Lipase-catalyzed benzyloxycarbonylation of alcohols

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The protection of functional groups is crucial aspect of multistep organic synthesis. The benzyloxycarbonyl group has been employed as a protecting group for alcohols and amines. Recently, enzymatic protecting techniques have gained increasing importance in the promotion of green, sustainable chemistry. Lipases have been widely utilized in organic synthesis due to their ease of handling, mild reaction conditions, and high selectivity. We have previously developed the lipase-catalyzed *tert*-butoxycarbonylation of primary alcohols using di-*tert*-butyl dicarbonate.[1] In this research, we investigate the benzyloxycarbonylation of alcohols using benzyl phenyl carbonate in the presence of lipases.

For example, the reaction of 4-methylbenzyl alcohol with benzyl phenyl carbonate (2 equiv.) was carried out in the presence of lipases such as *Aspergillus niger* lipase, *Pseudomonas fluorescens* lipase, *Candida rugosa* lipase, *Burkholderia cepacia* lipase, and *Candida antarctica* lipase B (CAL-B) in hexane at 40°C for 24 h (Table 1). From these results, we confirmed that *Candida rugosa* lipase and *Burkhoderia cepacia* lipase worked well as a catalyst for the benzyloxycarbonylation of 4-methylbenzyl alcohol.

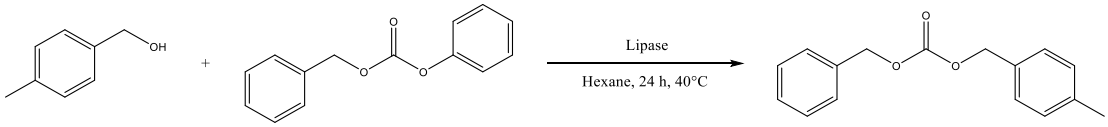

Table 1. Reaction of 4-methylbenzyl alcohol with benzyl phenyl carbonate in the presence of lipases

Entry	Lipase	Yield (%)[a]
1	None	-
2	*Aspergillus niger* lipase	4
3	*Pseudomonas fluorescens* lipase	45
4	*Candida rugosa* lipase	64
5	*Burkholderia cepacia* lipase	64
6	CAL-B	31

a) Determined by ^{1}H-NMR

1) N. Kishi, H. Kojima, *ChemistrySelect*, **2019**, *4*, 9570-9572.

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