

**Supplemental Table 1.** Summary sequences of 16S rRNA gene fragments retrieved from the seven full-scale anaerobic digesters by using pyrosequencing

Digester	Number of sequences from anaerobic digester sludge samples	Number of size filtered sequences <sup>a</sup>	Number of chimeric sequences <sup>b</sup>	Local database sequences	Mean size (bp)	Size range (bp)
Total	90,781	89,079	5,305	83,774	486.88 ± 18.31	304 ~ 692
S1-1	214	153	14	139	485.74 ± 18.49	439 ~ 526
S1-2	854	841	10	831	497.96 ± 18.49	431 ~ 579
S1-3	2,864	2,828	5	2,823	488.81 ± 18.39	331 ~ 563
S1-4	1,783	1,769	25	1,744	488.29 ± 18.41	431 ~ 568
S1-5	943	930	86	844	493.31 ± 20.21	431 ~ 544
S1-6	1,060	1,053	101	952	496.83 ± 19.84	433 ~ 539
S2-1	1,327	979	41	938	482.21 ± 15.10	429 ~ 535
S2-2	1,836	1,816	18	1,798	494.22 ± 16.21	312 ~ 546
S2-3	3,807	3,750	331	3,419	486.65 ± 17.00	338 ~ 692
S2-4	2,304	2,282	48	2,234	488.97 ± 17.54	430 ~ 558
S2-5	937	932	124	808	489.27 ± 19.00	428 ~ 610
S2-6	1,040	1,030	160	870	486.08 ± 21.49	429 ~ 539
J2-1	3,240	3,177	111	3,066	484.78 ± 18.83	428 ~ 565
J2-2	4,907	4,866	120	4,746	489.02 ± 19.08	335 ~ 553
J2-3	3,947	3,892	386	3,506	487.74 ± 17.25	430 ~ 590
J2-4	1,613	1,601	62	1,539	487.17 ± 19.07	352 ~ 562
J2-5	1,085	1,072	147	925	489.47 ± 21.10	420 ~ 550
J2-6	1,246	1,234	139	1,095	488.37 ± 19.17	429 ~ 549
J3-1	4,447	4,406	74	4,332	490.20 ± 20.24	429 ~ 556
J3-2	1,229	1,198	39	1,159	492.45 ± 20.27	378 ~ 558
J3-3	2,106	2,079	77	2,002	486.53 ± 19.54	409 ~ 565
J3-4	2,704	2,679	132	2,547	486.71 ± 17.14	426 ~ 549
J3-5	1,155	1,139	124	1,015	489.54 ± 20.24	429 ~ 540
J3-6	1,080	1,060	120	940	488.41 ± 19.98	404 ~ 533
N1-1	5,012	4,908	262	4,646	483.90 ± 17.46	426 ~ 548
N1-2	5,133	5,098	227	4,871	487.03 ± 16.52	377 ~ 540
N1-3	2,609	2,571	309	2,262	486.27 ± 16.21	304 ~ 546
N1-4	2,035	2,017	90	1,927	488.07 ± 16.04	427 ~ 570
N1-5	786	781	98	683	491.43 ± 16.59	426 ~ 530
N1-6	1,244	1,232	110	1,122	491.23 ± 17.80	432 ~ 533
N2-1	4,691	4,367	289	4,078	483.66 ± 17.38	426 ~ 554
N2-3	3,081	3,039	322	2,717	487.79 ± 16.50	428 ~ 558
N2-4	3,682	3,637	378	3,259	482.80 ± 19.66	430 ~ 559
N2-5	1,169	1,152	163	989	486.48 ± 19.73	412 ~ 537
T1-1	4,010	3,983	48	3,935	494.00 ± 17.10	332 ~ 552
T1-2	1,443	1,429	19	1,410	500.40 ± 15.45	315 ~ 567
T1-3	2,480	2,461	71	2,390	489.25 ± 16.74	425 ~ 550
T1-4	2,811	2,799	110	2,689	489.30 ± 15.22	429 ~ 548
T1-5	1,305	1,291	160	1,131	491.66 ± 19.11	431 ~ 546
T1-6	1,562	1,548	155	1,393	491.96 ± 18.90	432 ~ 582

<sup>a</sup> Number of sequences after removing the sequences less than 300 bp in length.

