



Name: Klara Bangert

Name of the project: Biocatalytic access to novel functional building blocks/ materials

Abstract of the project:

This PhD-project deals with the transformation of cheap renewables into higher functionalised molecules, which then may serve as building blocks for polymers.

For this purpose, various peroxygenases will be analysed in relation to activity, stability and regio- and enantioselectivity, improved and modified. Finally, best transformations will be optimized for larger scale. While the first part (initial experiments with biocatalysts) will take place at the University of Graz (Austria) the second part (larger scale, polymerization) will take place at the company b4plastics (Belgium).

Building blocks for polymers can be obtained by transforming renewables such as medium-chain fatty acids (caproic acid, caprylic acid and capric acid) into α -hydroxylated fatty acids. The selective oxyfunctionalisation of carbon-hydrogen bonds can be catalysed by P450 monooxygenases and peroxygenases. P450 monooxygenases and peroxygenases rely on an oxoferryl-heme as the oxygenating species. Quite appealing is the simplicity of peroxygenases, while P450 monooxygenases depend on a reductase or reductase domain, thus requiring molecular oxygen and an additional cofactor recycling system, peroxygenases are cofactor-independent enzymes and only depend on hydrogen peroxide as both electron and oxygen resource.

Introduction of the ESR:

Klara was born in Freiburg, a beautiful city in the south of Germany. She studied Life Science at the University of Konstanz in Germany. After school she went to Mexico to do voluntary social work. Since Mexico, she is intrigued by Latin America and her studies included a semester abroad at the Universidad Católica in Santiago/ Chile.

The term life science refers to an interdisciplinary field where biology and chemistry overlap, and she wanted to continue working at this interface. Therefore she did two internships at Sigma-Aldrich Chemie GmbH in Buchs SG/ Switzerland and at the Institute of Molecular Enzyme Technology at Jülich Research Centre/ Germany. Both internships left her fascinated by the power of natural biocatalysts and reinforced her aspiration to conduct application-oriented research.

A Marie Skłodowska-Curie European Industrial Doctorate seemed the great opportunity to work in an interdisciplinary, international environment and on a project that is dedicated to meet the demands for renewable and biodegradable resources for a sustainable world.

Keywords: biocatalysis, renewables, polymers

Contact details:

- Name: Bangert Klara
- Department/University/Company: Institute of Chemistry, Department of Organic and Bioorganic Chemistry University of Graz and B4Plastics
- Address Department/University/Company: Heinrichstrasse 28 / II
8010 Graz – AUSTRIA; IQ-Parklaan 2a, B-3650 Lanklaar -BELGIUM
- Phone: +43 (0)316 380 - 8635
- Email: klara.bangert@uni-graz.at