

**Influences of organic loading, feed-to-inoculum ratio, and different pretreatment strategies on the methane
production performance of eggplant stalk**

Environmental Science and Pollution Research

Zhe Zhu¹, Si Zhang¹, Chao Song, Ligong Wang, Fanfan Cai, Chang Chen^{*}, Guangqing Liu^{*}

Biomass Energy and Environmental Engineering Research Center, College of Chemical Engineering, Beijing University of
Chemical Technology, Beijing 100029, China

Corresponding authors

Chang Chen's e-mail: chenchang@mail.buct.edu.cn

Guangqing Liu's e-mail: gqliu@mail.buct.edu.cn

Phone and Fax: +86-10-6444-2375

Address: 505 Zonghe Building, 15 North 3rd Ring East Road, Beijing 100029, China

Table S1 Coded and real values of the factors for CCD

Factors	Levels				
	-1.414	-1	0	1	1.414
OL (g VS/L)	3.0	7.7	19.0	30.3	35.0
F/I	0.3	0.7	1.6	2.6	3.0

Table S2 Methods of pretreatments

Methods	conditions	Methods	conditions
H ₂ SO ₄	1.5%	AHP (adjust by NaOH)	1.5%
	3.0%		3.0%
	4.5%		4.5%
	6.0%		6.0%
H ₃ PO ₄	1.5%	AHP (adjust by KOH)	1.5%
	3.0%		3.0%
	4.5%		4.5%
	6.0%		6.0%
NaOH	1.0%	AHP (adjust by Ca(OH) ₂)	1.5%
	2.0%		3.0%
	3.0%		4.5%
	4.0%		6.0%
KOH	1.0%	Microwave (630 W)	5 min
	2.0%		10 min
	3.0%	Microwave (420 W)	5 min
	4.0%		10 min
Ca(OH) ₂	1.0%	Microwave (210 W)	5 min
	2.0%		10 min
	3.0%	Ultrasonic (40 kHz 200 W)	30 min
	4.0%		60 min

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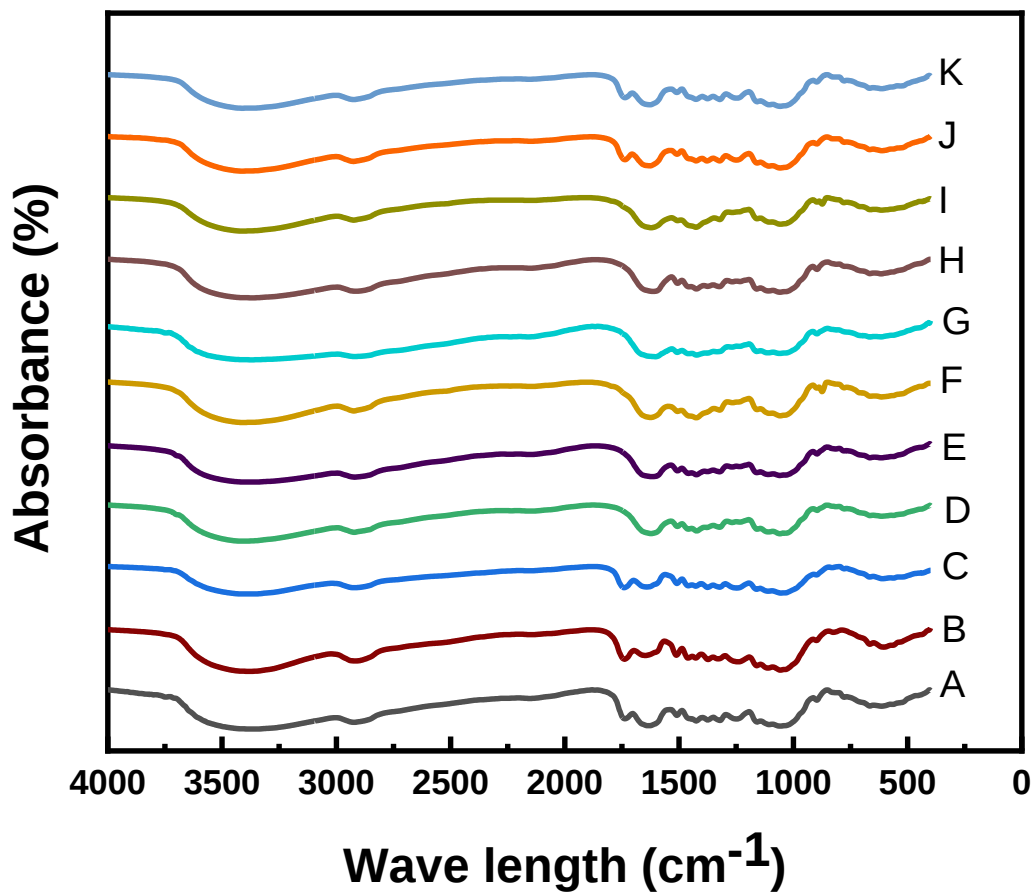
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Table S3 ANOVA of the response surface model