<sup>b</sup> Chimeric sequences were determined by using Mothur's chimera slayer algorithm.

**Supplemental Table 2.** Comparison of diversity indices for bacterial 16S rRNA gene sequences retrieved from 40 sludge samples for the seven digesters

Digester	No. of OTUs	No. of Sequences	Richness estimation <sup>a</sup>			
			<i>Chao1</i> <sup>b</sup>		<i>ACE</i> <sup>b</sup>	
Total	9,051	83,774	18,509	(17,795 ~ 19,281)	27,835	(27,454 ~ 28,224)
S1-1	75	139	287	(167 ~ 566)	297	(216 ~ 425)
S1-2	233	827	841	(598 ~ 1,243)	1,439	(1,246 ~ 1,669)
S1-3	865	2,823	2,297	(1,994 ~ 2,681)	3,944	(3,721 ~ 4,186)
S1-4	383	1,744	794	(668 ~ 976)	1,313	(1,167 ~ 1,487)
S1-5	320	844	913	(720 ~ 1,201)	1,561	(1,349 ~ 1,817)
S1-6	283	951	953	(720 ~ 1,311)	1,800	(1,539 ~ 2,116)
S2-1	236	938	474	(387 ~ 612)	721	(620 ~ 850)
S2-2	337	1,798	794	(641 ~ 1,024)	1,125	(993 ~ 1,284)
S2-3	954	3,419	2,276	(2,004 ~ 2,619)	3,611	(3,413 ~ 3,824)
S2-4	454	2,234	955	(811 ~ 1,157)	1,656	(1,486 ~ 1,854)
S2-5	370	807	1,070	(853 ~ 1,382)	1,964	(1,724 ~ 2,247)
S2-6	426	870	1,111	(915 ~ 1,386)	1,984	(1,748 ~ 2,263)
J2-1	726	3,066	1,642	(1,422 ~ 1,931)	2,394	(2,280 ~ 2,518)
J2-2	899	4,746	1,655	(1,487 ~ 1,869)	2,294	(2,201 ~ 2,393)
J2-3	1,284	3,506	3,646	(3,219 ~ 4,168)	6,831	(6,546 ~ 7,132)
J2-4	540	1,539	1,276	(1,082 ~ 1,540)	2,083	(1,876 ~ 2,323)
J2-5	506	925	1,387	(1,152 ~ 1,707)	2,250	(1,985 ~ 2,562)
J2-6	533	1,095	1,506	(1,250 ~ 1,852)	3,108	(2,792 ~ 3,467)
J3-1	654	4,332	1,167	(1,036 ~ 1,344)	1,578	(1,517 ~ 1,643)
J3-2	375	1,159	942	(764 ~ 1,202)	1,478	(1,304 ~ 1,685)
J3-3	489	2,002	918	(797 ~ 1,087)	1,242	(1,121 ~ 1,386)
J3-4	611	2,547	1,262	(1,097 ~ 1,482)	2,192	(2,101 ~ 2,288)
J3-5	414	1,015	1,010	(837 ~ 1,253)	1,576	(1,381 ~ 1,811)
J3-6	345	940	744	(620 ~ 924)	1,340	(1,182 ~ 1,529)
N1-1	1,094	4,646	2,103	(1,902 ~ 2,355)	3,200	(3,055 ~ 3,355)
N1-2	920	4,871	1,577	(1,429 ~ 1,769)	2,012	(1,925 ~ 2,107)
N1-3	927	8,262	2,457	(2,136 ~ 2,862)	4,468	(4,224 ~ 4,730)
N1-4	556	2,327	1,104	(960 ~ 1,300)	1,761	(1,602 ~ 1,943)
N1-5	309	683	735	(600 ~ 933)	1,258	(1,077 ~ 1,482)
N1-6	396	1,122	942	(782 ~ 1,170)	1,489	(1,307 ~ 1,707)
N2-1	1,068	4,078	2,859	(2,483 ~ 3,335)	4,032	(3,842 ~ 4,235)
N2-3	776	2,717	2,291	(1,944 ~ 2,742)	3,587	(3,251 ~ 3,968)
N2-4	964	3,259	2,068	(1,842 ~ 2,354)	3,382	(3,197 ~ 3,584)
N2-5	442	989	1,399	(1,116 ~ 1,802)		(2,402 ~ 3,004)
T1-1	462	3,935	835	(724 ~ 992)	1,158	(1,048 ~ 1,288)
T1-2	234	1,410	556	(439 ~ 740)	1,131	(974 ~ 1,322)
T1-3	491	2,390	969	(836 ~ 1,154)	1,369	(1,229 ~ 1,535)
T1-4	541	2,689	1,146	(988 ~ 1,361)	1,763	(1,586 ~ 1,970)
T1-5	421	1,131	979	(821 ~ 1,200)	1,689	(1,487 ~ 1,929)
T1-6	481	1,393	1,152	(970 ~ 1,402)	2,006	(1,789 ~ 2,259)

