

Soluble inhibitors generated during hydrothermal pretreatment of oil palm mesocarp fiber suppressed the catalytic activity of *Acremonium* cellulose

ABSTRACT

Oil palm mesocarp fiber was subjected to hydrothermal pretreatment under isothermal and non-isothermal conditions. The pretreated slurries were separated by filtration, pretreated liquids and solids were characterized. An enzymatic digestibility study was performed for both pretreated slurries and solids to understand the effect of soluble inhibitors generated during the pretreatment process. The highest glucose yield obtained from pretreated slurries was 70.1%, and gradually decreased with higher pretreatment severities. The highest glucose yield obtained in pretreated solids was 100%, after pretreatment at 210 °C for 20 min. In order to study the inhibitory effects of compounds generated during pretreatment with cellulase, technical grade solutions that mimic the pretreated liquid were prepared and their effect on *Acremonium* cellulase activity was monitored using Avicel. Xylo-oligomers and tannic acid were identified as powerful inhibitors of *Acremonium* cellulase, and the lowest hydrolysis rate of Avicel of 0.18 g/g-glucose released/L/h was obtained from tannic acid.

Keyword: Oil palm mesocarp fiber; Hydrothermal pretreatment; Tannic acid; Xylo-oligomers; *Acremonium* cellulase inhibition