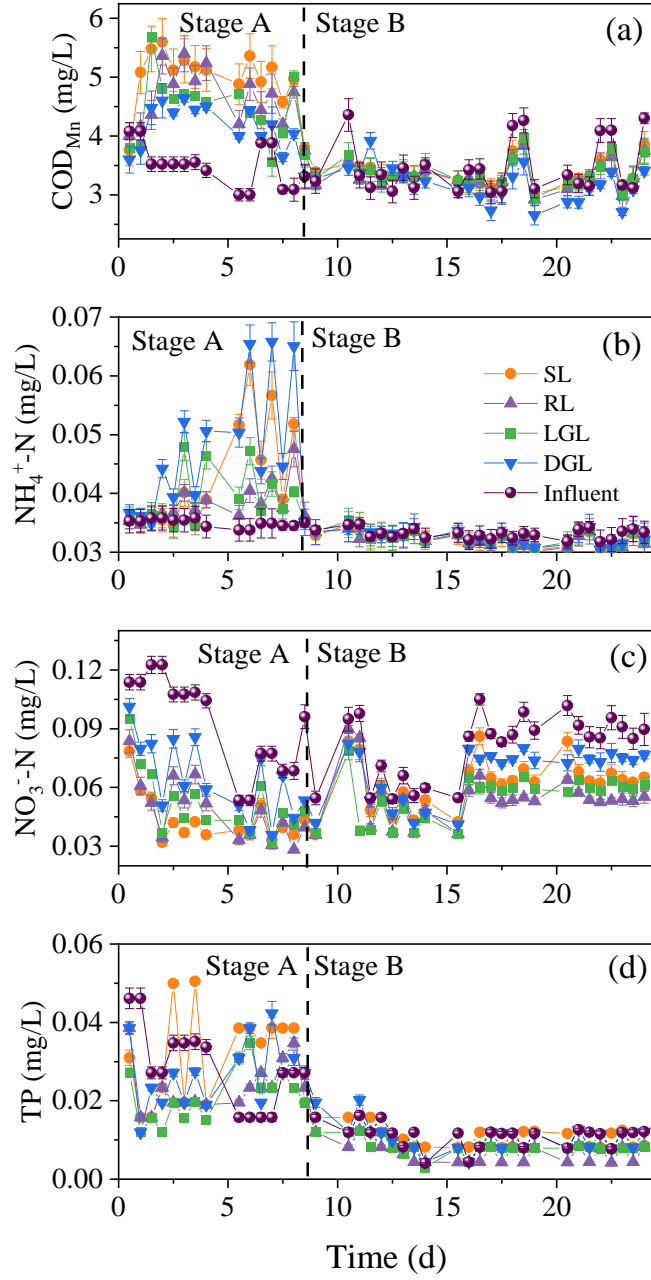
Figure S6 The pretreatment results of actual micro-polluted water collected from TaiHu: (a) COD_{Mn}, (b) NH_4^+-N, (c) NO_3^--N, (d) TP. SL: sunlight, RL: red light, LGL: light green light, DGL: dark green light.
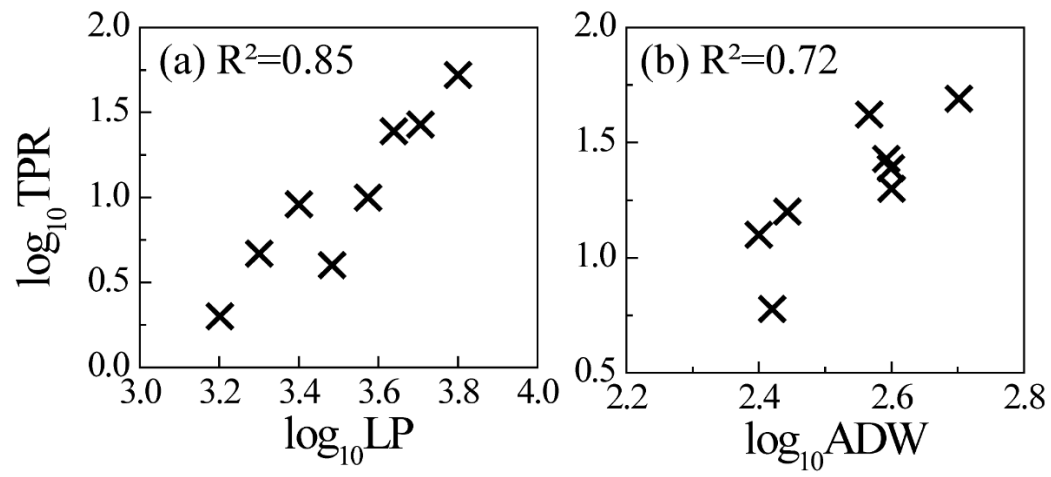
Figure S7 The correlation scatter plot for TP. (a) TP removal rate (TPR) vs biofilm lipid phosphorus (LP), (b) TPR vs ash-free dry weight (ADW).