Kinetic studies of the strengthening effect on liquid hot water pretreatments by organic acids

Huisheng LYU, Chunliu Lv, Minhua Zhang, Jiatao Liu, Fanmei Meng, Zhong Feng Geng

PII: S0960-8524(17)30396-6
DOI: http://dx.doi.org/10.1016/j.biortech.2017.03.115
Reference: BITE 17819

To appear in: *Bioresource Technology*

Received Date: 23 February 2017
Revised Date: 18 March 2017
Accepted Date: 20 March 2017

Please cite this article as: LYU, H., Lv, C., Zhang, M., Liu, J., Meng, F., Geng, Z.F., Kinetic studies of the strengthening effect on liquid hot water pretreatments by organic acids, *Bioresource Technology* (2017), doi: http://dx.doi.org/10.1016/j.biortech.2017.03.115

Kinetic studies of the strengthening effect on liquid hot water pretreatments by organic acids

Huisheng LYU, Chunliu Lv, Minhua Zhang, Jiatao Liu, Fanmei Meng, Zhong Feng Geng*

Key Laboratory for Green Chemical Technology of Ministry of Education, Tianjin University R&D Center for Petrochemical Technology, Tianjin 300072, China

Abstract

The liquid hot water (LHW) pretreatments would be accelerated by the organic acids produced from the process. In the study, the organic acids included not only acetic acid but also lactic acid during LHW hydrolysis of reeds, at 180-220ºC and for 15-135min. The lactic acid was presumably produced from xylose degradation in the pretreatment process. The different organic acids, such as acetic acid, lactic acid and acetic-lactic acids, were used to strengthen the LHW pretreatments for increasing xylose production. Moreover, the work presented kinetic models of xylose and hemicellulose at different conditions, considering the generation of lactic acid. The experimental and kinetic results both indicated that acetic-lactic acids had synergistic catalytic effect on the reaction, which could not only inhibit the degradation of xylose, but also promote the hydrolysis of hemicellulose. Besides, the highest concentration of xylose of 7.323g/L was obtained at 200°C, for 45min and with 1wt% acetic-lactic acids.

* **Corresponding author.** Minhua Zhang. Tel. /fax: +86-22-27406119.

E-mail address: TJU2016@126.com