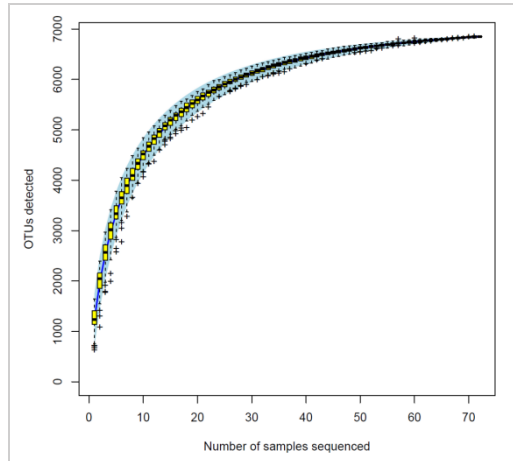


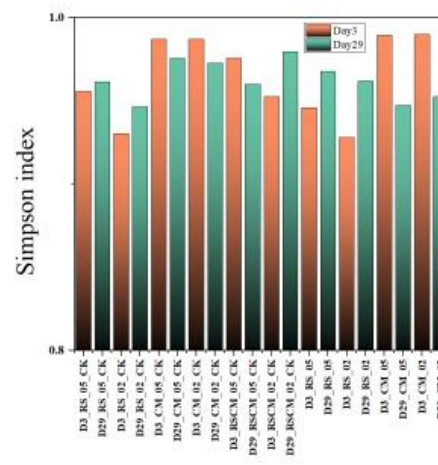
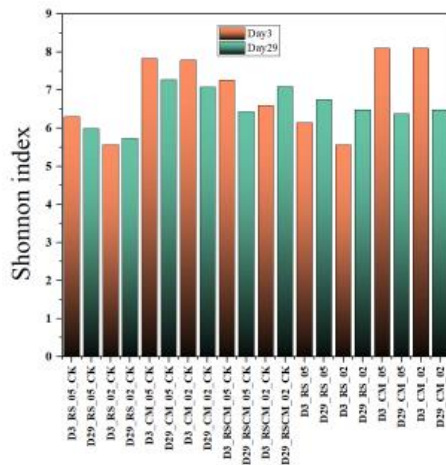
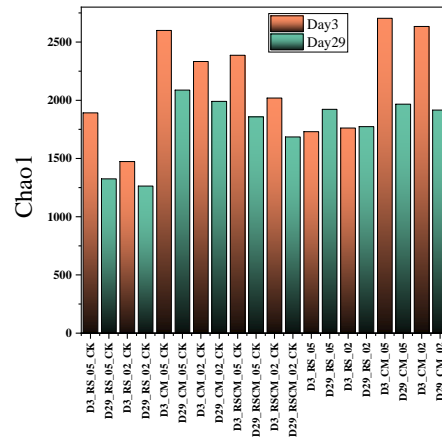
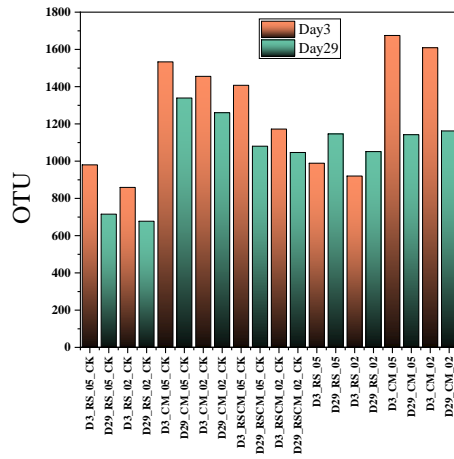
Table S1 Basic characteristics of inoculum and feedstock

