

## Supplementary Materials

**Table S1** Detailed elements in phosphate buffer

Element	Concentration (mg/L)	Element	Concentration (mg/L)
MgCl <sub>2</sub> ·6H <sub>2</sub> O	400	CoCl <sub>2</sub> ·6H <sub>2</sub> O	0.17
CaCl <sub>2</sub> ·2H <sub>2</sub> O	150	FeCl <sub>2</sub> ·4H <sub>2</sub> O	2
NH <sub>4</sub> Cl	500	NaHCO <sub>3</sub>	5000
K <sub>2</sub> HPO <sub>4</sub>	872	ZnCl <sub>2</sub>	0.07
KH <sub>2</sub> PO <sub>4</sub>	680	H <sub>3</sub> BO <sub>3</sub>	0.06
MnCl <sub>2</sub> ·4H <sub>2</sub> O	0.611	NiCl <sub>2</sub> ·6H <sub>2</sub> O	0.04
CuCl <sub>2</sub> ·2H <sub>2</sub> O	0.027	Na <sub>2</sub> MoO <sub>4</sub> ·2H <sub>2</sub> O	0.025
EDTA	5		

**Table S2** Primary bacteria composition in mesophilic and thermophilic sludge

Temperature	Phylum	Genus	Number of OTU	Percentage (%)	Similarity (%)
Mesophilic	<i>Thermotogae</i>	<i>SI</i>	6044	14.14	100
	<i>Bacteroidetes</i>	<i>Bacteroides</i>	5272	12.33	99.92
		<i>Others</i>	8698	20.35	
	<i>Firmicutes</i>	<i>Streptococcus</i>	4424	10.35	97.82
		<i>Syntrophomonas</i>	2210	5.17	97.7
		<i>Others</i>	6512	15.23	
	<i>Actinobacteria</i>	<i>Actinomyces</i>	4247	9.93	98.02
	<i>Chloroflexi</i>	<i>T78</i>	3733	8.73	100
	<i>Synergistetes</i>	<i>vadinCA02</i>	895	2.09	96.15
		<i>HA73</i>	716	1.67	98.47
	Total		42751	100.00	
Thermophilic	<i>Thermotogae</i>	<i>SI</i>	26573	59.04	100
	<i>Bacteroidetes</i>	<i>Others</i>	5591	12.42	
		<i>Coprothermobacter</i>	2667	5.93	100
	<i>Firmicutes</i>	<i>Thermacetogenium</i>	1365	3.03	97.96
		<i>Sporanaerobacter</i>	663	1.47	99.47
		<i>Others</i>	5076	11.28	
	<i>Synergistetes</i>	<i>Anaerobaculum</i>	2095	4.66	99.82
	<i>OP9</i>	<i>Others</i>	975	2.17	99.79
	Total		45005	100.00	