



Supplementary Materials

Table S1. Characteristics of Seed Sludge

Characteristic	Range	Mean
pH	7.1–7.9	7.3 ± 0.29
Alkalinity (mg/L as CaCO ₃)	6,200–7,600	7,050 ± 680
TCODCr (mg/L)	21,000–29,000	24,000 ± 4,100
SCODCr (mg/L)	2,300–5,500	3,300 ± 940
TS (mg/L)	19,000–27,000	23,700 ± 2,600
VS (mg/L)	16,000–23,000	19,000 ± 3,100
T-N (mg/L)	1,300–1,800	1,600 ± 280

TCOD, total chemical oxygen demand; SCOD, soluble chemical oxygen demand; TS, total solid; VS, volatile solids; T-N, total nitrogen

Table S2. Archaeal Communities in AD and ADMEC Determined by 454-pyrosequencing Analysis

Phylum	Class	Order	Family	Genus	Species	Ratio (%)	
						AD	ADMEC
Archaea	Methanomicrobia	Methanomicrobiales	Methanomicrobiaceae	Methanoculleus	<i>Methanoculleus bourgensis</i>	0.21	69.13
					<i>EF552186_s</i>	0.03	1.50
		Methanosarcinales	Methanosarcinaceae	Methanosarcina	<i>Methanosarcina concilii</i>	20.23	-
					<i>EU369605_s</i>	5.60	-
					<i>Methanobacterium beijingense</i>	62.73	0.15
	Methanobacteria	Methanobacteriales	Methanobacteriaceae	Methanobacterium	<i>Methanobacterium petrolearium</i>	4.24	-
					<i>Methanobacterium subterraneum</i>	2.25	-
	Thermoplasmata	Rice_cluster3_o	Methanomassiliococcus_f	CP002916_g	<i>EU662692_s</i>	0.05	25.12
					<i>AY816986_s</i>	-	2.34
	Crenarchaeota	MCG_c	AF424768_o	AF424768_f	AF424768_g	<i>CU917078_s</i>	1.27

AD: anaerobic digester, ADMEC: anaerobic digester combined with microbial electrolysis cells

Table S3. Bacterial Communities in AD and ADMEC dDetermined by 454-pyrosequencing Analysis

Phylum	Class	Order	Family	Genus	Species	Ratio (%)					
						AD	ADMEC				
Firmicutes	Clostridia	Clostridiales	Sedimentibacter_f	Sedimentibacter	FJ825495_s	43.83	0.84				
					Sedimentibacter_uc	2.57	0.01				
			Ruminococcaceae	Ruminococcaceae_uc	Ruminococcaceae_uc_s	3.67	0.72				
				EF559154_g	EF559154_g_uc	1.49	0.70				
			Christensenellaceae	Christensenellaceae_uc	Christensenellaceae_uc_s	1.48	0.24				
			Eubacteriaceae	Pseudoramibacter	Pseudoramibacter_uc	0.87	1.36				
			Thermoanaerobacterales	Thermacetogenium_f	Syntrophaceticus	Syntrophaceticus schinkii	0.62	2.94			
			Erysipelotrichi	Erysipelotrichales	EU009800_f	AM982588_g	GQ138794_s	9.11	29.50		
			Bacteria	Bacteroidetes	Bacteroidia	Bacteroidales	Porphyromonadaceae	HQ183935_s	0.62	2.69	
								EU845084_f	AC160630_g	EU358683_s	0.84
AB270144_g	CR933139_s	1.09					0.10				
FN436026_g	FN436026_s	1.07					3.80				
AB243818_g	DQ346459_s	0.72					1.03				
Bacteroidaceae	Bacteroides	CT573904_s					1.21	2.56			
Tenericutes	Mollicutes	GU196243_o					FJ367735_f	CU921110_s	2.09	2.84	
Synergistetes	Synergistia	Synergistales					Synergistaceae	AF280863_g	AF280863_s	1.68	0.07
		Dethiosulfovibrio_o					Aminobacterium_f	Aminobacterium	Aminobacterium colombiense	0.50	1.82
Spirochaetes	Spirochaetes_c	Spirochaetales					Spirochaetaceae	Sphaerochaeta	GQ138913_s	0.27	1.97
			4P000273_s	0.01	2.19						
Cloacamonas_p	Cloacamonas_c	Cloacamonas_o	Cloacamonas_f	Cloacamonas_f_uc	Cloacamonas_f_uc_s	4.73	20.54				
Thermotogae	Thermotogae_c	Petrotoga_o	Petrotoga_f	Defluviitoga	Defluviitoga tunisiensis	0.04	1.37				

AD: anaerobic digester, ADMEC: anaerobic digester combined with microbial electrolysis cells

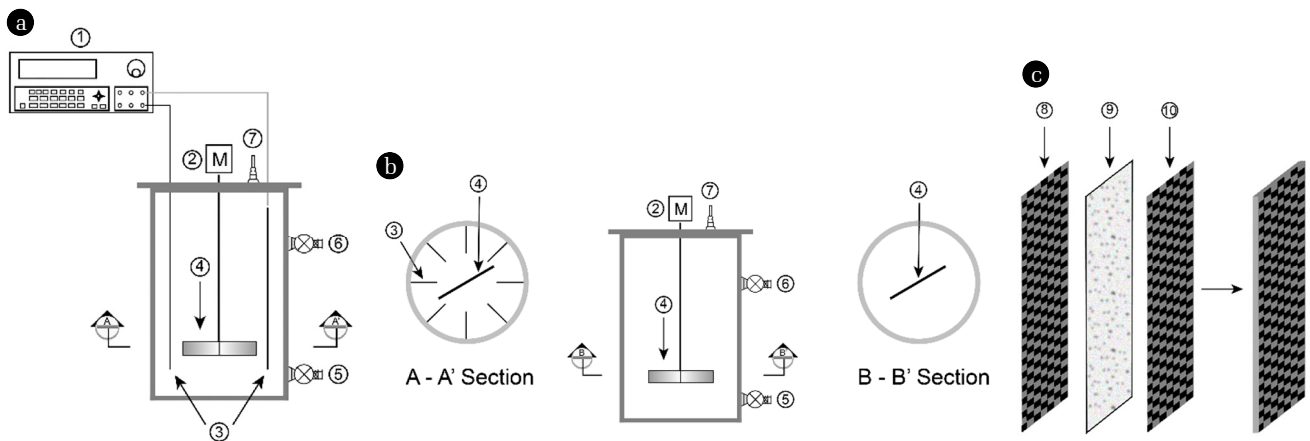


Fig. S1. Schematic representation of (a) single-chamber ADMEC (anaerobic digester combined with microbial electrolysis cells); (b) AD (anaerobic digester). (①: DC power supply, ②: Motor, ③: Electrodes, ④: Stirring paddle, ⑤: Influent valve, ⑥: Effluent valve, ⑦: Gas outlet) AD: anaerobic digester; ADMEC: anaerobic digester combined with microbial electrolysis cells; (c) schematic diagram of electrodes. Anodes were made of graphite carbon coated with Ni. Cathodes were coated with Fe and Cu. A non-woven fabric (1 mm in thickness) was placed between electrodes to prevent direct contact between the anode and cathode. (⑧: Anode, ⑨: Non-woven fabric, ⑩: Cathode).

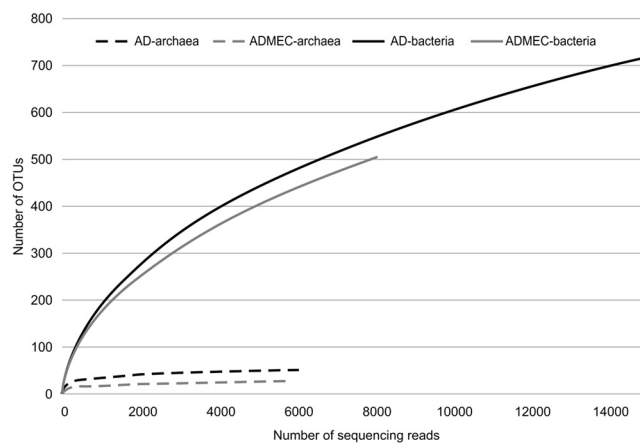


Fig. S2. Rarefaction curve of archaea and bacterial communities in AD (anaerobic digester) and ADMEC (anaerobic digester combined with microbial electrolysis cells). Species diversity is higher in.

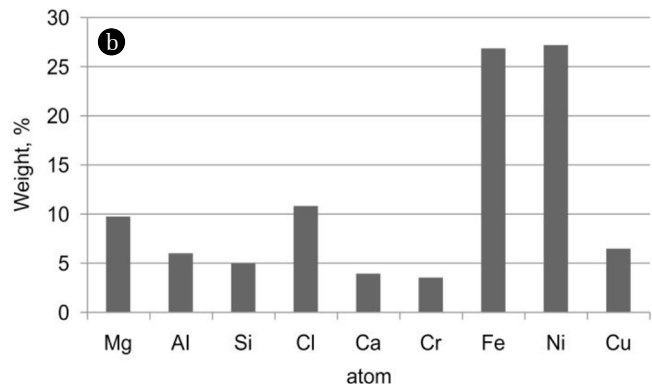
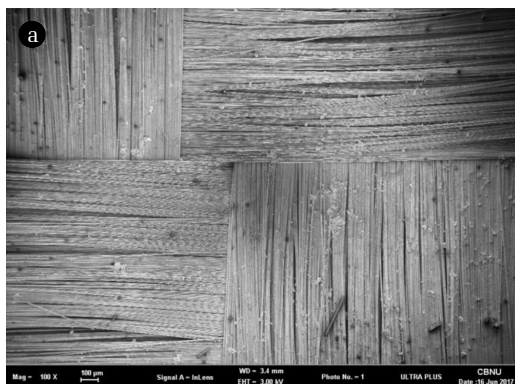


Fig. S3. Scanning electron microscope (SEM) energy dispersive spectrum (EDS) of the cathode surface used in this study; (b) formation of the coated element (without carbon)

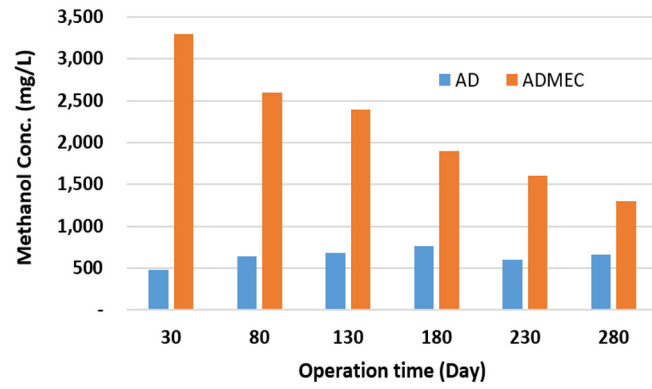


Fig. S4. Methanol concentration in bulk solution of ADMEC and AD.