

Supplementary Material

Changes in the fluorescence intensity, degradability, and aromaticity of organic carbon in ammonium and phenanthrene-polluted aquatic ecosystems

Zixia Qiao^a, Sihai Hu^a, Yaoguo Wu^{a,*}, Ran Sun^{a,*}, Xiaoyan Liu^a, Jiangwei Chan^a

^a*Department of Applied Chemistry, Northwestern Polytechnical University, Xi'an 710129, China*

*** Corresponding author:**

Yaoguo Wu

Department of Applied Chemistry

Northwestern Polytechnical University, 710072 Xi'an, China

E-mail: wuygal@nwpu.edu.cn

Tel.: +86-29-88488018

Ran Sun

Department of Applied Chemistry

Northwestern Polytechnical University, 710072 Xi'an, China

E-mail: sunran@nwpu.edu.cn

Tel.: 86-29-88488018

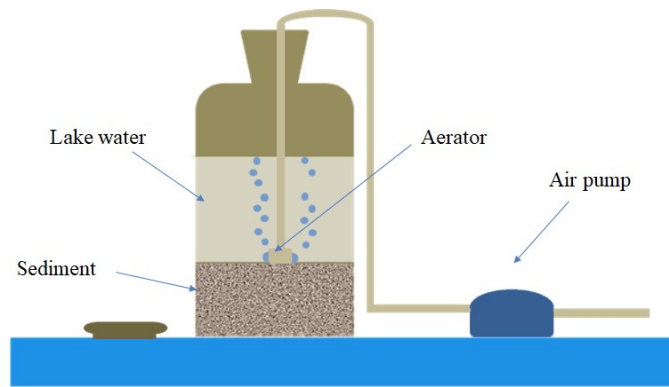


Fig. S1 The mixed culture established by sediment.

Four components were selected for further PARAFAC examination (Fig. S2). Component 1 (Ex/Em: 340/420) and component 4 (Ex/Em: 310/400) is humic acid (fulvic acid) associated with biological production of autochthonous sources (Gentry-Shields et al., 2013). Component 2 (Ex/Em: 300(375)/450) is more likely to be associated with terrestrial organic C (fulvic acid) (Yang et al., 2016), whereas component 3 (Ex/Em: 400/500) is also identified as humic acid organic.

References:

(Gentry-Shields, J., Wang, A., Cory, R.M., Stewart, J.R., 2013. Determination of specific types and relative levels of QPCR inhibitors in environmental water samples using excitation–emission matrix spectroscopy and PARAFAC. *Water Res.* 47, 3467–3476.

Yang, C., Liu, Y., Zhu, Y., Zhang, Y., 2016. Insights into the binding interactions of autochthonous dissolved organic matter released from *Microcystis aeruginosa* with pyrene using spectroscopy. *Mar. Pollut. Bull.* 104, 113–120.)

