

Challenges in Flow-Biocatalysis

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Enzyme immobilisation offers an opportunity to render biocatalysts heterogeneous and allows their recovery from a batch reaction. At the same time, enzyme immobilisation allows for packing such biocatalyst in a reactor and run biotransformation in continuous. While this sounds straight forward, there is no single immobilisation method that suits every enzyme and tailoring is essential to deliver highly stable and active biocatalysts. In addition, several biocatalysts require exogenous cofactors and when this is transferred in flow, even if the cofactor can be recycled, it will eventually be lost downstream. Cofactor co-immobilisation offers an opportunity to overcome this hurdle. But flow biocatalysis, in packed-bed reactors, faces a number of challenges, such as possible interaction of the substrate/product with the enzyme carrier, insolubility of the substrate/product in aqueous medium, as well as enzyme that are oxygen dependent and struggle in terms of efficiency in a sealed environment. In this talk, a series of challenges and solutions will be presented, as well as yet unsolved issues.