SUPPORTING INFORMATION

Impact of surface area and current generation of microbial electrolysis cell electrodes inserted into anaerobic digesters

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Table S1. Summarized results of previous MEC studies used for analysis.

Substrate	Single or double chamber	Sub conc. (g COD/L)	A_s (m^2/m^3) [a]	E_{ap} (V)	I_v (A/m^3)	Q_{H2} ($m^3/m^3/d$)	Ref.
Defined and synthetic wastewater							
Acetate	Single	0.6	14	n.a.	2	0.002	[1]
Acetate	Double	0.8	56	0.7	31	0.5	[2]
Acetate	Double	0.8	56	0.7	24	0.5	
Acetate	Double	0.8	56	0.7	22	0.3	
Acetate	Double	0.8	56	0.7	39	0.4	
Acetate	Double	0.8	56	0.7	39	0.6	
Acetate	Single	1.0	50	1.0	163	1.0	[3]
Acetate	Double	0.8	3	0.8	7	0.03	[4]
Acetate	Double	0.8	10	0.8	26	0.18	[5]
Acetate	Single	1.0	32	0.9	131	1.1	[6]
Acetate	Single	1.1	100	1.0	460	5.4	[7]
Acetate	Single	1.5	100	1.0	460	5.4	
Acetate	Single	1.1	100	1.0	360	4.1	[8]
Acetate	Double	0.6	100	0.5	140	0.04	[9]
Acetate	Double	0.6	100	0.8	330	n.a.	
Acetate	Double	0.6	100	n.a.	120	0.6	[10]
Acetate	Single	2.4	14	0.6	270	2.0	[11]
Acetate	Single	2.4	14	0.6	200	1.5	
Acetate	Single	2.4	14	0.6	179	2.1	[12]
Acetate	Single	0.8	22	1.1	312	4.2	[13]
Acetate	Single	0.8	25	0.9	433	3.7	[14]
Acetate	Single	1.6	35	1.0	382	1.5	[15]
Acetate	Single	1.6	25	0.8	194	1.3	[16]
Acetate	Single	1.6	25	0.8	153	1.3	
Acetate	Single	1.6	25	0.8	136	1.2	
Acetate	Single	0.6	6	0.5	68	0.6	[17]
Acetate	Single	0.8	13	0.6	186	1.7	[18]
Acetate	Single	0.8	25	0.6	71	0.01	[19]
Acetate	Single	0.8	25	0.9	222	1.5	
Acetate	Single	0.8	25	0.6	86	0.1	
Acetate	Single	0.8	25	0.9	160	0.8	
Acetate	Single	0.8	25	0.6	160	1.3	[20]
Acetate	Single	0.8	25	0.6	139	1.2	
Acetate	Single	0.8	25	0.6	103	0.9	
Acetate	Single	0.8	15	n.a.	146	n.a.	[21]
Acetate	Single	0.8	25	0.7	n.a.	0.8	[22]
Acetate	Single	0.8	25	0.9	143	1.4	
Acetate	Double	1.4	35	0.9	85	1.1	

Acetate	Double	1.4	35	0.9	60	0.5	[23]
Acetate	Double	1.4	35	0.9	92	0.7	
Acetate	Double	1.6	25	0.9	105	0.4	[24]
Acetate	Double	1.6	25	0.9	85	0.3	
Acetate	Single	0.8	30	1.0	400	n.a.	[25]
Glucose	Double	1.0	4	0.6	n.a.	1.2	[26]
Glucose	Single	1.1	25	0.5	115	0.8	[27]
Glucose	Single	1.1	25	0.9	182	1.9	
Glucose	Single	2.1	27	0.6	38	0.3	[28]
Glucose	Single	2.1	27	0.8	50	0.4	
Glucose	Single	2.1	27	0.6	113	1.0	
Glucose, acetate, ethanol, lactic acid, BSA	Double	1.2	25	0.9	143	0.3	[29]
Glucose, acetate, ethanol, lactic acid, BSA	Double	1.2	25	0.9	115	0.3	
Glucose, acetate, ethanol, lactic acid, BSA	Double	1.2	25	0.9	173	0.3	
Glucose, acetate, ethanol, lactic acid, BSA	Double	1.2	25	0.9	90	0.4	[30]
Glucose, acetate, ethanol, lactic acid, BSA	Double	1.2	25	0.9	85	0.3	
Cellulose	Double	1.0	4	0.6	n.a.	0.1	[26]
Butyric acid	Double	1.0	4	0.6	n.a.	0.5	
Lactic acid	Double	1.0	4	0.6	n.a.	1.0	
Propionic acid	Double	1.0	4	0.6	n.a.	0.7	
Valeric acid	Double	1.0	4	0.6	n.a.	0.1	
P-glycerol	Single	1.2	25	0.5	116	0.8	[27]
P-glycerol	Single	1.2	25	0.9	221	2.0	
B-glycerol	Single	1.2	25	0.5	35	0.1	
B-glycerol	Single	1.2	25	0.9	63	0.4	
BSA	Single	0.5	27	0.6	67	0.05	[31]
BSA	Single	0.8	27	0.6	125	0.2	
BSA	Single	1.1	27	0.6	132	0.4	
BSA	Single	1.1	27	0.8	144	0.5	
BSA	Single	1.6	27	0.6	121	0.1	
BSA	Single	2.3	27	0.6	135	0.1	
Peptone	Single	0.5	27	0.6	33	0.1	
Peptone	Single	0.8	27	0.6	68	0.04	
Peptone	Single	1.1	27	0.6	76	0.1	

