Practical Applications of A Systematic Approach for Yielding A Potential Pool of Enzymes

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A systematic approach for the selection of potential biocatalysts from a natural source was designed here and then some practical applications were addressed. The approach that involves systematically combined conventional screening methods and current tools comprises the following consecutive steps; strain enrichment for activity screening, identification of positive strains, choosing whole genome-sequenced strains as candidates, gathering information about responsible enzymes, bioinformatic analyses and gene mining, probing genetic molecules and then functional expression using appropriate expression systems. Actually, esterase, glucoside-3-dehydrogenase, novel amidohydrolases, as potential enzymes for industrial biocatalysts, were prepared by the systematic procedure. The selected enzymes indeed had a high activity and selectivity for specific chemical compounds and were suitable therefore as biocatalysts for practical use. These result achieved by the combined approach could not easily be obtained with typical procedure. Hence, the approach proposed here should be of considerable use for the screening of potential enzymes, particularly for enzymes with desired activity to unnatural substrates, from conditionally expressed and/or repressed proteins that are distributed widely in natural pools under normal conditions.

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