Item	Unit	Inoculum	CM	RS
		8.28 ± 0.06	7.84 ± 0.06	Not applicable (N.A.)
pH				
	%, wet weight (ww) basis	1.40 ± 0.03	12.8 ± 0.2	96.9 ± 0.2
TS				
VS	%, TS basis	57.8 ± 3.6	84.3 ± 0.3	85.7 ± 0.2
C	%, TS basis	30.7 ± 0.0	42.7 ± 0.1	45.0 ± 0.2
H	%, TS basis	4.91 ± 0.08	6.03 ± 0.18	6.41 ± 0.02
N	%, TS basis	3.51 ± 0.00	2.00 ± 0.12	0.54 ± 0.01
S	%, TS basis	0.62 ± 0.01	0.38 ± 0.00	< 0.10
O	%, TS basis	18.1 ± 0.0	33.2 ± 0.2	33.7 ± 0.1
NDF	%, ww basis	N.A.	N.A.	61.4 ± 0.4
ADF	%, ww basis	N.A.	N.A.	41.2 ± 0.5
Hemi-cellulose	%, ww basis	N.A.	N.A.	19.9 ± 0.3
Cellulose	%, ww basis	N.A.	N.A.	32.6 ± 0.3
ADL	%, ww basis	N.A.	N.A.	4.22 ± 0.18
TAN	g/Kg, ww basis	1.19 ± 0.05	1.98 ± 0.04	N.A.
FAN	mg/Kg, ww basis	222 ± 9	152 ± 3	N.A.
TA	g CaCO ₃ /Kg ww	21.0 ± 0.5	40.3 ± 0.7	N.A.
PA	g CaCO ₃ /Kg ww	16.7 ± 0.5	17.6 ± 1.2	N.A.
IA	g CaCO ₃ /Kg ww	3.87 ± 0.03	19.1 ± 1.5	N.A.
IA/PA ratio		0.23 ± 0.01	1.09 ± 0.10	N.A.
TMC	%	53.5 ± 0.4	59.1 ± 0.5	43.3 ± 1.8
BMP _u	mL CH ₄ /g VS	586 ± 3	519 ± 9	422 ± 2

a



b



c

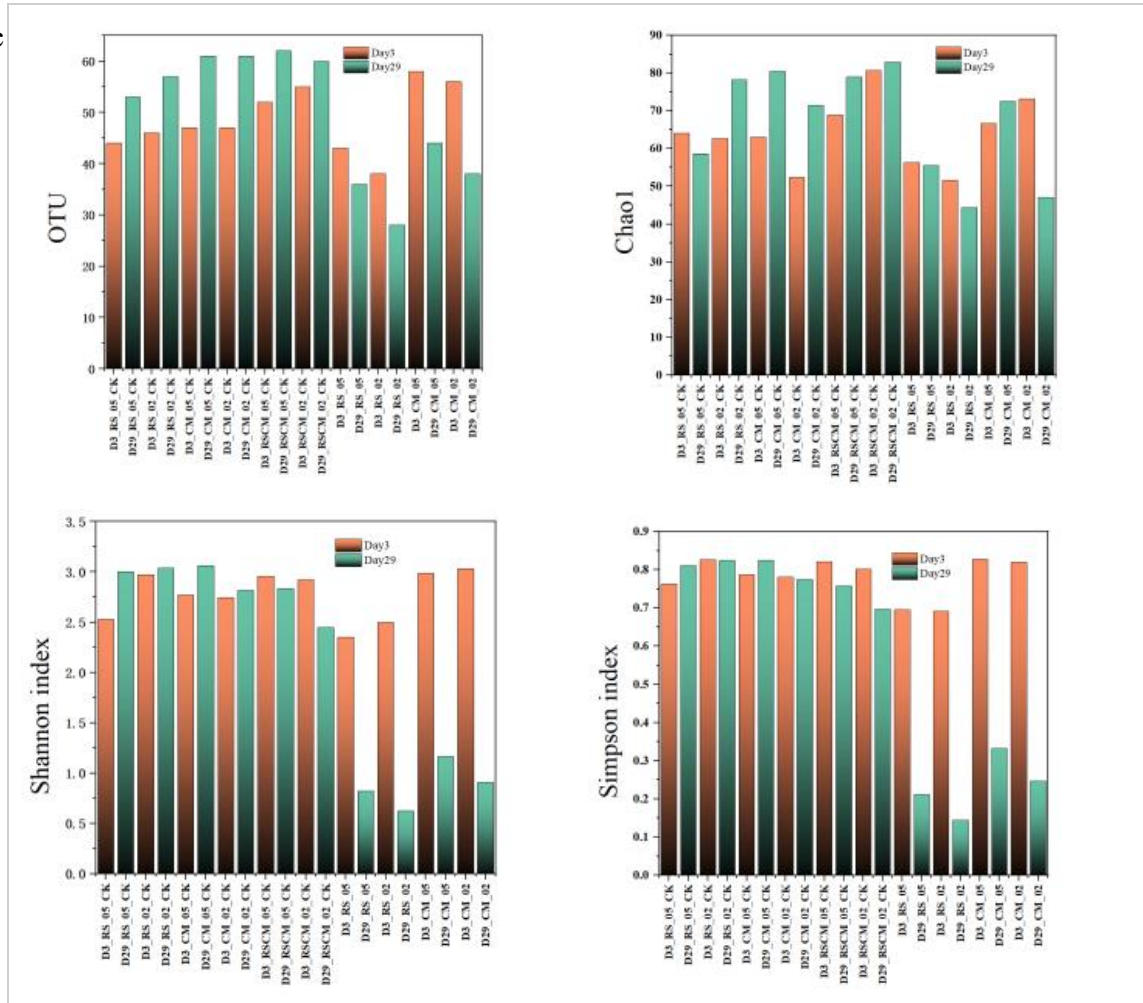


Figure S1 Distribution of OTUs among the bacterial and methanogenic archaeal communities in mono-AD, co-AD, and the 4S2P AD system.

a, Rarefaction curve of all samples analyzed.

b, Indices histograms of alpha diversity for bacterial communities on day 3 and day 29.

c, Indices histograms of alpha diversity for archaeal communities on day 3 and day 29.

