NON-CONVENTIONAL MEDIA IN FLOW BIOCATALYSIS

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Continuous-flow processing and miniaturization have recently changed the paradigm of biocatalytic process design and significantly contribute to process intensification.[1] Since many organic substrates or reaction products are only sparingly soluble in water, the use of non-conventional media is receiving considerable attention, especially with the possibility for *in situ* product removal in two-liquid phase systems.[2] Current trends to use solvents that combine high solubilization capacity and cost-effectiveness with a low environmental footprint, such as deep eutectic solvents and protic ionic liquids that can even improve biocatalyst selectivity, might gain momentum by using high-throughput microflow system for their selection.[3]

In this presentation, the application of both free enzymes in cosolvent or two-liquid phase systems, as well as immobilized biocatalysts in non-conventional media within microfluidic devices will be highlighted. Examples include lipase-catalyzed esterifications and transesterifications in selected ionic liquids with immobilized enzyme, or in aqueous/organic solvent and ionic liquid/organic solvent systems with dissolved enzyme[4-7]. Moreover, amine transaminase-catalyzed transamination using selected deep eutectic solvent in a magnetic-field assisted microreactor will be presented, and the effect of various cosolvent and two-liquid phase systems on laccase-catalyzed tyrosol acetate oxidation in a microflow system will be discussed. Finally, the application of deep eutectic solvent for tuning the characteristics of a copolymeric hydrogel used for biocatalyst immobilization will be presented.[8]

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