Source	Sum of squares	Degree of freedom	Mean square	F-value	p-value prob>F	
Model	4198.02	5	839.60	20.75	0.0005	
A- F/I	76.38	1	76.38	1.89	0.2118	
B- OL	3419.21	1	3419.21	84.52	<0.0001	significant
AB	180.61	1	180.51	4.46	0.0725	
A ²	32.45	1	32.45	0.80	0.4002	
B ²	449.10	1	449.10	11.10	0.0126	
Residual	283.18	7	40.45			
Lack of Fit	256.87	3	85.62	13.01	0.157	significant
Pure Error	26.32	4	6.58			
Cor Total	4481.21	12				

Table S4 Methods of selected pretreatments with optimal digestion conditions

Methods	Concentrations (w/w)	Methods	Adjusted Reagents	Concentrations (w/w)
NaOH	1.5%	AHP	NaOH	1.5%
	3.0%			3.0%
	4.5%			4.5%
	6.0%			6.0%
KOH	1.5%		KOH	1.5%
	3.0%			3.0%
	4.5%			4.5%
	6.0%			6.0%



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112 **Fig. S1** FTIR of ES after different pretreatments, (A) Untreated ES; (B) 3.0% H₂SO₄-pretreated ES; (C) 3.0% H₃PO₄-
 113 pretreated ES; (D) 4.0% NaOH-pretreated ES; (E) 4.0% KOH-pretreated ES; (F) 2.0% Ca(OH)₂-pretreated ES; (G) 6.0%
 114 AHP-pretreated ES (adjusted by NaOH); (H) 4.5% AHP-pretreated ES (adjusted by KOH); (I) 1.5% AHP-pretreated ES
 115 (adjusted by Ca(OH)₂); (J) Microwave (630 W, 10 min)-pretreated ES; (K) Ultrasonic (60 min)-pretreated ES.

