

Evaluation of autohydrolysis pretreatment using microwave heating for enzymatic saccharification of corn residues

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Pretreatment of lignocellulosic materials (LCMs) is one of the most critical stages in the production of 2G bioethanol, this stage allows to maximize the production of fermentable sugars in the enzymatic saccharification process (ESP). Recently the microwave heating (MH) have been studied for enhanced the LCMs pretreatment, this technology reduces the energy requirements in the process, due to the fast heat transfer and it has allowed to redefine a lot of reactions which the thermal factor plays an essential role in the process. In this work were evaluated the effects of autohydrolysis pretreatment from corn residues using microwave heating and the pretreated solids as substrate in the enzymatic saccharification. The autohydrolysis pretreatment was performed using water as catalyst, the time (10, 30 and 50) and temperature (160, 180 and 200 °C) were evaluated and the pretreated solids were used in the ESP. The enzymatic saccharification were performed with a working volume of 50 mL, 50 mM citrate buffer (pH 4.8), 2% (w/v) sodium with a cellulose concentration of 1 % (w/v) and incubated at 50 °C. The CellicCTec2 - cellulase was used with a loading of 20 FPU/g. This work showed that microwave autohydrolysis processing is an efficient pretreatment producing a solid enriched with cellulose (63.67 ± 0.91). The solid pretreated at 200 °C for 10 min was the best condition for saccharification yield ($96.95\% \pm 0.79$). This autohydrolysis pretreatment using microwave heating and enzymatic saccharification is a good alternative to obtain fermentable sugars for bioethanol production.