

Boosting hydrolysis of cellulosic substrates by peroxidase from *Phanerochaete chrysosporium*

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Biocatalytic hydrolysis of cellulose is a key step for using lignocellulosic biomass. Accordingly, it is essential to develop the efficient cellulolytic biocatalyst with a higher reaction rate and extended substrate specificity. Herein, we report not only a novel promiscuous activity of peroxidases from *Phanerochaete chrysosporium* for direct hydrolysis of cellulosic substrates but also boosting hydrolysis of cellulosic substrate in the co-existence of cellulase. Lignin peroxidase (LiP, E.C. 1.11.1.14) and manganese peroxidase (MnP, E.C. 1.11.1.13) were tested using carboxyl methyl cellulose (CMC) as the substrate. LiP had endo-, exo-glucanase, and β -glucosidase activity and MnP had endo- and exo-glucanase activity. Surprisingly, LiP and MnP were found to boost cellulase activity. When adding LiP in the co-existence of cellulase, reducing sugars from CMC and Avicel increased 2.6-fold and 2.1-fold, respectively, comparing with those using cellulase only. Also, MnP promoted 1.9-fold higher reducing sugar production from CMC. Further study will be conducted to verify the mechanism of LiP and MnP on cellulose.