Abstract of the PhD Thesis

Stereoselective Biohydrolysis of Epoxides: Analysis, Optimisation and Modelling

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Enantiopure Epoxides and their corresponding diols are versatile synthons in the chemical and pharamaceutical industry. The present work deals with the stereoselective biohydrolysis of styrinepoxide und derivates with epoxidhydrolasis from the fungi *Aspergillus niger* (DSM 823) and *Beauveria bassiana* (DSM 1344) in a whole cell fermentation (figure 1).

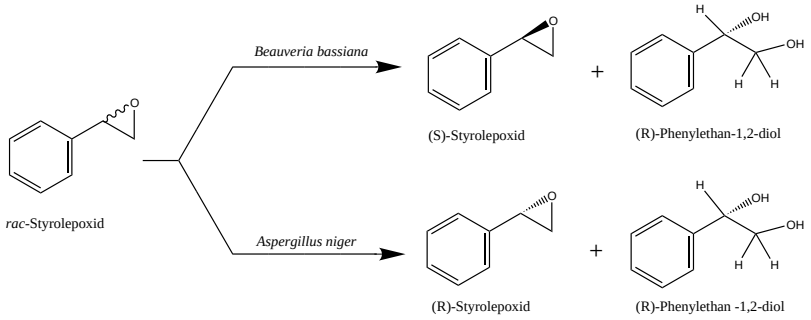

Figure 1: *Enatiokonvergent biohydrolysis of styrinepoxide with Aspergillus niger (DSM 823) and Beauveria bassiana (DSM 1344)*

After optimisation of growing conditions in a batch fermenter and determination of the optimal harvest time, the reaction system was analysed and kineticly quantificated for mathematic modelling. For the enhancement of the reaction mode, in order to receive higher substrate concentration, the reaction behaviour in cosolvent system was measured. Subsequently, an immobilisation process in polyvinylalcohol (LentiKats) was established, which enables an application of the biocatalyst for 7 days. The substrat range of this biohydrolysis was extanded by a new type of etherbridged epoxides. Using the messured kinetic data a mathematic model was establised, which includes different kinetic aspects and substrat transport limitation in the immobilised biocatalyst.