

Accepted Manuscript

Enzymes catalyzing pre-hydrolysis facilitated the anaerobic fermentation of waste activated sludge with acidogenic and microbiological perspectives

Xiaodong Xin, Junguo He, Lin Li, Wei Qiu

PII: S0960-8524(17)31790-X
DOI: <https://doi.org/10.1016/j.biortech.2017.09.211>
Reference: BITE 19042

To appear in: *Bioresource Technology*

Received Date: 22 August 2017
Revised Date: 28 September 2017
Accepted Date: 30 September 2017

Please cite this article as: Xin, X., He, J., Li, L., Qiu, W., Enzymes catalyzing pre-hydrolysis facilitated the anaerobic fermentation of waste activated sludge with acidogenic and microbiological perspectives, *Bioresource Technology* (2017), doi: <https://doi.org/10.1016/j.biortech.2017.09.211>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



1 **Enzymes catalyzing pre-hydrolysis facilitated the anaerobic fermentation of waste activated sludge**
2 **with acidogenic and microbiological perspectives**

3
4 Xiaodong Xin¹, Junguo He¹, Lin Li¹, Wei Qiu^{1,2*}

5
6 1. School of Municipal and Environmental Engineering, Harbin Institute of Technology (HIT), Harbin 150090, China

7 2. State Key Laboratory of Urban Water Resource and Environment, Harbin Institute of Technology (SKLUWRE, HIT),
8 Harbin 150090, China

9
10 *Corresponding author, Tel: +86-0451-86289099. E-mail address: qiuwei@hit.edu.cn (W. Qiu)

11
12 **Abstract:** This study investigated acidogenic and microbiological perspectives in the anaerobic
13 fermentation (AF) of waste activated sludge (WAS) pre-hydrolyzed by enzymes catalysis. The enzymes
14 catalysis boosted WAS biodegradability dramatically with nearly 8500 mg/L soluble chemical oxygen
15 demand (SCOD) increase just within 4 h. The volatile fatty acids (VFAs) in acidogenesis were
16 accumulated effectively with over 3200 mg COD/L in 12 d, which reached 0.687 kWh/Kg VSS
17 electricity conversion efficiency (2.5 times higher than the control test). The fermentation process
18 favored the compression of fermentative sludge with the distribution spread index (DSI) rising. The core
19 populations of bacteria and archaea shifting enlarged the dissimilarity of communities at different
20 fermentation stages. Increase of community diversity contributed to VFAs accumulation stability.
21 Moreover, the intermediate bacterial community evenness favored VFAs accumulation potentially. The
22 enzymes catalysis might be a promising solution for strengthening VFAs accumulation and potential
23 electricity conversion efficiency in WAS fermentation.

24
25 **Keywords:** Anaerobic fermentation, Enzymes catalysis, VFAs accumulation, Energy conversion
26 efficiency, Diversity and evenness, Impact factors

Download English Version:

<https://daneshyari.com/en/article/7068671>

Download Persian Version:

<https://daneshyari.com/article/7068671>

[Daneshyari.com](https://daneshyari.com)