

Supplementary Materials: Comparing the Bio-Hydrogen Production Potential of Pretreated Rice Straw Co-Digested with Seeded Sludge using an Anaerobic Bioreactor under Mesophilic and Thermophilic Conditions

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Pretreatment of Rice Straw

In order to perform mechanical pretreatment, the rice straw was first cut into 6–8 cm lengths and placed in the grinder, after which, it was sieved.



Figure S1. Steps for mechanical treatment.

For steam explosion, the straw was cut into 3–4 cm lengths, and water was added and mixed thoroughly many times to maintain a moisture content of 80%. After 3–4 h, the straw was placed into the steam explosion machine for the required treatment.

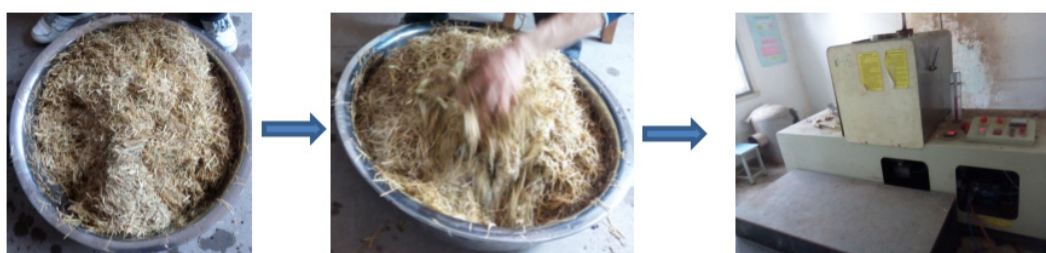


Figure S2. Preparation for steam explosion treatment.

For chemical treatment, the straw was made 5 mm–10 mm in size by another grinder, and water containing 6 g NaOH was thoroughly mixed and placed in beakers for three weeks.

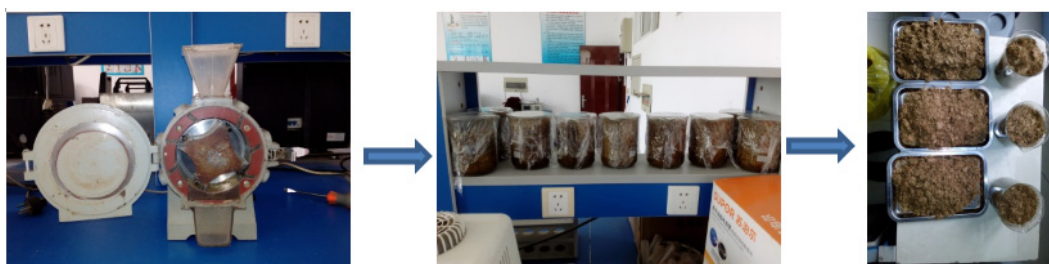


Figure S3. Chemical pretreatment.

After all of the treatments, the pretreated straw was added into a 20-L anaerobic reactor in an equal proportion of sludge for seven days.

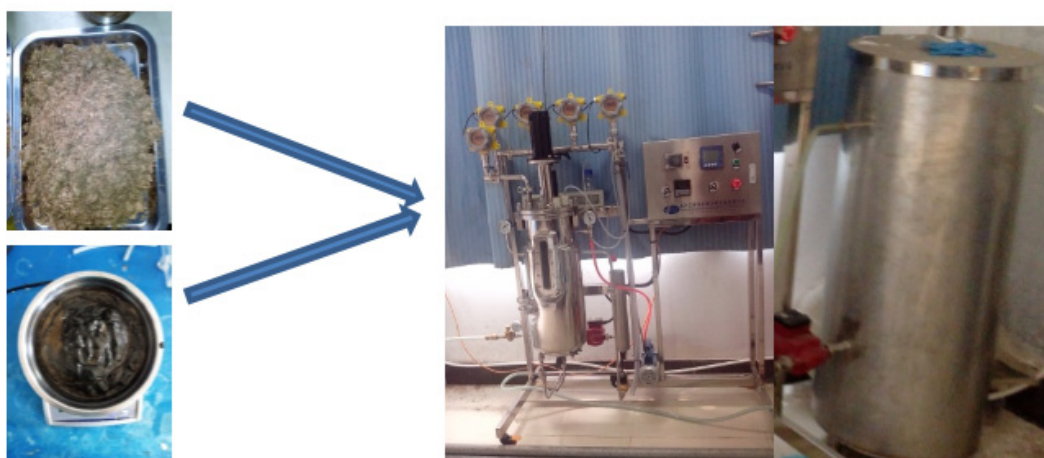


Figure S4. Treated rice straw and sludge in the anaerobic bioreactor.

Table S1. Average bio-hydrogen production.

Time	37 °C			55 °C		
	Mechanical	Steam Explosion	Chemical	Mechanical	Steam Explosion	Chemical
0	0	0	0	0	0	0
12	200	200	0	640	380	550
24	630	1170	600	1175	1545	1250
36	1230	2040	1920	1675	2445	2150
48	1680	2750	2870	2165	3305	3150
60	2130	3330	3730	2615	3900	4250
72	2530	3800	4460	3055	4400	5300
84	2880	4230	4960	3455	4840	6100
96	3180	4650	5370	3855	5250	6800
108	3470	5040	5715	4185	5640	7440
120	3720	5410	5925	4455	5915	7790
132	3920	5410	5925	4715	6065	7900
144	4050	5410	5925	4955	6065	7975
156	4050	5410	5925	5010	6065	7975
168	4050	5410	5925	5010	6065	7975