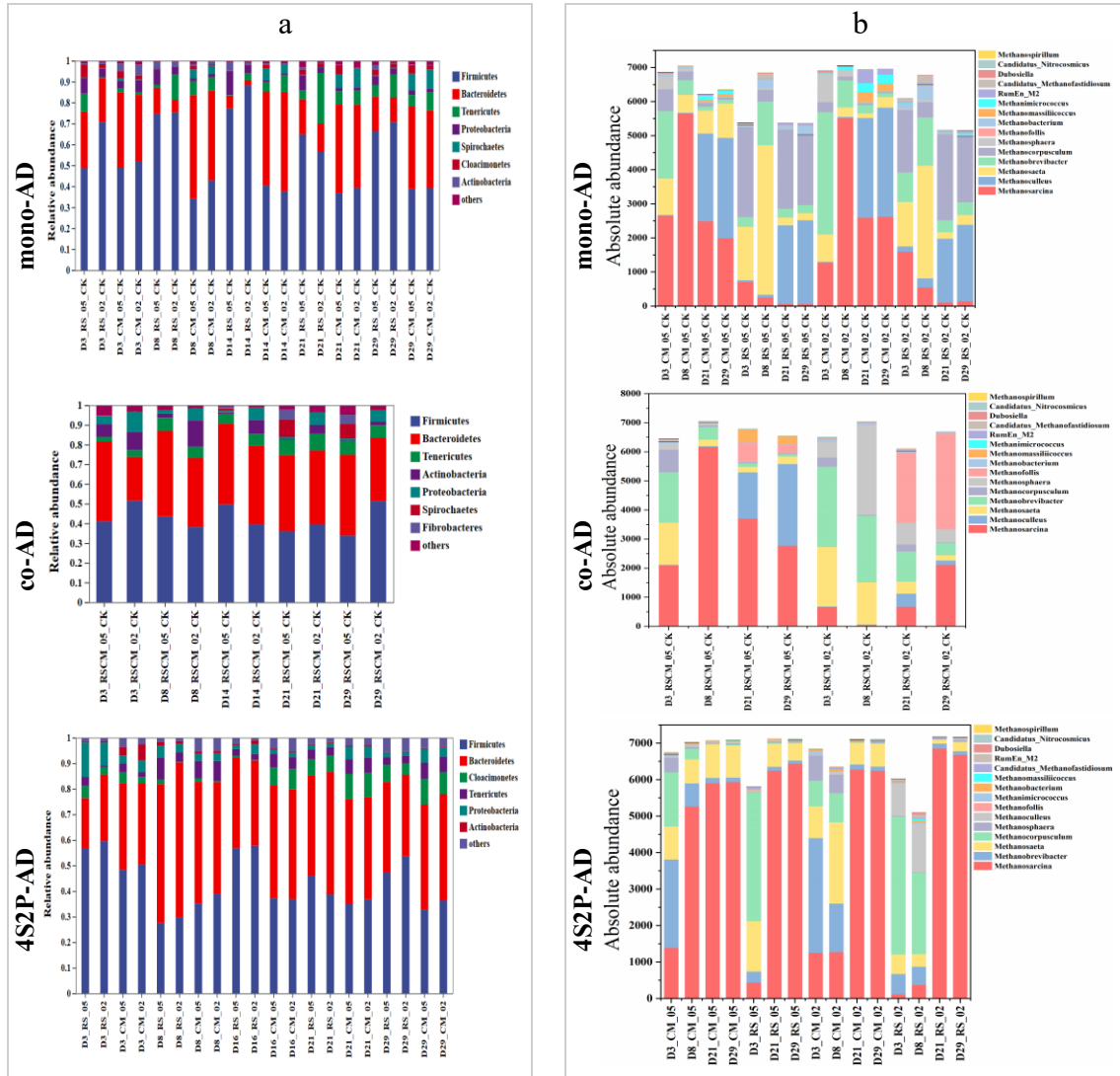


Figure S2 Microbial community structure bar graph of bacteria on the phylum level (a) and archaea on the genus level (b).

