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PII: S0960-8524(18)30148-2
DOI: https://doi.org/10.1016/j.biortech.2018.01.126
Reference: BITE 19483

To appear in: *Bioresource Technology*

Received Date: 21 November 2017
Revised Date: 23 January 2018
Accepted Date: 27 January 2018

Please cite this article as: Liu, J., Yang, M., Zhang, J., Zheng, J., Xu, H., Wang, Y., Wei, Y., A comprehensive insight into the effects of microwave-H_2O_2 pretreatment on concentrated sewage sludge anaerobic digestion based on semi-continuous operation, *Bioresource Technology* (2018), doi: https://doi.org/10.1016/j.biortech.2018.01.126

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Abstract: This study gave a comprehensive insight into the effects of microwave-H_2O_2 pretreatment on concentrated sludge anaerobic digestion (AD). Results showed that mixture of activated sludge and pretreated sludge at mass ratio of 1:1 was efficient for enhancing AD, methane production was increased from 215.51 mL/g VS_{added} to 258.38 mL/g VS_{added}. Pretreatment resulted in the change of sludge properties, such as solubilization of organic matters, decrease of viscosity. For concentrated sludge AD, the "pH buffer system" ensured the "inhibitory steady state" during start-up period, and