BIOCATALYTIC DECARBOXYLATION OF AMINO ACIDS IN DEEP EUTECTIC SOLVENT USING IMMOBILIZED DECARBOXYLASES

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Decarboxylases play a crucial role in catalyzing the removal of carboxyl groups from amino acids, offering a sustainable and selective approach for the sustainable production of primary amines. In this study, we explore the application of L-valine decarboxylase from *Streptomyces viridifaciens* [1] and L-tyrosine decarboxylase from *Lactobacillus brevis* [2] in the biocatalytic decarboxylation of amino acids. We use a deep eutectic solvent as the reaction medium, introducing a challenging yet advantageous condition for catalysis, particularly beneficial for downstream processes.

The biocatalysts are immobilized to enhance stability and facilitate their reuse in subsequent reactions. The immobilization strategy consider the physical entrapment of whole cells in alginate matrix, as the most cost-effective options for the primary amines production. The immobilization strategy ensures prolonged enzymatic activity and simplifies the separation of the biocatalyst from the reaction mixture. Our methodology aligns with the principles of green chemistry, promoting efficiency while minimizing environmental impact.

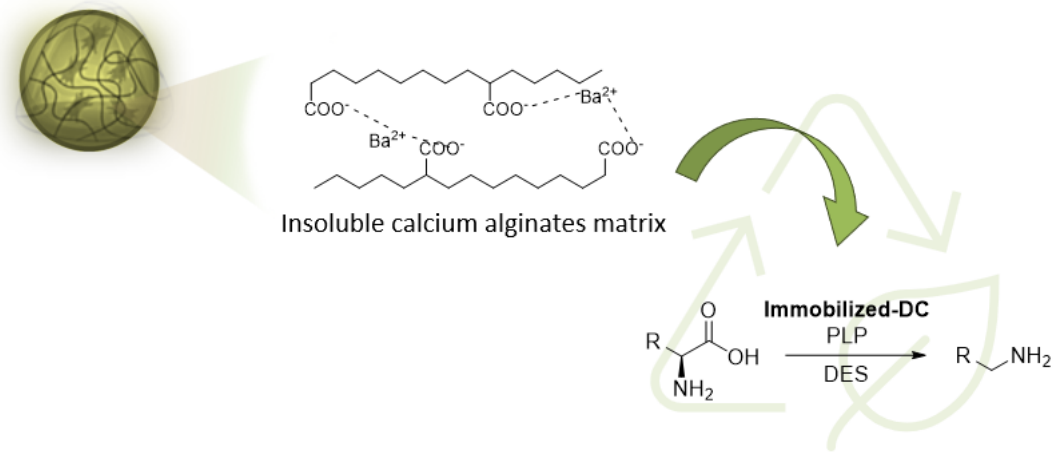

Figure 1: Biocatalytic decarboxylation of natural amino acids in deep eutectic solvent *via* alginate beads.

[1] Kim, D.I., Chae, T.U., Kim, H.U. et al. Microbial production of multiple short-chain primary amines via retrobiosynthesis. Nat Commun 12, 173 (2021). doi.org/10.1038/s41467-020-20423-6.
[2] Zhang, Kai, and Ye Ni. "Tyrosine decarboxylase from Lactobacillus brevis: soluble expression and characterization." Protein expression and purification 94 (2014): 33-39. doi.org/10.1016/j.pep.2013.10.018.