Peptone	Single	1.1	27	0.8	111	0.1	
Peptone	Single	1.6	27	0.6	77	0.1	
Peptone	Single	2.3	27	0.6	93	0.02	
Glycerol	Single	1.2	25	0.8	100	0.02	[32]
Starch	Single	1.2	25	0.8	25	0	
Milk	Single	1.0	25	0.8	75	0.09	
Mixed	Single	n.a.	25	0.8	150	0.9	
Real wastewater							
Swine wastewater	Single	14.5	25	0.5	92	1.0	[33]
Swine wastewater	Single	14.5	25	0.5	112	1.0	
Potato wastewater	Single	2.2	25	0.9	161	0.7	[34]
Alkaline-pretreated WAS	Single	4.1	27	0.6	129	0.9	[35]
Dark fermentation effluent	Double	12.2	28	0.6	10	0.02	[36]
Dark fermentation effluent	Double	12.2	28	0.8	12	0.02	
Dark fermentation effluent	Double	12.2	28	1.0	20	0.02	
Industrial wastewater	Single	4.1	25	0.7	38	0.8	[37]
Industrial wastewater	Single	4.1	25	0.7	30	1.2	
Food processing wastewater	Single	8.1	25	0.7	25	0.1	
Food processing wastewater	Single	8.1	25	0.7	25	0.2	

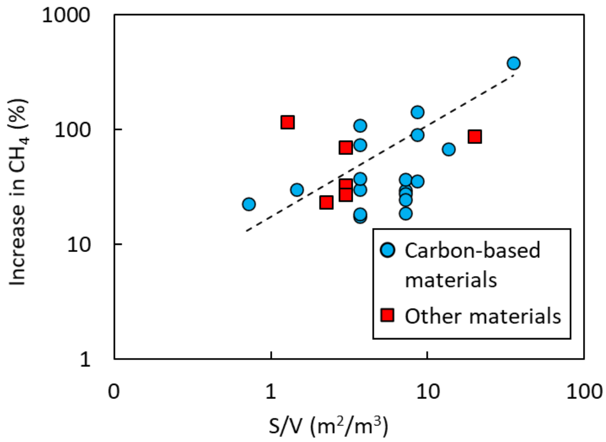

Fig. S1. Increase in methane production as a function of surface area-to-reactor volume ration in AD-MEC studies with carbon-based materials (circles) and other materials (squares) as cathodes.

