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Biocatalysts in synthetic organic chemistry

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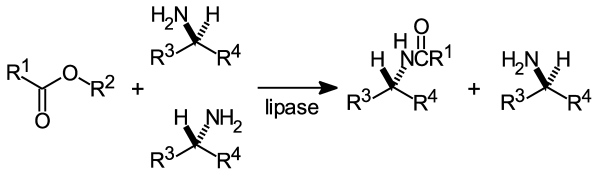
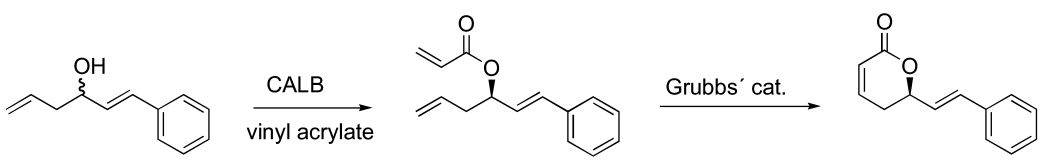
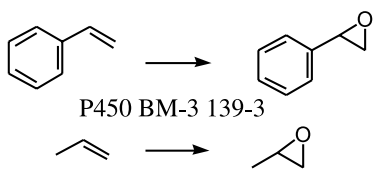
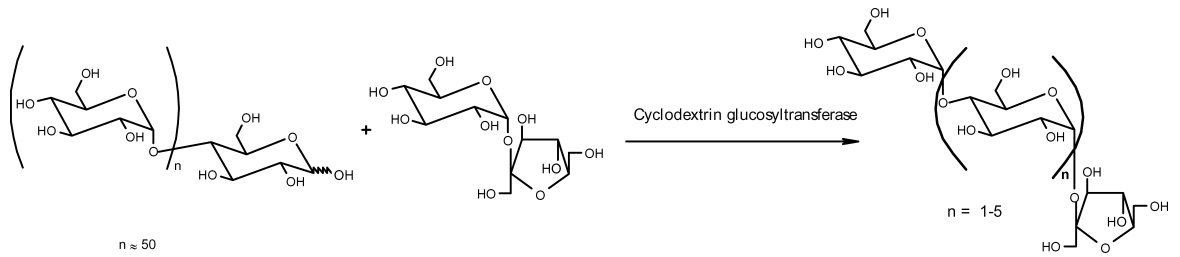
Contents

