

Chiral amines synthesis and *in-situ* product recovery for process intensification for application in organic fine chemicals and pharmaceuticals

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Chiral amines integrate the backbone of several active pharmaceutical ingredients (APIs) used in modern medicine for treatment of a vast range of diseases. However, despite the demand, their synthesis remains challenging. Besides a range of chemicals and enzymatical methods, chiral amine synthesis using transaminases (EC 2.6.1.W) represents a useful alternative to access this important class of compounds. Even though transaminases exhibit excellent stereo and regioselectivity and the potential for high yield, the reaction suffers from a number of challenges including the thermodynamic equilibrium, product inhibition, low substrate solubility etc.

In this work, an attractive process strategy for “*in-situ* product recovery in transamination” is presented. It involves the use of novel “High molecular weight” amines as donor substrates in transamination reactions. The choice of donor substrate is of high importance for amine transaminase reaction and process design. In contrast to common donor substrates such as alanine or isopropyl amine, we present a novel approach that makes it superfluous to administer amino donor molecules in excess, which, as known, leads to substantial losses of these molecules. The equilibrium shift towards the product side is greatly boosted without affecting the purity of the resulting product stream. On the contrary, our process leads to a substantial increase in product purity and yield. Results demonstrate the immense potential of these novel amine donors for developing a continuous transamination process.