

## **Conditions of Hydrolysis with a Specific Pair of Endo- and Exo-Cellulases**

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### **ABSTRACT**

Enzymatic hydrolysis of cellulose is a technology involved in the production of bioethanol, a potential alternative renewable energy. Many cellulases with endo- and exo-type of activity are known to hydrolyze cellulose synergistically. In this thesis, potential synergy between endo-cellulase, Ce15B, with and without a carbohydrate-binding module (CBM6), and a new exo-cellulase, CBH1, from *trichoderma harzianum* FP108 were examined during the hydrolysis of semi-crystalline cellulose (Avicel). Since CBM6 is recognized as having a high affinity for amorphous cellulose, it was hypothesized that this affinity could enhance the synergistic effect between the endo- and exo-cellulases by focusing the action of Ce15B+CBM6 on the amorphous regions of the Avicel substrate. The increased activity of Ce15B+CBM6 over Ce15B alone was confirmed. However, in contrast to our expectations, a synergistic effect was not observed between either endo- and exo-cellulase pairs. From the obtained hydrolysis yield, it was inferred that Ce15B+CBM6 may have exo-type activity that caused a competitive interaction with the exo-cellulase, which resulted in no synergy.