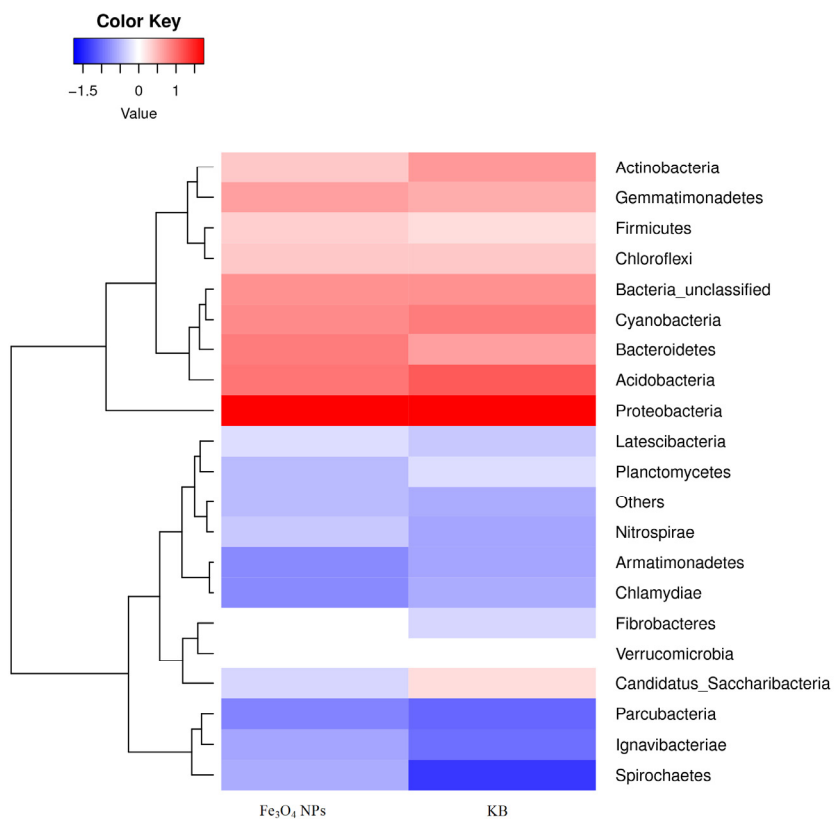
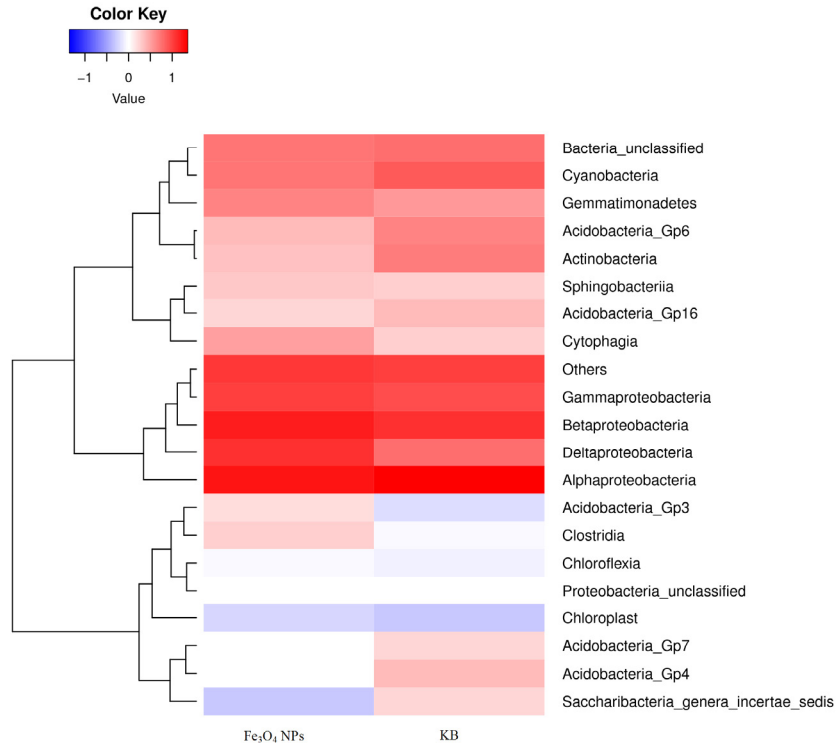




## Supplementary Materials



**Fig. S1.** Heat-map graph of hierarchy cluster for the top 20 phyla in the CWs incorporated with and without Fe<sub>3</sub>O<sub>4</sub> NPs (Fe<sub>3</sub>O<sub>4</sub> NPs represents CWs incorporated with Fe<sub>3</sub>O<sub>4</sub> NPs; KB represents CWs without Fe<sub>3</sub>O<sub>4</sub> NPs). Color intensity in each panel represents the difference and similarity characteristic.



**Fig. S2.** Heat-map graph of hierarchy cluster for the top 20 classes in the CWs incorporated with and without Fe<sub>3</sub>O<sub>4</sub> NPs (Fe<sub>3</sub>O<sub>4</sub> NPs represents CWs incorporated with Fe<sub>3</sub>O<sub>4</sub> NPs; KB represents CWs without Fe<sub>3</sub>O<sub>4</sub> NPs). Color intensity in each panel represents the difference and similarity characteristic.