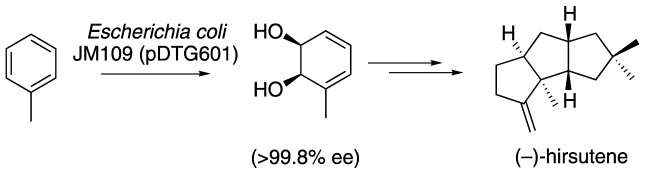


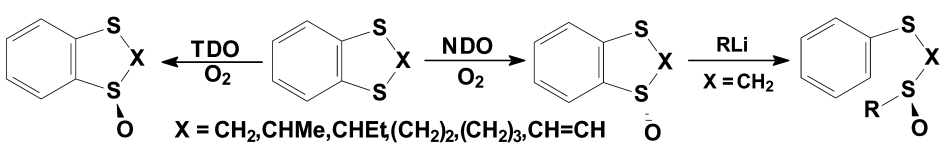


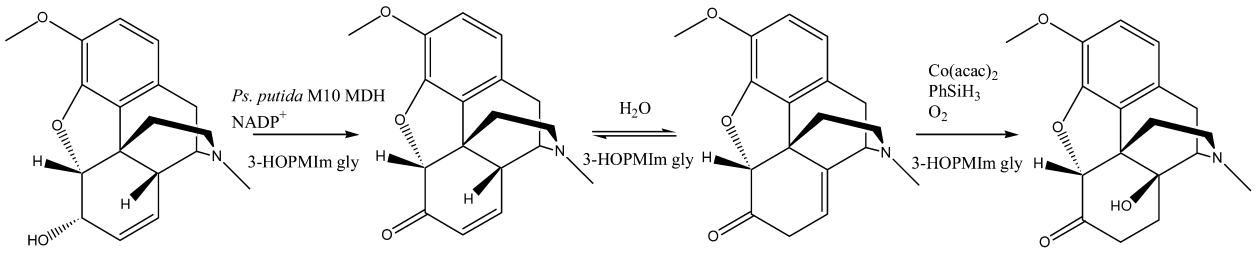
(±)-**2** *R*-**3** (+)-Goniothalamin

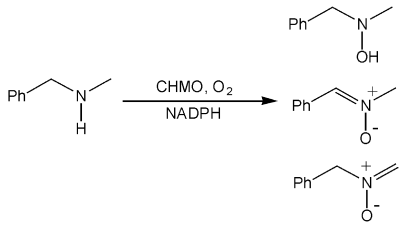




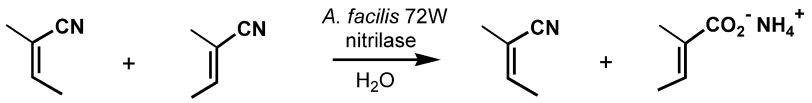


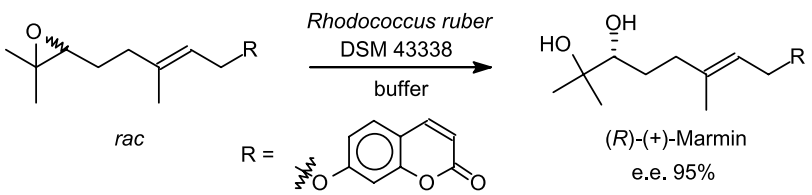




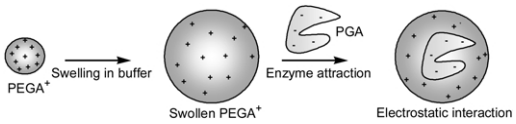


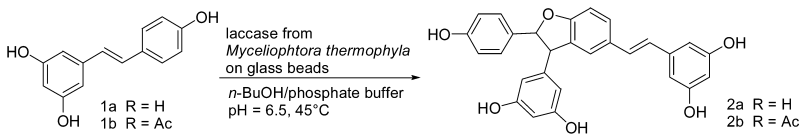
The formation of *N*-oxides, hydroxylamines and nitrones via enzymatic oxidation with cyclohexanone monooxygenase is described.

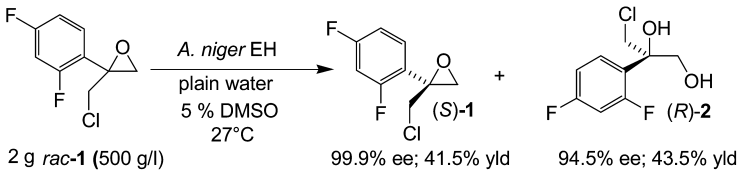


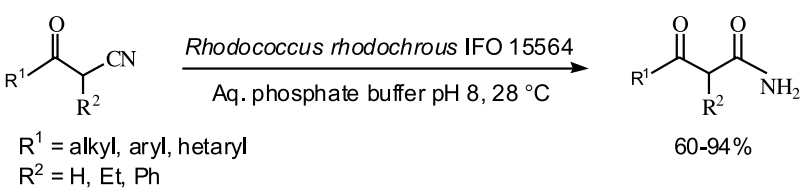


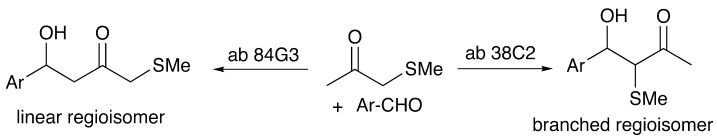
(*R*)-(+)-Marmin was obtained by asymmetric enantioconvergent biohydrolysis of the corresponding oxirane in 95% ee.