<sup>a</sup> Values are calculated at the 97% confidence intervals.

<sup>b</sup> The values indicate average and range (minimum to maximum).

**Supplemental Table 3.** Distribution of core OTUs among the 40 different anaerobic digester samples

Digesters	Number of core OTUs																																	
	OTU5	OTU6	OTU11	OTU36	OTU38	OTU42	OTU46	OTU62	OTU65	OTU68	OTU84	OTU89	OTU95	OTU103	OTU105	OTU110	OTU128	OTU129	OTU172	OTU207	OTU270	OTU280	OTU396	OTU414	OTU453	OTU458	OTU462	OTU662	OTU986	OTU1078	OTU3884			
S1-1	26	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	1	0	0	0	7			
S1-2	145	184	23	0	0	8	0	51	4	3	0	0	0	0	0	0	0	0	0	0	7	1	1	0	5	0	8	5	0	0	0			
S1-3	590	381	33	0	0	5	1	154	7	2	1	0	0	0	0	5	0	0	0	0	3	14	6	0	28	0	40	37	0	0	2			
S1-4	275	259	62	0	0	19	2	69	14	15	8	0	0	0	0	7	0	0	0	0	10	17	6	0	22	0	32	18	0	1	0			
S1-5	110	147	0	0	0	4	0	22	0	3	1	0	0	0	0	0	0	0	0	0	0	3	2	0	4	0	22	7	0	0	1			
S1-6	250	238	0	0	0	2	0	17	3	9	4	0	0	0	0	6	0	0	0	0	0	1	1	0	1	0	26	7	0	0	0			
S2-1	0	16	187	0	2	6	1	28	2	63	0	0	0	0	0	87	0	0	0	0	2	3	0	0	43	0	5	29	0	0	0			
S2-2	8	110	407	0	0	53	3	83	56	102	1	0	0	0	0	30	0	0	0	0	29	14	0	0	21	0	4	7	0	1	0			
S2-3	7	347	340	0	0	40	74	36	62	162	3	0	0	0	18	0	0	0	0	0	19	85	0	0	23	0	6	17	0	2	0			
S2-4	80	291	114	0	0	88	17	44	75	194	1	0	0	0	30	0	0	0	0	0	32	20	1	0	9	2	30	8	0	1	0			
S2-5	19	33	1	0	0	6	26	0	6	80	0	0	0	0	1	0	0	0	0	0	5	16	0	0	6	3	11	7	0	0	0			
S2-6	7	9	3	0	0	1	14	0	0	86	0	0	0	0	0	0	0	0	0	0	0	27	0	0	6	28	0	10	0	0	2			
J2_1	8	246	0	0	0	3	0	160	0	40	95	2	23	0	12	3	0	21	0	1	1	0	122	0	2	2	152	2	0	45	0			
J2_2	31	552	34	0	48	17	0	218	31	63	61	4	118	0	100	16	2	7	0	1	11	0	33	0	3	8	121	6	0	28	0			
J2_3	2	614	1	0	93	4	29	28	10	5	33	7	23	0	80	1	8	22	0	0	3	2	15	0	1	2	41	0	0	17	0			
J2_4	2	228	1	0	24	3	3	29	10	5	41	6	4	0	34	1	0	8	0	0	1	2	29	0	0	8	1	0	50	0	0			
J2_5	5	47	0	0	15	2	4	0	0	11	3	3	0	8	0	0	0	0	0	0	1	1	8	6	1	0	18	0	0	29	0			
