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PII: S0960-8524(16)31632-7
DOI: http://dx.doi.org/10.1016/j.biortech.2016.11.111
Reference: BITE 17357

To appear in: *Bioresource Technology*

Received Date: 25 September 2016
Revised Date: 27 November 2016
Accepted Date: 28 November 2016

Please cite this article as: Tang, J., Wang, X.C., Hu, Y., Zhang, Y., Li, Y., Effect of pH on lactic acid production from acidogenic fermentation of food waste with different types of inocula, *Bioresource Technology* (2016), doi: http://dx.doi.org/10.1016/j.biortech.2016.11.111

Effect of pH on lactic acid production from acidogenic fermentation of food waste with different types of inocula

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Abstract: Effect of acidic pH (4, 5, 6 and uncontrolled) on lactic acid (LA) fermentation from food waste was investigated by batch fermentation experiments using methanogenic sludge, fresh food waste and anaerobic activated sludge as inocula. Results showed that due to the increase of hydrolysis, substrate degradation rate and enzyme activity, the optimal LA concentration and yield were obtained at pH 5, regardless of the inoculum used. The highest LA concentration (28.4 g/L) and yield (0.46 g/g-TS) were obtained with fresh food waste as inoculum. Moreover, after the substrate was completely utilized, the lactic acid bacteria population sharply decreased, and the LA produced was converted to volatile fatty acids (VFAs) at pH 6 within a short period. The VFA components varied with the inoculum supplied. Microbial community analysis using high-throughput pyrosequencing revealed that diversity decreased and a high abundance of *Lactobacillus* (83.4%-98.5%) accumulated during fermentation with all inocula.

Keywords: lactic acid; food waste; inoculum; pH; acidogenic fermentation