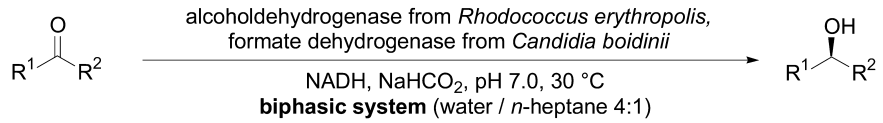




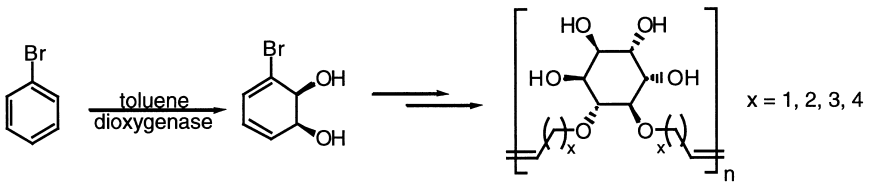


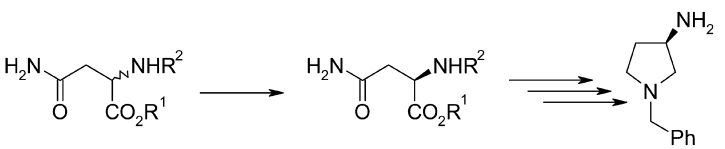


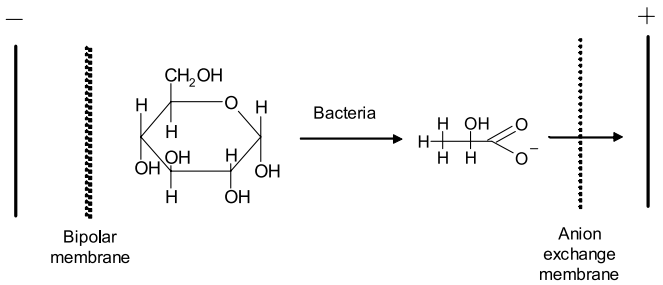


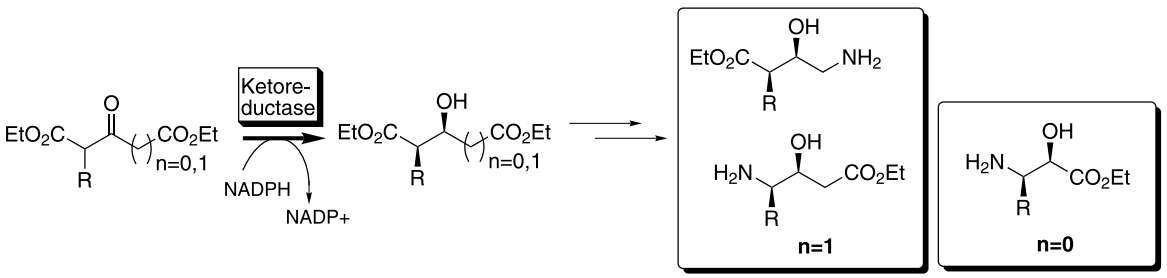


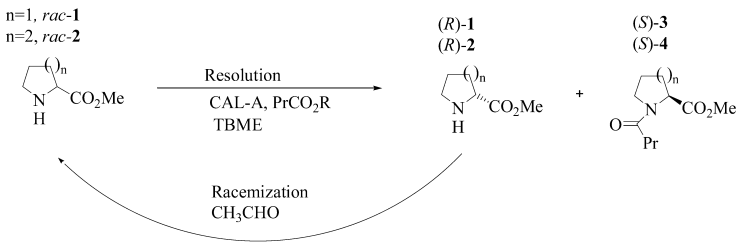
An enzyme-compatible biphasic reaction media for the asymmetric reduction of ketones with in situ-cofactor regeneration has been developed. As enzymes, a novel recombinant (*S*)-alcohol dehydrogenase from *Rhodococcus erythropolis* and a formate dehydrogenase were used.

