Seminars at the Department of Chemistry and Industrial Chemistry

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Alessandro Pellis obtained his B.Sc. in Biotechnology (2010) and his M.Sc. in Medical Biotechnology (2012) from the University of Trieste working at the Department of Chemical and Pharmaceutical Sciences on the synthesis of functional polyesters under the supervision of Prof. Lucia Gardossi. He then moved to the University of Natural Resources and Life Sciences of Vienna (BOKU) as Early Stage Researcher in the frame of the EU FP7 Marie Curie project REFINE aimed at the training of material scientists for a sustainable polymer industry working with Prof. Georg M. Guebitz. He obtained his PhD from BOKU in 2016 discussing a thesis titled: "Enzymatic synthesis and functionalization of bio-based polyesters".
After a brief post-doc at the same university where he acted as manager of the EU Horizon 2020 project RESYNTEX, he was awarded an Erwin Schödinger Individual Fellowship to join the Green Chemistry Centre of Excellence of the University of York. There, he started working with Prof. James H. Clark on the exploitation of biocatalysts in sustainable solvents for synthetic purposes.
In 2019 Alessandro returned to BOKU where he got promoted to Senior Scientist and he is now leading the Chemo-enzymatic processes team in the group of Prof. Georg M. Guebitz.

Friday February 5th, 2021
online on TEAMS
at 15.00

The Closure of the Cycle: Enzymatic Synthesis and Functionalization of Bio-Based Polymers

Abstract

The polymer industry is under pressure to mitigate the environmental cost of petroleum-based plastics. Green chemistry, in combination with biotechnology, contributes to the gradual replacement of petroleum-based chemistry and the development of new renewable products, leading to the closure of carbon circle[1]. An array of bio-based building blocks is already available on an industrial scale and is boosting the development of a new generation of sustainable and functionally competitive polymers, such as polylactic acid (PLA) and poly(hydroxyalkanoates) (PHA)[2].
Biocatalysts add higher value to bio-based polymers by catalyzing not only their selective functionalization[3], but also their synthesis under mild and controlled conditions[4]. The ultimate aim is the introduction of chemical functionalities on the surface of the polymer while retaining its bulk properties, thus enlarging the spectrum of advanced applications. All these materials are also enzymatically degradable to their constituent monomers therefore creating a zero-waste closed loop[5].

References

1. Pellis et al. **2016**, *Trends Biotechnol.*, **34**, 316-328
2. Pellis et al. **2016**, *Polym. Int.*, **65**, 861-871
3. Ortner et al. **2017**, *Green Chem.*, **19**, 816-822
4. Pellis et al. **2019**, *Nat. Commun.*, **10**, 1-9
5. Weinberger et al. **2017**, *Green Chem.*, **19**, 5381-5384

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