Chitin binding study of a lytic polysaccharide monooxygenase from the marine bacterium *Vibrio campbellii*

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Abstract: The enzymatic degradation of naturally abundant polysaccharides has received much attention by biotechnological industries, most notably for first (starch) and second (cellulose/chitin) generations of biofuel production. Lytic polysaccharide monooxygenases (LPMOs) are copper-dependent enzymes that are capable of oxidative cleavage of recalcitrant polysaccharides, such as chitin or cellulose and they may also play a critical role in bacterial infections. Despite the importance of LPMOs in biomass conversion and a large number of LPMO genes that have been identified from various microorganisms, only a few LPMOs have been well studied so far. Therefore, further characterization of these proteins is thus of interest. In the present study, a chitin-active LPMO family AA10 from the marine bacterium, *Vibrio campbellii* ATCC BAA-1116 (formerly *Vibrio. harveyi*), named *Vh*LPMO10A, is described. This enzyme consists of 487 amino acids, comprising a signal peptide followed by an *N*-terminal family AA10 LPMO catalytic domain, an uncharacterized α+β domain and a *C*-terminal CBM carbohydrate-binding domain. This enzyme was successfully produced and expressed at a high level in the exogenous *E. coli* strain BL21(DE3) host cells. *Vh*LPMO10A was shown to bind different chitin polymeric substrates with different extents of binding capacity. The results obtained may provide a further understanding of this new member of chitin-active LPMOs.

Keywords: Chitin; Lytic polysaccharide monooxygenase; *Vibrio campbellii;* Chitin-binding assay.

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