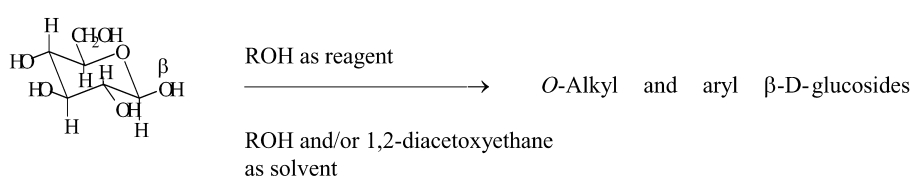


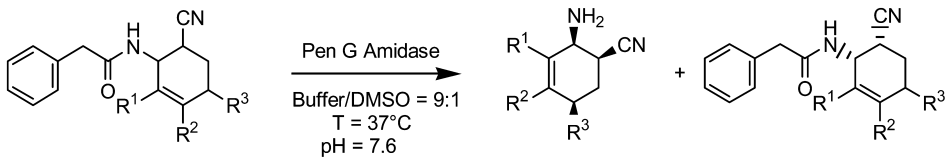


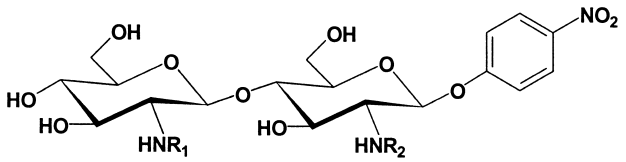


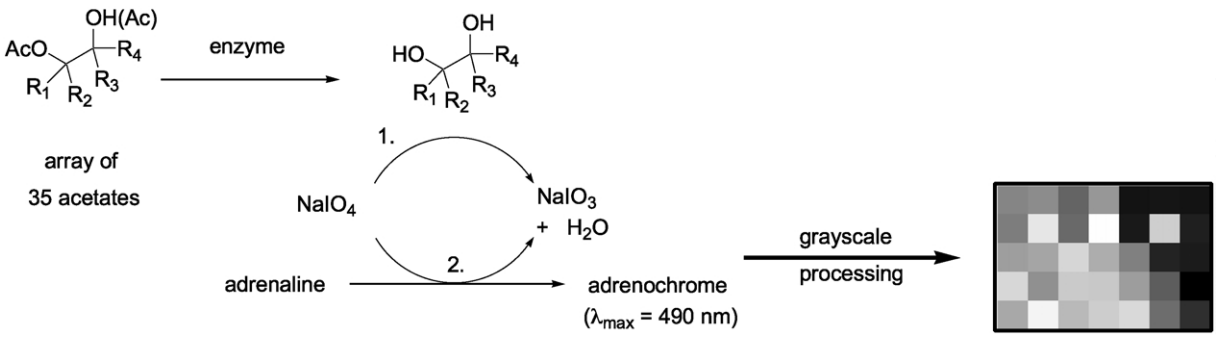




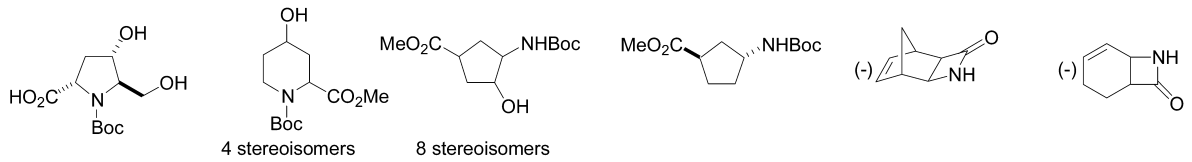


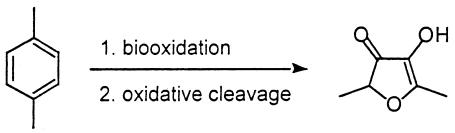


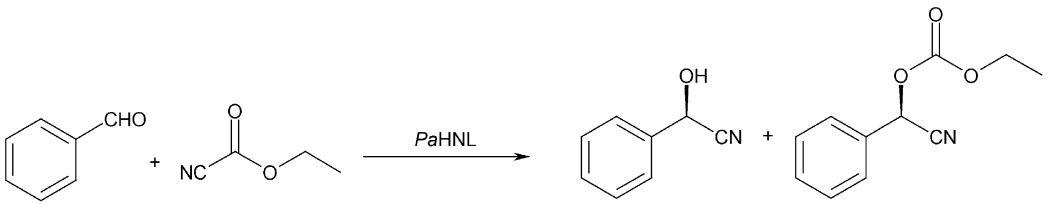


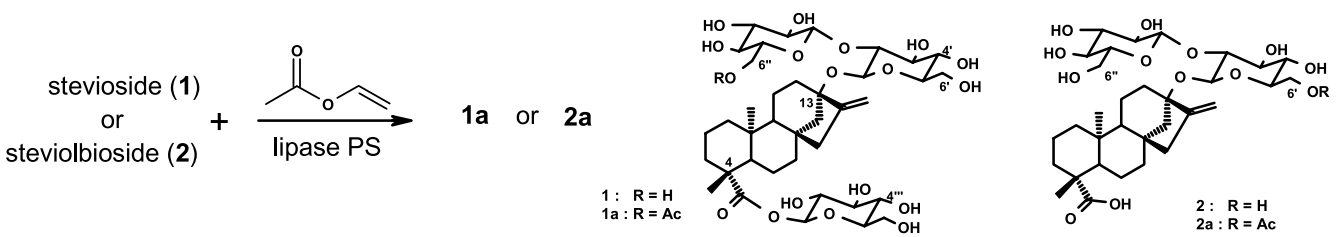


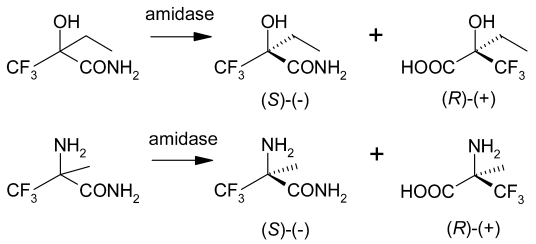
An enzyme that selectively cleaves the (+)-enantiomer from a racemic mix of γ-lactam has been isolated from the thermophilic archaeon *Sulfolobus solfataricus* MT4. The temperature optimum for the cleavage reaction of the γ-lactam substrate was 85 °C in phosphate buffer at pH 7.0. The enzyme also exhibits general amidase activity by cleaving linear and branched aliphatic and aromatic amides. It can catalyse the synthesis of benzoic hydrazide from benzamide preferentially to benzamide cleavage in the presence of excess hydrazine. It has potential for use in industrial biotransformations for the production of both carbocyclic nucleosides and hydrazides.