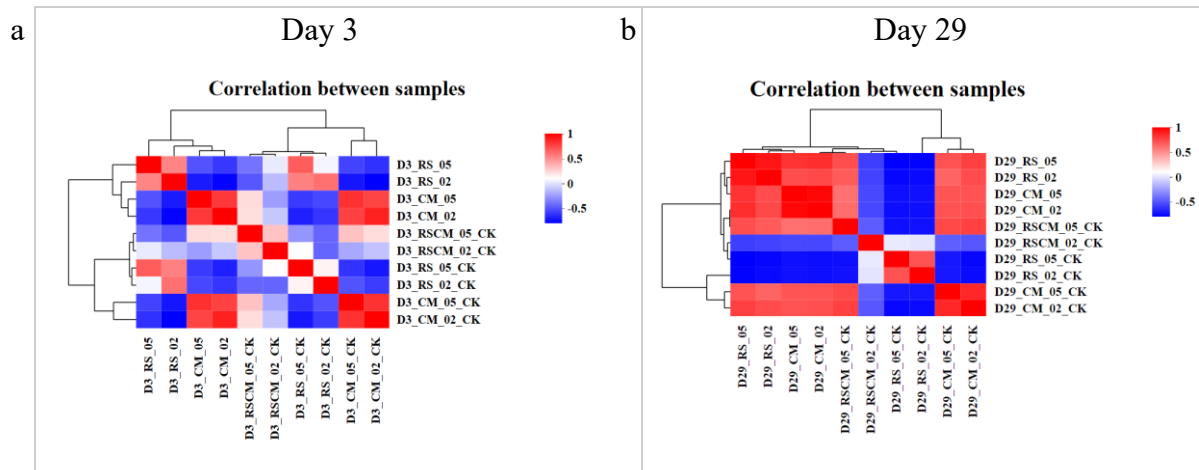


Figure S3 Heat maps showing the similarity degree of the bacterial phyla on day 3 (a) and day 29 (b).

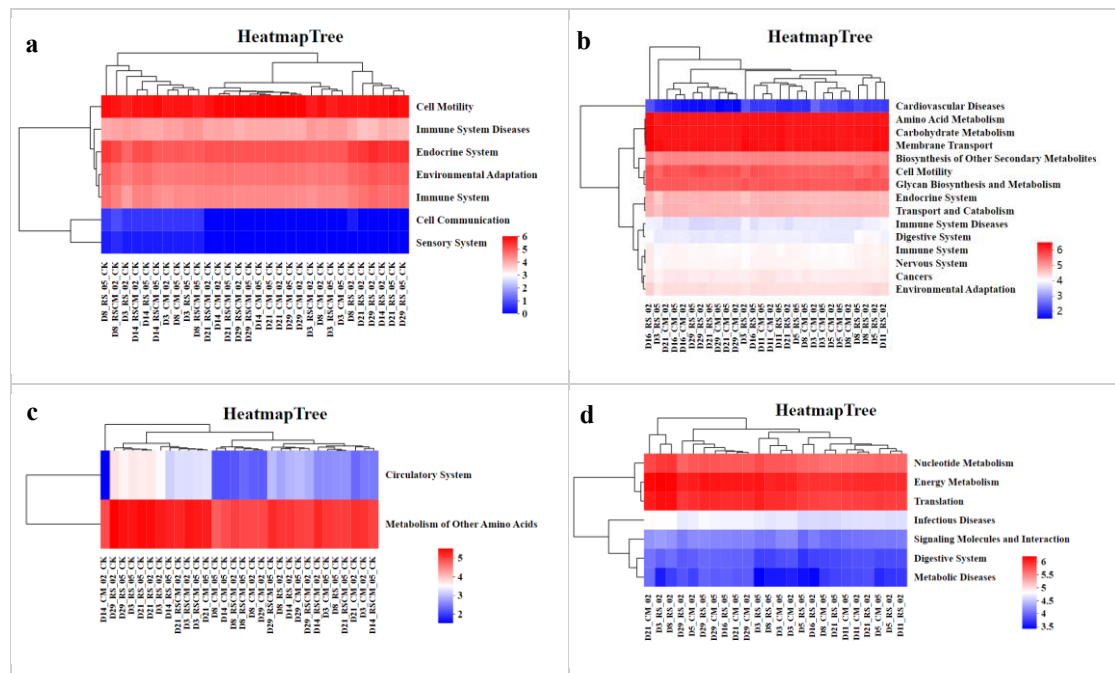


Figure S4 Secondary KEGG function prediction map of bacterial and archaeal communities in control groups and 4S2P AD groups.

a and b, function predictions for bacterial community in control (a) and 4S2P-AD (b) groups, respectively.

c and d, function predictions for archaeal community in control (c) and 4S2P-AD (d) groups, respectively.