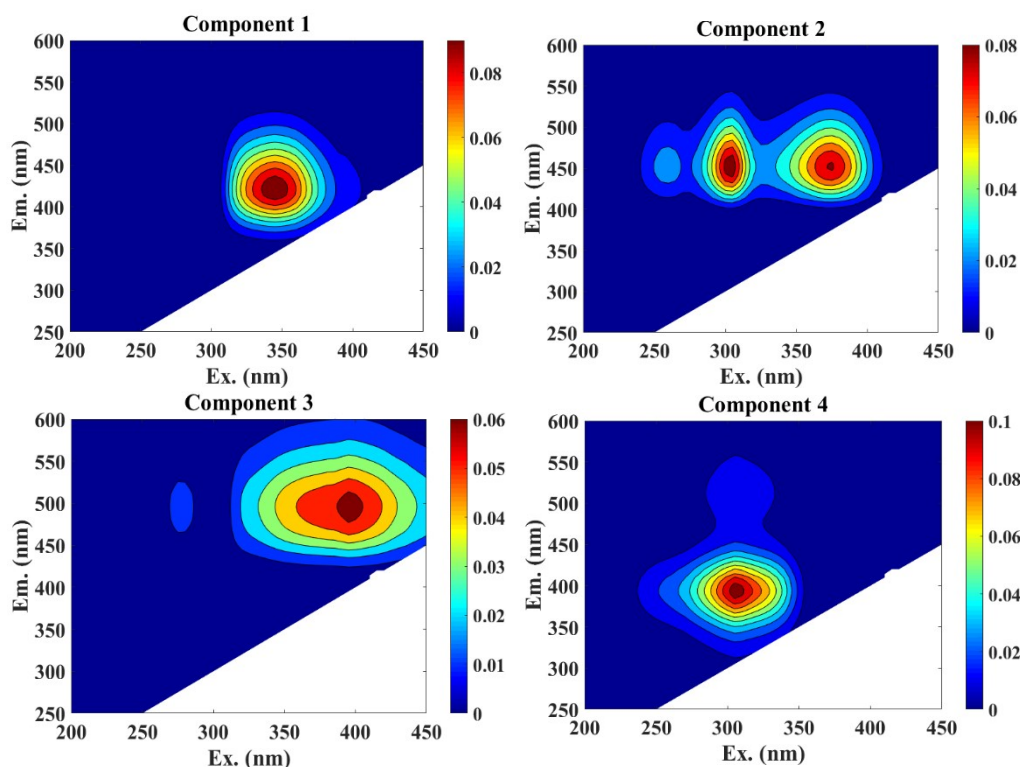


Fig. S2 Fluorescence components analyzed by PARAFAC.

The DO values were all above 5 mg/L, which suggested the aerobic conditions in the mixed cultures.

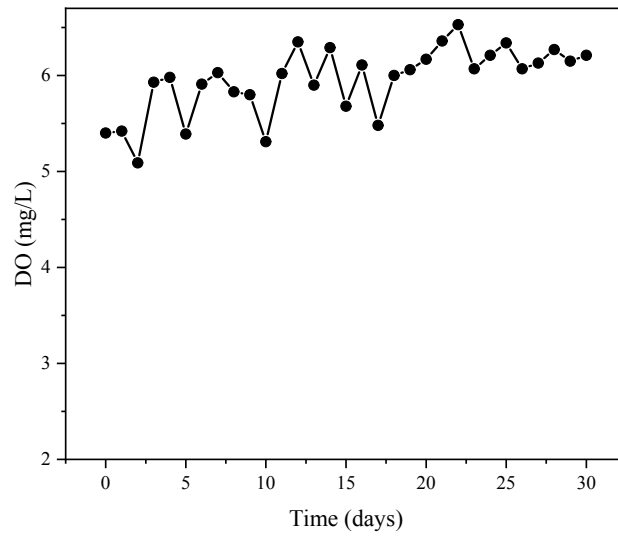


Fig. S3 The DO values in the combined ammonium and phenanthrene biotransformation process.

The pH values were almost consistent with the pollutant biodegradation process, therefore, the pH variations in this study have little effect on the HIX value.

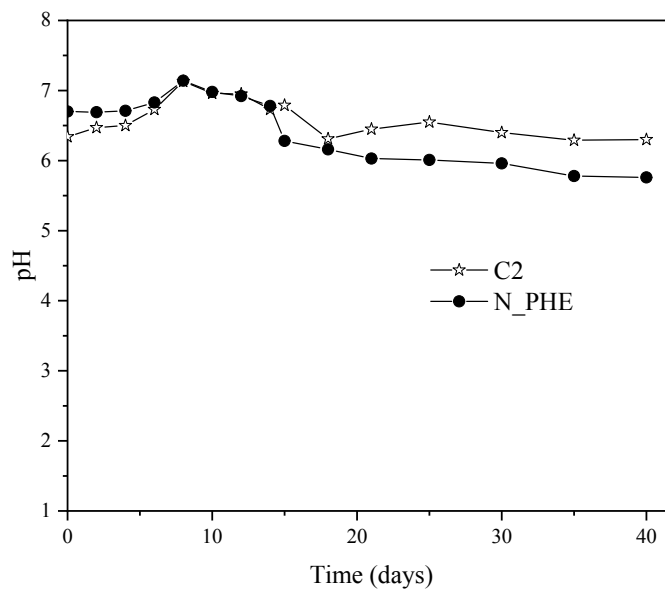


Fig. S4 Changes of pH values in C1 and N_PHE.

