

### Supplementary data

Table S1 the basic indices of the experimental activated sludge

Index	Fresh activated	Seeding sludge
pH	7.2	7.3
TSS ( $\text{mg}\cdot\text{L}^{-1}$ )	16370	13880
VS S( $\text{mg}\cdot\text{L}^{-1}$ )	11520	5520
Total COD ( $\text{mg}\cdot\text{L}^{-1}$ )	21340	10476
Soluble COD ( $\text{mg}\cdot\text{L}^{-1}$ )	6663.6	2754.8

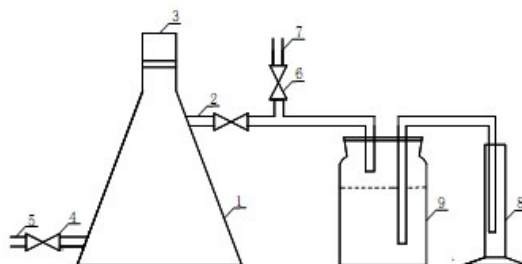
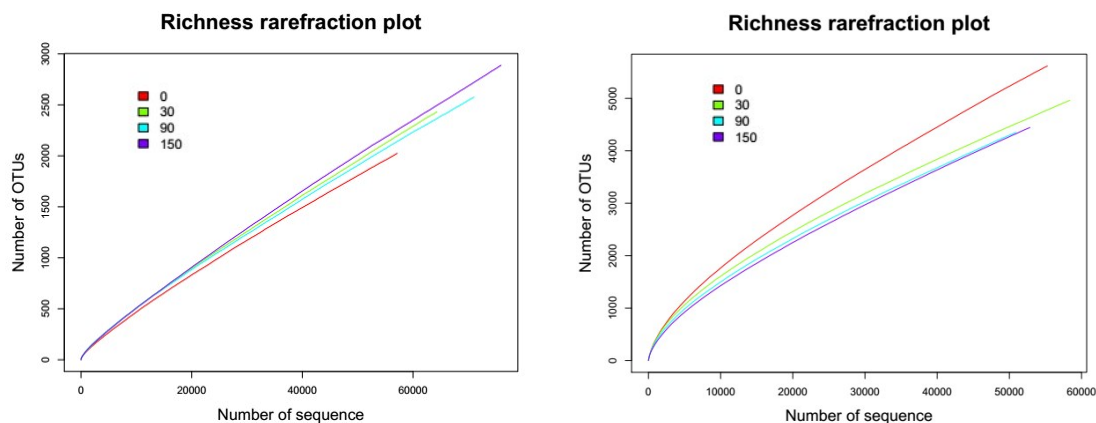
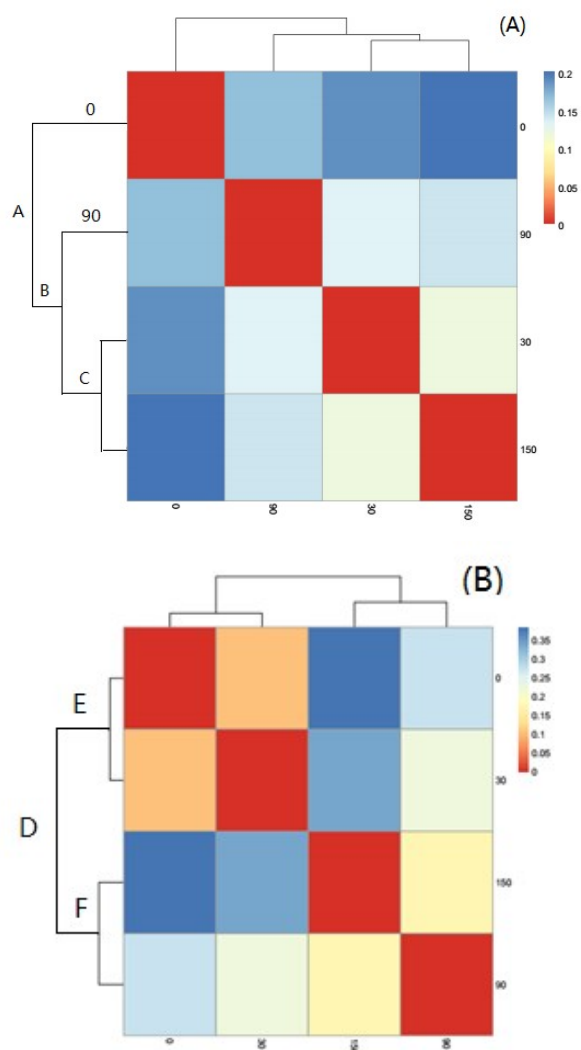


Fig. S1. Experimental setup of anaerobic digestion. 1. Anaerobic digestion reactor; 2. Gas collector; 3. Rubber stopper; 4. Pinchcock; sample collection; 6. Pinchcock; Gas sample connection; 8. Measuring cylinder; 9. Wide-mouth bottle



**Fig. S2** Richness rarefaction plot of species in the activated sludge. (A) Archaeal; (B) Bacterial.



**Fig. S3.** Sample distance heatmap (A: Archaeal; B: Bacterial)