Screening of stable *Fusarium solani pisi* cutinase using plasmid display system

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Enzymes have played an important role in many processes and industrial applications. However, since they function under mild aqueous conditions, the industrial applications have some limitations. In this research, plasmid display system was used for enzyme screening in organic solvent and high temperature. Plasmid display system is conceptually simple and avoids the potential difficulties. The fusion proteins were expressed *in vivo* and the proteins bound to the specific DNA sequence on the encoding plasmids. And proteolysis resistance was used for selection tool that well-folded proteins should be more resistant to digestion of protease than poorly-folded proteins. Cutinase that has activity on hydrophobic substrates was chosen as a model enzyme. Stable mutants (I183T, I183F and A56V) were screened using the library obtained by the enrichment of well-folded mutants. I183T and I183F are more stable than A56V in organic solvent, while A56V is superior to I183T and I183F in thermostability. Computational study was performed to investigate the residual characteristics of the stable mutants and this has given some lessons for increased stability.