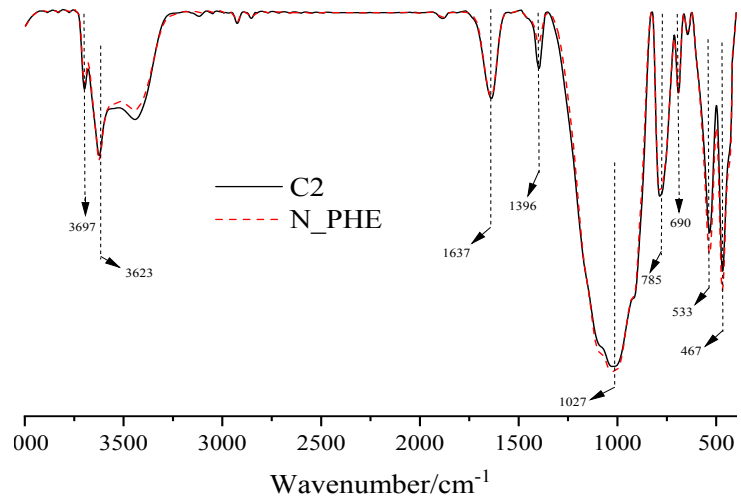


Fig. S5 FTIR spectra of sediment sample in C2 and N_PHE at the 30th day.

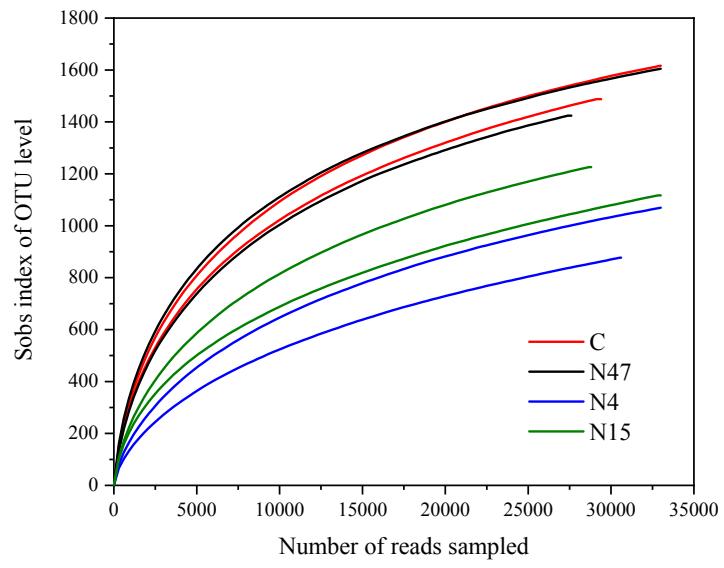


Fig. S6 The rarefaction curves of sediment samples.

Table S1 Physicochemical properties of the water and sediment samples [N=3, mean (stderr)]

	pH	DO (mg/L)	TOC	Ammonium-N	Nitrate-N	Nitrite-N	A _{surf} (m ² /g)	Pore size (nm)	Ca	Na	K	Mg
Water	9.01 (0.02)	9.99 (0.05)	4.01 (0.01) mg/L	0.05 (0.01) mg/L	4.05 (0.01) mg/L	0.15 (0.01) mg/L	-	-	7.89 (0.05) mg/L	9.23 (0.09) mg/L	2.27 (0.07) mg/L	1.37 (0.05) mg/L
Sediment	8.67 (0.03)	-	72.33 (1.13) mg/kg	45.91 (0.52) mg/kg	40.05 (0.03) mg/kg	0.58 (0.01) mg/kg	7.27 (1.02)	92.75 (5.05)	94.23 (0.15) (mg/Kg)	38.43 (0.11) (mg/Kg)	13.75 (0.09) (mg/Kg)	17.41 (0.02) (mg/Kg)

- Not detect