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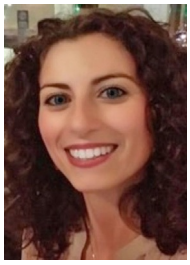
CHEMCATCHEM Cover Profile

Highly Efficient Oxidation of Amines to Aldehydes with Flow-based Biocatalysis


Dr. Martina L. Contente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Prof. Francesco Molinari


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The front cover artwork for Issue 20/2017 is a collaboration between the University of Nottingham (UK) and the University of Milan (Italy). The image shows the ease of production of a range of aldehydes in continuous flow through an efficient enzymatic oxidation with minimal waste and in an environmentally friendly manner.
See the Full Paper itself at https://doi.org/10.1002/cctc.201701147.

How did the collaboration on this project start?

The two teams started working on cell-free immobilized enzymes in continuous flow systems in 2016 and were brought together by a common link (thank you Lucia Gardossi!). The Paradisi group had experience in covalent enzyme immobilization and had recently reported on a particularly stable transaminase from a salt-loving bacterium. The group in Milan had extensive experience in biocatalysis and flow chemistry, and it seemed a natural evolution to bring the two groups together. Dr. Contente's move from Milan to Dublin first, and then to Nottingham proved to be key to the success of the project.

What was the biggest surprise?

Three of the substrates tested posed an unexpected challenge as the aldehyde products had an extremely high affinity for the resin. Toluene easily stripped the product from the packed-bed reactor and, amazingly, the biocatalyst was completely unaffected by the solvent, retaining 100% activity after each cycle.

What aspects of this project do you find most exciting?

The realization that this is just the tip of the iceberg was very exciting. This technique is very powerful and extremely adaptable, so we have no doubt that there will be a rapid development of more complex biotransformations, cascade reactions in multi-step syntheses, and hopefully, in a not too far future, a real industrial application of enzymes in flow.

Acknowledgements

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