Biocatalytic synthesis of secondary alcohols

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In this work, studies toward effective synthesis of selected enantiomerically pure secondary alcohols are presented. 1,3-Diols and β-hydroxyketones are especially important building blocks for synthesizing many biologically active compounds. As target chemicals, derivatives of 5-aryl-3,5-dihydroxypentanoic acid and 5-aryl-5-hydroxy-3-oxopenatnoic acid were selected. New chemoenzymatic approach, which allows to obtain all stereoisomers of examined compounds with high enantiomeric excesses, was developed. Screening a large amount of enzymes and whole cell microorganisms was an effort required to achieve the objectives of the research. Chromatographic methods, for determining enantioselectivity are time-consuming and expensive. Therefore, the scope of the work was extended to develop a rapid and inexpensive method for estimating those parameters. Optical spectroscopy technique was used to monitor the progress of the reaction in real time but it requires the use of appropriate chromogenic or fluorogenic substrates. Already known, available compounds did not allow for screening the activity of enzymes toward secondary alcohols. Therefore, a new class of fluorogenic probes was designed and synthesized. These probes were evaluated for use as substrates for screening the activity of hydrolytic enzymes and chemoselectivity and stereoselectivity of the reactions. Obtained results were published in *ChemBioChem,* polish patent application, and were presented on numerous international and national conferences as oral communications, as well as posters. Part of research was performed on University of Graz in Prof. Wolfgang Kroutil team, within the COST CM1303 action.