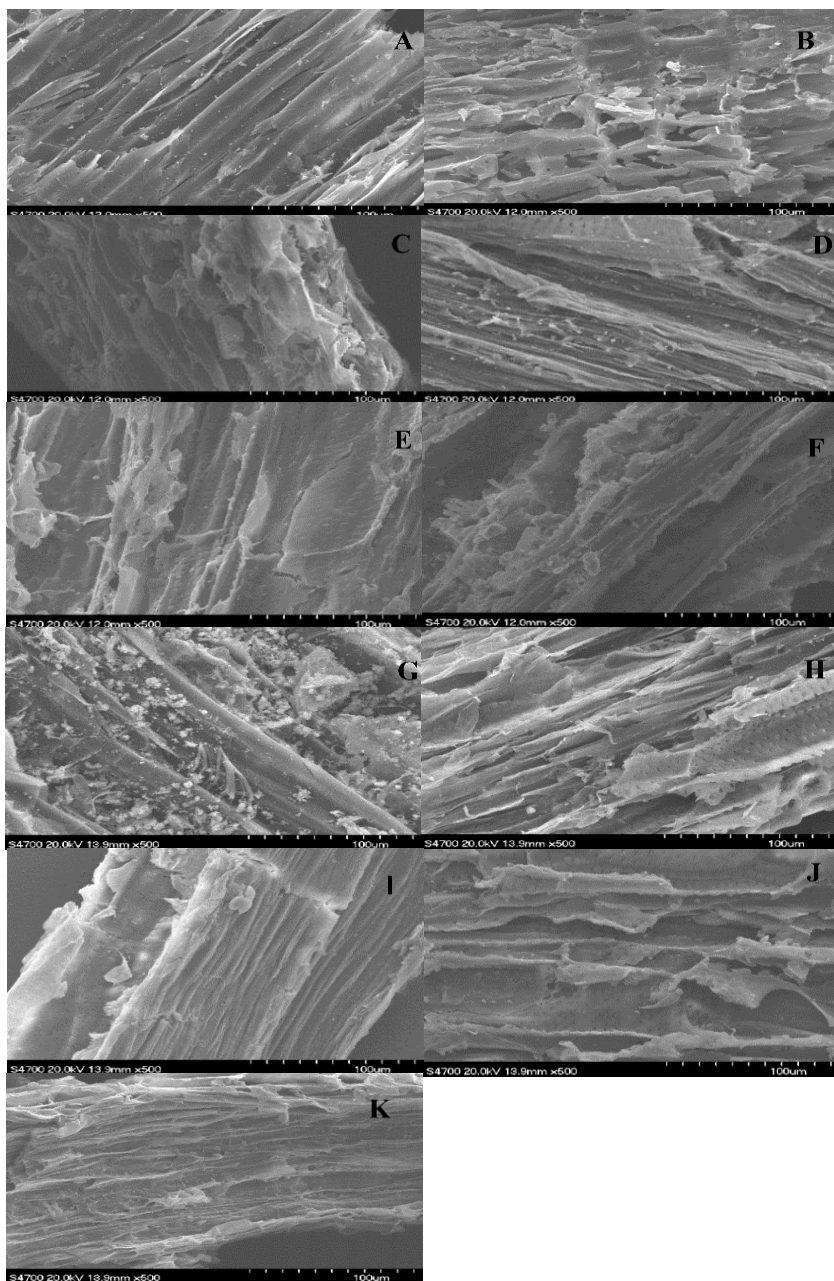


Fig. S2 SEM of ES after different pretreatments, (A) Untreated ES; (B) 3.0% H_2SO_4 -pretreated ES; (C) 3.0% H_3PO_4 -pretreated ES; (D) 4.0% NaOH -pretreated ES; (E) 4.0% KOH -pretreated ES; (F) 2.0% $\text{Ca}(\text{OH})_2$ -pretreated ES; (G) 6.0% AHP-pretreated ES (adjusted by NaOH); (H) 4.5% AHP-pretreated ES (adjusted by KOH); (I) 1.5% AHP-pretreated ES (adjusted by $\text{Ca}(\text{OH})_2$); (J) Microwave (630 W, 10 min)-pretreated ES; (K) Ultrasonic (60 min)-pretreated ES.

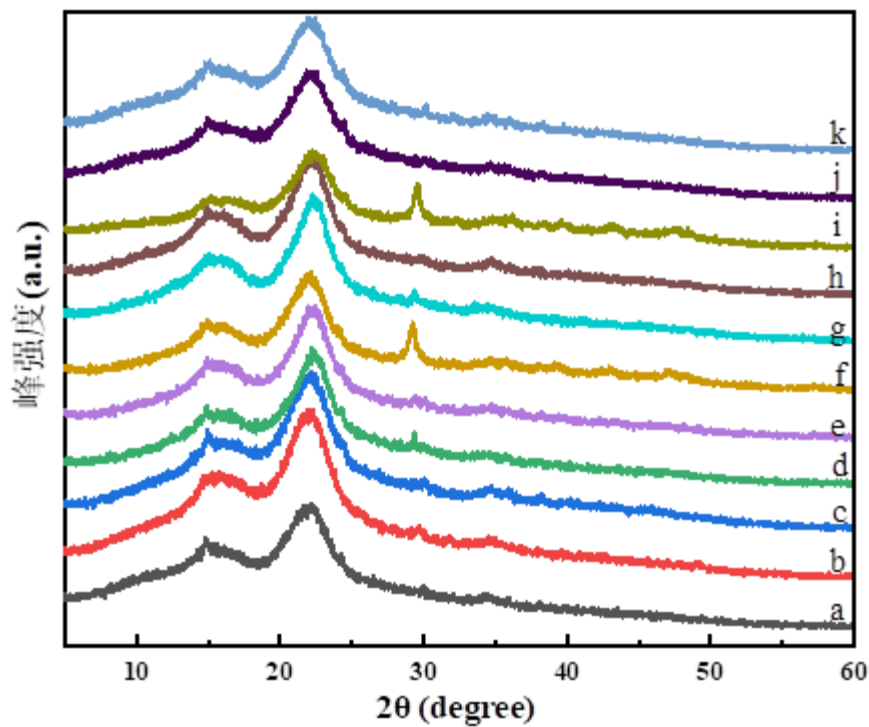


Fig. S3 XTR of ES after different pretreatments, (a) Untreated ES; (b) 3.0% H_2SO_4 -pretreated ES; (c) 3.0% H_3PO_4 -pretreated ES; (d) 4.0% NaOH -pretreated ES; (e) 4.0% KOH -pretreated ES; (f) 2.0% $\text{Ca}(\text{OH})_2$ -pretreated ES; (g) 6.0% AHP-pretreated ES (adjusted by NaOH); (h) 4.5% AHP-pretreated ES (adjusted by KOH); (i) 1.5% AHP-pretreated ES (adjusted by $\text{Ca}(\text{OH})_2$); (j) Microwave (630 W, 10 min)-pretreated ES; (k) Ultrasonic (60 min)-pretreated ES.

134 **Tables captions**

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137 **Table S3** ANOVA of the response surface model

138 **Table S4** Methods of selected pretreatments with optimal digestion conditions

139 **Figures captions**

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