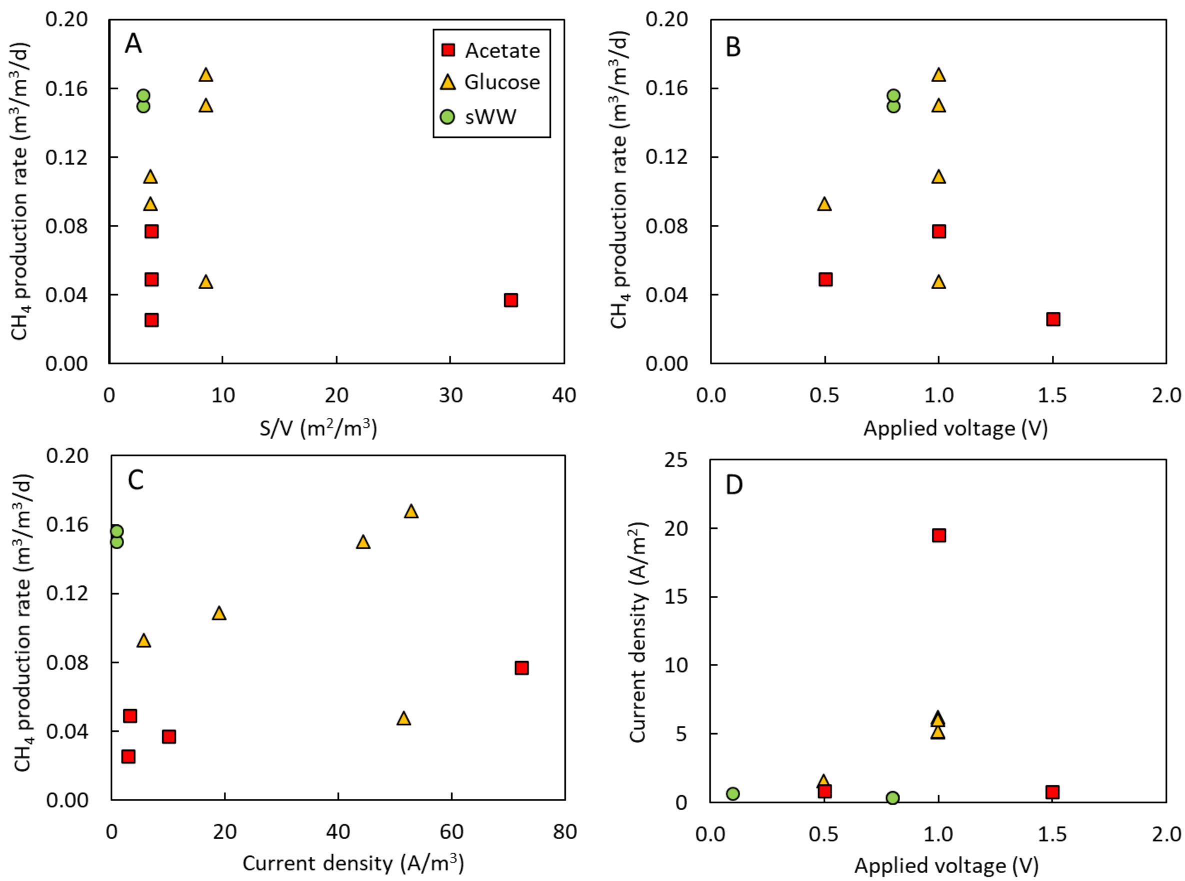

Fig. S2. Comparisons of methane production rate in AD-MECs with acetate (squares), glucose (triangles) and synthetic wastewaters (sWW; circles) as a function of (A) surface area-to-reactor volume ratio, (B) applied voltage, and (C) current density. (D) The relationship between applied voltage and current density.

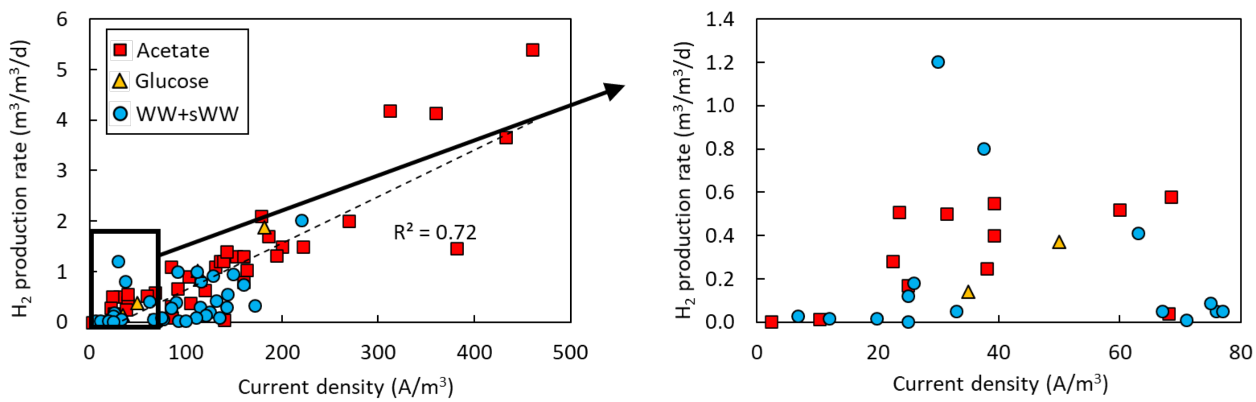

Fig. S3. Hydrogen production rate as a function of current density in the range of 0–80 A/m³ in MEC studies.

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