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Enantioconvergent hydrolysis of racemic styrene oxide by *Caulobacter crescentus* epoxide hydrolase for the production of enantiopure (*R*)-phenyl-1,2-ethanediol

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Epoxide hydrolase (EH) hydrolyze epoxide into the corresponding diol. Enantiopure phenyl-1,2-ethanediol with high enantiopurity and yield can be synthesized using *Caulobacter crescentus* EH(CcEH)-catalyzed enantioconvergent hydrolysis, based on different regioselectivities of CcEH for the different enantiomers. (*S*)-Styrene oxide was hydrolyzed into (*R*)-phenyl-1,2-ethanediol by attack on the benzylic position, resulting in inversion of the stereochemistry. EH attacks the less substituted carbon atom of (*R*)-styrene oxide to form (*R*)-phenyl-1,2-ethanediol with retention of the stereochemistry. The reaction conditions including temperature, substrate concentration, addition of detergents were analyzed to improve the yield and enantiopurity of diol. Using EH-catalyzed enantioconvergent hydrolysis, (*R*)-phenyl-1,2-ethanediol could be obtained in 48% yield with an enantiomeric excess of 95%.

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