Asymmetric synthesis with a novel Baeyer-Villiger monooxygenase from *Fusarium* sp. NBRC 109816

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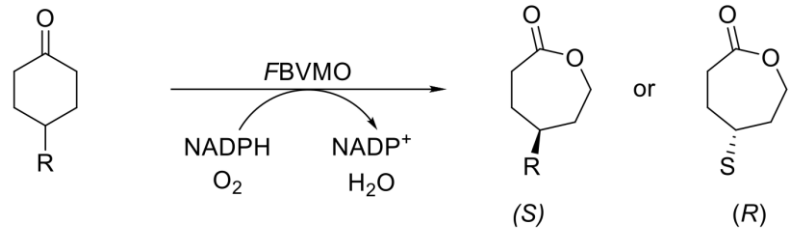
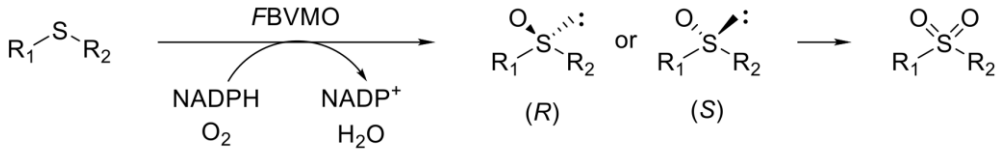
A novel Baeyer-Villiger monooxygenase (BVMO) was found in a fungi *Fusarium* sp. NBRC 109816 growing with acetone as the only carbon source and overexpressed in *Escherichia coli*.[1] *F*BVMO exhibits broad substrate scope and high activity for oxidizing linear, cyclic, and aromatic ketones to the corresponding esters or lactones. This study investigated the asymmetric Baeyer–Villiger oxidation of 4-substituted cycloalkanones and asymmetric sulfoxidation of sulfides. For example, it oxidized 4-methyl cyclohexanone and methyl phenyl sulfide with excellent conversions and enantioselectivities (Fig. 1). Adding 1% of methanol (MeOH) increased the conversion and changed the enantioselectivity of *F*BVMO.[2]

(a)



R= Me, Et, Pr, Methoxy

(b)



R_1 = Me, Allyl
R_2 = Phenyl, *p*-tolyl, *o*,*m*,*p*- bromophenyl

Fig. 1 Asymmetric oxidation of (a) cycloalkanones and (b) alkyl aryl sulfides by *F*BVMO

In summary, this study demonstrated the ability of a novel Baeyer-Villiger monooxygenase from *Fusarium* sp. NBRC 109816 to catalyze asymmetric Baeyer-Villiger monooxygenation and sulfoxidation. The result shows that *F*BVMO is a promising catalyst for the asymmetric synthesis of lactones and alkyl aryl sulfoxides.

1) M. Takagi, Biotechnol. **2022**, 44, 461-471
2) L. H. Le Viet, Tetrahedron, **2023**, 131, 133204.