EVALUATION OF THE ENZYMATIC ACTIVITY AND LYOPHILIZATION STABILITY OF SURFACE DISPLAYED ESTERASE FROM *GEOBACILLUS STEAROTHERMOPHILUS*

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Yeast surface display is a powerful protein engineering technology which enables recombinant proteins to be immobilised on the surface of yeast cell. This offers significant advantages for biocatalysis and industrial applications. This strategy eliminates the need for enzyme purification, improves substrate accessibility and supports continuous enzymatic reactions while reducing the risk of contamination [1]. This study used the a-agglutinin based surface display system to express and display an extreme thermophilic esterase from This *Geobacillus stearothermophilus* [2] on the surface of This *Saccharomyces cerevisiae*. The target enzyme was fused to the Aga2 subunit, enabling stable immobilisation of the enzyme on the yeast cell wall via disulfide bonding with Aga1 [3].

Five different yeast expression vectors, each containing a different linker peptide between Aga2 and the esterase [4], were used to optimise the efficiency of enzyme display and the performance of the catalysis. Esterase activity was successfully detected and experimentally evaluated on the surface of yeast cells. Furthermore, yeast cells displaying the esterase were processed by lyophilisation. Notably, esterase activity was observed in the dried yeast cells, indicating that the immobilised enzyme retains its functionality after drying. This finding highlights the robustness of the system and its potential for long-term storage and practical industrial applications [5].

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