The Power of Applied Chemocatalysis

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Despite the recent advances in biotherapeutics, the majority of FDA-approved active pharmaceutical ingredients are still small molecules. Thus, the development of robust and scalable synthetic routes to a large variety of complex molecules is a major task in organic process development. Nowadays, topics like sustainability, atom- and step economy and E-factors need to be additionally considered for an environmentally benign synthesis. A very convenient way to acknowledge these green chemistry concepts, as well as the consideration of economic necessities is to implement catalytic transformation in the synthetic routes.

The commercial availability of a large variety of chiral ligands is an important key factor for a successful lead finding and subsequent optimization in the development of catalytic reactions. First this wide library of modular ligands was initially designed and successfully applied in asymmetric hydrogenation on industrial scale and have, in turn, been expanded to new applications with unprecedented findings. In the last years very interesting asymmetric transformations have been demonstrated such as hydrofunctionalization reactions or reductive couplings. New applications will be discussed to highlight the versatility of catalytic transformations and its benefits for increased sustainability processes.