J2_6	13	19	0	0	103	1	0	6	0	1	24	2	2	0	10	0	0	0	0	0	0	10	9	1	0	0	17	0	0	15	0			
J3_1	13	427	4	0	0	20	0	93	19	11	314	0	335	0	136	0	0	0	0	15	7	92	0	0	0	83	0	0	97	0	0			
J3_2	3	79	0	0	0	4	0	17	2	0	112	0	46	0	36	0	0	2	0	0	7	2	12	0	0	8	0	0	12	0	0			
J3_3	1	117	0	0	54	7	35	19	2	0	116	0	83	0	70	0	5	30	0	0	4	24	41	0	0	16	0	0	35	0	0			
J3_4	2	113	0	0	207	7	12	34	1	0	154	2	141	1	93	0	7	32	0	0	7	22	41	3	0	1	13	0	0	29	0			
J3_5	1	45	0	0	55	0	1	3	0	0	52	0	40	1	14	0	1	2	0	0	1	3	20	9	0	0	20	0	0	30	0	0		
J3_6	0	20	0	0	169	1	0	2	0	0	20	2	34	7	3	0	6	0	0	0	1	2	10	4	0	0	13	0	0	18	0	0		
N1_1	0	3	0	0	103	241	0	9	44	0	0	6	118	97	0	4	0	26	153	134	107	0	25	37	0	0	2	28	0	9	0	0		
N1_2	0	7	0	0	410	214	0	18	4	0	0	1	150	66	0	0	4	46	22	185	0	24	9	0	0	1	0	0	1	0	0	0		
N1_3	0	0	0	0	164	131	0	11	0	0	0	0	15	8	0	0	0	26	35	2	42	0	9	1	2	0	0	0	21	0	0	0		
N1_4	0	0	0	0	190	272	0	6	4	0	0	0	1	23	17	0	0	9	15	2	38	0	13	9	7	0	0	0	2	0	0	0		
N1_5	0	0	0	0	69	88	0	0	0	0	0	0	2	1	0	0	0	2	1	0	8	0	8	0	14	0	0	0	0	24	0	0	0	
N1_6	0	0	0	0	148	191	0	0	0	0	0	0	20	13	0	0	0	2	0	0	2	0	5	0	9	0	0	0	31	0	0	0	0	
N2_1	0	7	0	0	91	265	0	14	52	0	0	7	90	116	0	0	0	20	65	188	79	0	23	30	0	0	0	37	0	19	0	0	0	
N2_3	0	3	0	0	4	875	0	3	19	0	0	8	39	56	0	1	0	39	12	16	2	0	16	34	3	0	0	19	0	3	0	0	0	
N2_4	0	8	0	0	4	161	0	0	33	0	0	37	64	134	0	11	0	5	6	42	5	1	21	57	2	0	2	34	0	0	0	0	0	
N2_5	0	1	0	0	10	91	0	0	2	0	0	5	11	17	0	1	0	0	0	11	3	0	8	6	17	0	0	10	0	0	0	0	0	
T1-1	0	110	0	0	1679	9	0	15	0	0	129	0	109	8	62	0	120	82	14	0	3	8	31	7	1	0	49	0	0	19	0	0		
T1-2	1	1	1	0	906	0	1	4	0	0	9	0	19	8	19	0	19	2	11	0	1	1	2	7	0	0	1	0	0	1	0	0	1	0
T1-3	1	30	200	0	677	4	3	65	17	0	31	0	38	7	18	0	33	56	25	0	0	1	6	3	1	0	23	1	0	5	0	0	0	
T1-4	0	14	48	0	1085	1	2	29	2	0	68	0	37	24	77	0	38	26	24	0	1	7	23	10	0	0	26	0	0	2	0	0	0	
T1-5	1	1	0	0	279	0	1	3	0	0	22	0	7	17	21	0	8	0	23	0	0	4	3	39	0	3	9	0	0	2	0	0	0	0
T1-6	0	26	0	0	243	38	1	0	8	0	28	0	9	42	16	0	2	3	2	0	0	47	8	2	4	0	0	5	0	0	0	0	0	0