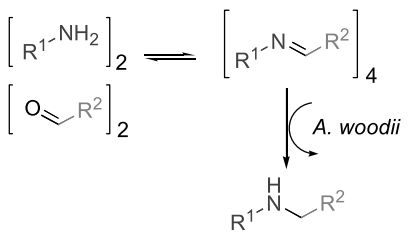




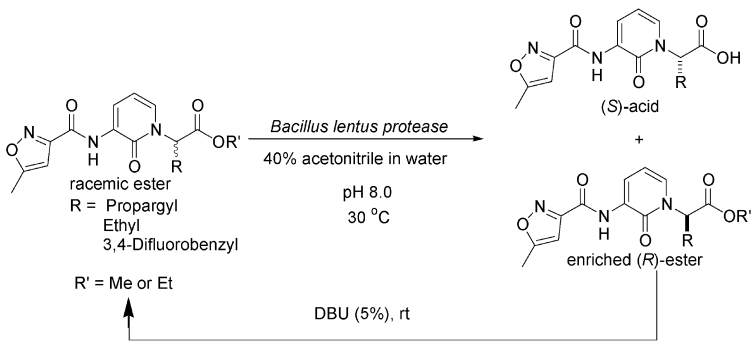


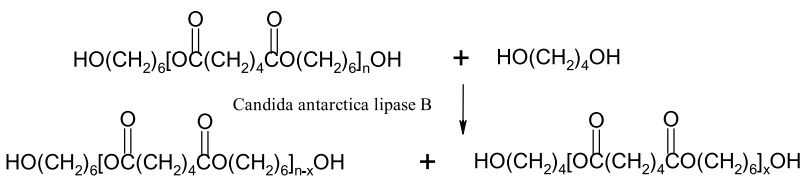


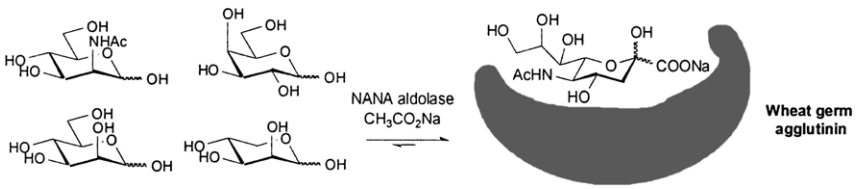


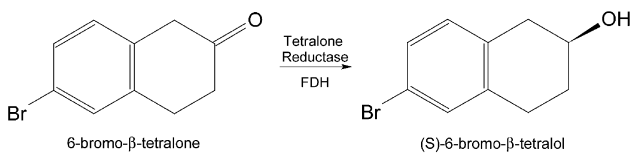


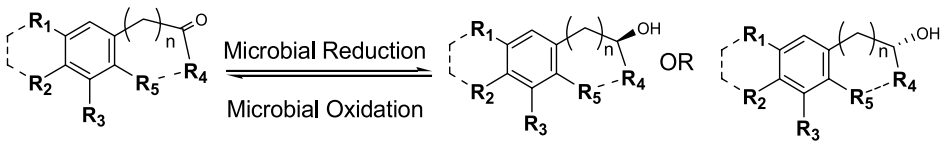
A new screen has been developed for novel biocatalytic imine reduction using virtual dynamic combinatorial libraries. Imine reductase activity has been detected in the strict anaerobe, *Acetobacterium woodii*.

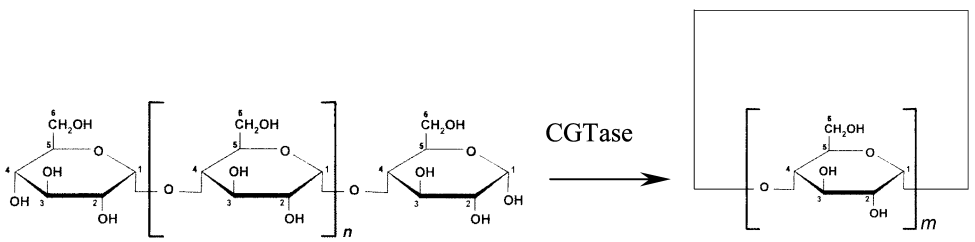












OTHER CONTENTS

*Corresponding author
ⓘ+ Supplementary data available via ScienceDirect

COVER

This picture shows the active site of the *Aureobacterium* (-)γ-lactamase enzyme (PDB code 1HK7). The catalytic triad made up of Ser98, His259 and Asp230, is shown as ball and stick and the secondary structure elements are shown as ribbons. A tetrahedral intermediate of the cyclic carbonate, (3aR,7aS)-3a,4,7,7a-tetrahedro-benzo [1,3] dioxol-2-one, is shown in pale blue covalently bound to the catalytic serine residue. (*J. Mol. Biol.* **2004**, submitted)
Authors: Kirsty Line, Michail N. Isupov and Jennifer A. Littlechild
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