

### Investigation on Bulk-scale Adhesive Force of Recombinant Mussel Adhesive fp-3

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Mussel adhesive proteins (MAPs) have received increased attention as potential biomedical and environmentally friendly underwater adhesives. Particularly, foot protein type 3 (fp-3), is located at the interface between the substratum and the adhesion plaque of mussels, and it is expected as one of the important components for surface adhesion with high concentration of 3, 4-dihydroxyphenyl-L-alanine (DOPA). Although our previous research reported the production of *Mytilus galloprovincialis* fp-3 variant A (fp-3A) in *Escherichia coli*, its biochemical characterization and practical use were difficult because of its low productivity. In this work, fp-3A gene was codon-optimized based on the preference of *E. coli* codon usage and signal sequence was eliminated. Mass production of recombinant fp-3 fused with a hexahistidine affinity ligand and its purification with affinity chromatography were succeeded with ~47 mg/L yield. Bulk-scale adhesive forces of purified recombinant fp-3 were measured without and with in vitro DOPA modification. Collectively, we can expect that recombinant fp-3A may be used as a practical bulk-scale bioadhesive.