

Influence of microbial treatment on the preparation of biochar materials with stepped-up performance and its application in organic pollutants control

Yingjie Su^{a,b}, Keyu Xie^{a,b}, Jiaohui Xiao^{a,b}, Siji Chen^{a,b,*}

^aCollege of Life Sciences, Jilin Agricultural University, Changchun 130118, China

^bKey Laboratory of Straw Comprehensive Utilization and Black Soil Conservation, Ministry of Education, Jilin Agricultural University, Changchun 130118, China

*Corresponding author E-mail: 18638342679@163.com.

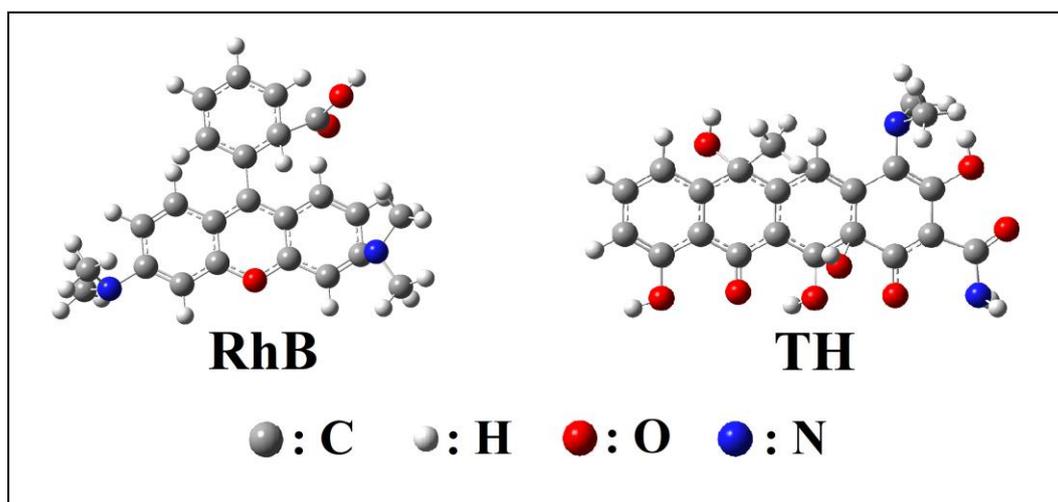


Figure S1. The structural formulas of RhB and TH.

S1 Characterization methods

Scanning electron microscopy (SEM, Hitachi S4800, Japan) was used to examine the morphology of materials. Thermogravimetric analysis of the samples was carried out under the protection of nitrogen flow (TGA, Netzsch STA409PC, Germany). FT-IR spectrometer was used to characterize the surface functional groups of materials between 400 and 4000 cm^{-1} at a resolution of 1 cm^{-1} (FT-IR, Thermo Fisher Nicolet iS50, USA). X-ray diffraction patterns of the powders were observed by an X-ray diffractometer with a filtered Cu-K α X-ray source (XRD, Bruker D8 Advance,

Germany). Raman spectra of the samples were obtained using a model Renishaw 2000 Raman spectrometer at 514 nm to investigate the presence of defects in the biochar materials. X-ray photoelectron spectroscopy was used to test the electronic binding energy of the samples (XPS, Thermo Escalab 250Xi⁺, USA). The zeta potential instrument was used to characterize the surface charge of samples (Zeta potential, Zetasizer Nano ZS90, UK). N₂ adsorption-desorption isotherms were used to obtain the porosity of the samples at 77 K (N₂ adsorption-desorption isotherms, Quantachrome Autosorb iQ2, USA). The Brunauer–Emmett–Teller (BET) theory was used to calculate the surface area. The non-local density functional theory (NLDFT), HK method (HK), and the Barrett–Joyner–Halenda (BJH) model were used to analyze the pore size distribution of samples. The zeta potential instrument was used to characterize the surface charge of samples (Zeta potential, Zetasizer Nano ZS90, UK).