Hans Jurgen Federsel, J Ind Environ Chem 2019, Volume 3
DOI: 10.4066/2591-7331-C1-007

Hans Jurgen Federsel

EnginZyme, Sweden

Future of biocatalysis – Enzymatic reactions in continuous flow processes

There is a need to develop sustainable and greener processes in order to address excessive generation of waste and recent advances in the field of biocatalysis is making this possible. Biocatalysts in the form of enzymes are environmentally-friendly, biodegradable, and adaptable, enabling chemical transformations with remarkable regio- and enantioselectivities. Protein engineering has enabled the tailoring of enzymes to a required function and increased catalytic efficiency, alter substrate recognition, and even adding new structural functionality. The ability to implement these engineered biocatalysts holds promise for sustainable chemical manufacturing. However, several challenges remain a barrier against a more widespread use of biocatalysis including the cost of production of the biocatalyst itself (difficulties in capturing and re-using the enzyme), as well as the complexity of designing a manufacturing process. For this, industry is looking at immobilisation as an opportunity. Harnessing the synergy between biocatalysis and flow chemistry, immobilisation onto a solid support makes it possible to recycle the enzyme and, hence, reducing costs associated with enzyme production. Immobilisation can improve enzyme stability, prevent product contamination by the enzyme reducing downstream processing requirements, and facilitate the use of higher enzyme loadings for shorter processing times. The EziG immobilisation platform is based on polymer-coated controlled-porosity glass beads which specifically anchor any protein containing a polyhistidine (His6) tag. This platform offers a standardised solution for targeted immobilisation of enzymes on a carrier. These features of EziG enables biocatalysis to become an accessible, effective, and sustainable choice for developing greener processes.

Speaker Biography

Hans Jurgen Federsel is a PhD in Organic Chemistry, Royal Institute of Technology (KTH), Stockholm (1980). Starting as process R&D chemist in Astra, Sodertalje, Sweden (1974) he has occupied positions both as line and project manager. After the formation of AstraZeneca (1999) he became Director of Science, followed by appointment as Senior Principal Scientist. Academic qualifications led to an Associate Professorship (KTH,1990) and a seat on the Board of the School of Chemical Science and Engineering. In 2009 he was elected to the Royal Swedish Academy of Engineering Sciences. After closure of the R&D unit in Sodertalje (2012), he relocated to Macclesfield, UK maintaining his previous role. In 2017 (February) he returned to Sweden, picking up a role as Chief Scientific Officer in EnginZyme – a biotech company developing a technology platform in biocatalysis, aimed at immobilization of enzymes. Since 1st January 2019, he has taken on the position as Vice President Science Relations.

e: hans-jurgen@enginzyme.com

Notes: