

P019 On the way to chemo-deracemisation of secondary alcohols:
Directed evolution of Galactose Oxidase
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During the last two decades, the synthesis of chiral compounds in high enantiomeric excess has emerged into one of the most important fields of organic synthesis owing to the increased demand for chiral bioactive chemicals in enantiomerically pure form, such as pharmaceuticals or agrochemicals. Among the various ways to prepare enantiopure compounds, the use of asymmetric catalysts constitutes the most elegant and efficient strategy.

Chemo-enzymatic deracemisation, which has the advantage of converting directly a racemate mixture to a single enantiomer in a theoretical 100% yield and 100% e.e. has been previously shown in our group to be efficient to get enantiomerically pure amines and amino-acids. This process consists of a cyclic sequence involving an enantioselective enzymatic oxidation of the enantiomers mixture and a chemical reduction of the newly formed asymmetric compound. The project aims at applying this technique to secondary alcohol racemates. Galactose oxidase has been chosen for this purpose due to its high stability and its well-known structure. The modification of the substrate specificity from its primary alcohol oxidase activity to an enantioselective secondary alcohol activity has been considered by using directed evolution and rational design.

The overall strategy will be described and the achievement and characterization of a mutant with improved activity towards a range of secondary alcohols will be presented.