

## Biomimetic Enzyme Encapsulation by Peptide Mediated Biosilicification

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Silica nanoparticle is recognized as a useful material as support for biomolecules due to its biocompatibility, ordered pore structure, large surface area, high stability, etc. Various methods of enzyme immobilization have been developed to prepare a stable and reusable industrial biocatalyst. In this study, we immobilized enzyme into silica matrix mediated by SFP(silica forming peptide) which catalyze silica formation by itself fused to enzyme and tested the influence of encapsulated enzyme with biosilica. At first, we searched new SFP which can synthesize biosilica as like silaffins of diatoms. Next, we tried to encapsulate enzyme in the biosilica matrix by SFP. Prior to use of enzyme, we tested with GFP-SFP fused protein to encapsulate in silica matrix by mixing of TMOS. Finally, SFP was fused to C-terminus of cellulase derived from *Clostridium thermocellum* which hydrolyzes cellulose to glucose. As a result, encapsulated cellulase with biosilica showed high thermo stability and reusability. We expect this novel enzyme encapsulation strategy can be a new tool for biotechnology and industrial applications.