

Asymmetric Synthesis of Catalponol Using Chiral Iridium Catalyst

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Abstract : The development of catalytic asymmetric reaction is important for the synthesis of natural products. To construct the multiple stereogenic centers, the desymmetrization of meso compounds is powerful strategy for the synthesis of chiral molecules. Oxidative desymmetrization of meso diols using chiral iridium catalyst provides a chiral hydroxyl ketone. The reaction is practical and an environmentally benign method which does not require the use of stoichiometric amount of heavy metals. This time we report here catalytic asymmetric synthesis of catalponol based on tandem coupling of meso-diols and an aldehyde. The tandem reaction includes oxidative desymmetrization of meso-diols, aldol condensation with an aldehyde. The reaction of meso-diol, benzaldehyde in the presence of a catalytic amount of chiral Ir complex and CsOH in tetrahydrofuran afforded the desired benzylidene ketone in 82% yield with 96% ee (enantiomeric excess). Next, we applied this benzylidene ketone derivative to the synthesis of catalponol. The corresponding benzylidene ketone was obtained in 87% yield with 99% ee. Finally, catalponol was synthesized by the regio- and stereo-selective reduction of dienone moiety in good yield.

Keywords : catalponol, desymmetrization, iridium, oxidation

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