

Enhanced anaerobic digestion of swine manure by the addition of zero-valent iron

Yuan Yang ¹, Jianyu Wang ¹, Yanbo Zhou ^{1,2*}

¹ State Environmental Protection Key Laboratory of Environmental Risk Assessment and Control on Chemical Process, East China University of Science and Technology, No. 130 Meilong Road, Xuhui District, Shanghai 200237, China

² Shanghai Institute of Pollution Control and Ecological Security, No. 1515 Zhongshan Second North Road, Hongkou District, Shanghai 200092, China

Corresponding author

*Yanbo Zhou. Email: zhouyanbo@ecust.edu.cn. Tel./fax:021-64250225. Contact address: State Environmental Protection Key Laboratory of Environmental Risk Assessment and Control on Chemical Process, East China University of Science and Technology, No. 130 Meilong Road, Xuhui District, Shanghai 200237, China

Table S1. The material addition of 6 reactors.

Batch No.	Fresh swine manure (g)	Inocula (g)	ZVI supplementation on acidogenic stage (g)	ZVI supplementation on methanogenic stage (g)	Total ZVI dosage (g/L)
R1	300	200	0	0	0
R2	300	200	0	6	12
R3	300	200	6	0	12
R4	300	200	3	3	12
R5 ^a	300	200		0	0
R6 ^a	300	200		6	12

^a Single-stage anaerobic digestion

Table S2. Parameters of fitting kinetic model equation of R1 and R5.

Reactors	B_0 (mL/g·VS _{fed})	R_m (mL/g·VS _{fed} ·d)	λ (d)	R^2
R1	157.82 ± 1.85	15.86 ± 0.32	4.19 ± 0.09	0.9990
R5	149.87 ± 2.86	13.34 ± 0.36	3.90 ± 0.13	0.9983

Table S3. Recovery of zero-valent iron

Reactors	Mass of total ZVI (g)	Mass of recovery ZVI (g)	Recovery rate (%)
----------	-----------------------	--------------------------	-------------------

R2	6	4.24 ± 0.35	70.67 ± 8.25
R3	6	3.84 ± 0.30	64.00 ± 7.81
R4	6	3.95 ± 0.27	65.83 ± 6.84
R6	6	4.17 ± 0.23	69.50 ± 5.52

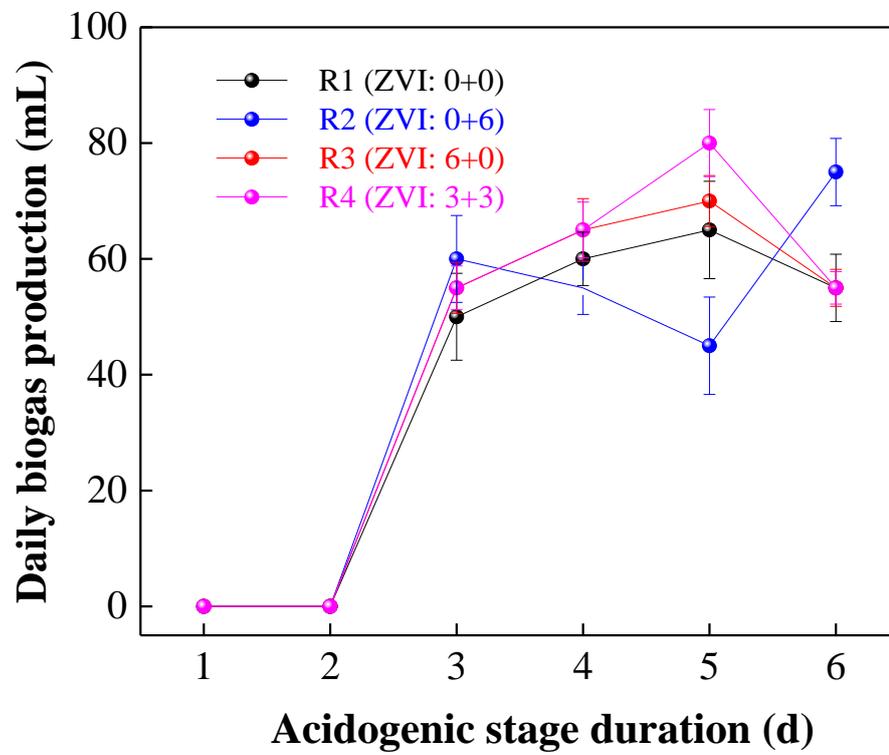


Fig. S1. Profiles of biogas production during acidogenic stage for R1-R4.

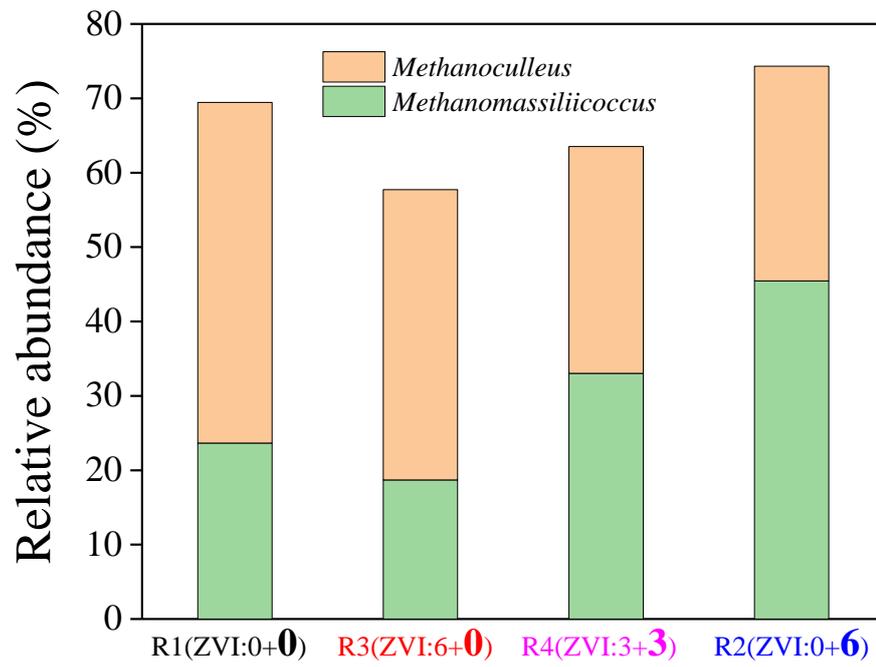


Fig. S2. The relative abundance relationships between *Methanoculleus* or *Methanomassiliicoccus* and ZVI dosage on methanogenic stage.