

Development of Recombinant Whole Cell Biocatalyst for Removal of Organophosphate Compounds : Cellular Localization of Organophosphorus Hydrolase

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Abstract

Organophosphorus hydrolase (OPH) from *Pseudomonas diminuta* or *Flavobacterium* sp. is a homodimeric organophosphotriesterase that can degrade a broad spectrum of toxic organophosphates (OPs) that are widely used for insecticides and chemical warfares.¹ This enzyme can hydrolyze various phosphorus-ester bonds including P-O, P-F, P-CN, and P-S bonds.² The hydrolytic mechanism involves the addition of an activated water molecule at the phosphorus center.³ The application of OPH for bioremediation is of great interest due to its high turnover rate. However, the whole cell biocatalyst expressing intracellular OPH has mass transport limitations of substrates and products because the cell membrane acts as a diffusion barrier.⁴ In this presentation, we will discuss the strategy for cellular localization of OPH to enhance whole cell bioconversion efficiency.

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