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Two anti-Prelog and NAD-dependent alcohol dehydrogenases with broad substrate scope and excellent enantioselectivity

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PURPOSE OF THE ABSTRACT

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The synthesis of enantiopure molecules such as alcohols is pivotal to the chemical fields. Especially, the possibility to access both enantiomers of a molecule with high enantioselectivity and chemoselectivity is of great interest for the synthesis of intermediates for pharmaceuticals, agrochemicals, flavour and fragrances, and fine chemicals.1 In this context, biocatalysis offers great opportunities for the highly efficient and enantioselective synthesis of molecules by exploiting the exquisite selectivity of the enzymes. Through alcohol dehydrogenases (ADH), alcohols can be obtained via the enzymatic reduction of carbonyls.2 The majority of the available ADHs lead to the formation of one of the two enantiomers following the Prelog rule.3 A limited number of wild-type anti-Prelog ADH have been reported in the literature so far and most of them are NADPH-dependent.4 This cofactor dependence increases the costs for the application of these anti-Prelog ADHs, thereby making them less attractive for the chemical industry. Herein, we investigated two NADH-dependent anti-Prelog ADHs from Candida maris and Pichia finlandica,5 which are capable of performing the reduction of a broad range of ketones with good yields and excellent enantioselectivity.

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FIGURES

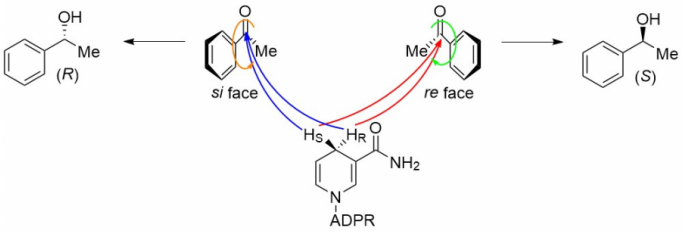

FIGURE 1

Prelog and anti-Prelog selectivity

Typical Prelog selectivity with most of the alcohol dehydrogenases (ADHs) and anti-Prelog selectivity with two ADHs from Pichia finlandica and Candida Maris

FIGURE 2

KEYWORDS

Alcohol dehydrogenase | Enantioselectivity | anti-Prelog

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