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

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

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6 **Abstract**

7 The liquid hot water (LHW) pretreatments would be accelerated by the organic
8 acids produced from the process. In the study, the organic acids included not only acetic
9 acid but also lactic acid during LHW hydrolysis of reeds, at 180-220°C and for
10 15-135min. The lactic acid was presumably produced from xylose degradation in the
11 pretreatment process. The different organic acids, such as acetic acid, lactic acid and
12 acetic-lactic acids, were used to strengthen the LHW pretreatments for increasing xylose
13 production. Moreover, the work presented kinetic models of xylose and hemicellulose at
14 different conditions, considering the generation of lactic acid. The experimental and
15 kinetic results both indicated that acetic-lactic acids had synergistic catalytic effect on
16 the reaction, which could not only inhibit the degradation of xylose, but also promote
17 the hydrolysis of hemicellulose. Besides, the highest concentration of xylose of
18 7.323g/L was obtained at 200°C, for 45min and with 1wt% acetic-lactic acids.

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