

## Lipase-Catalyzed Alkoxy carbonylation of Alcohols

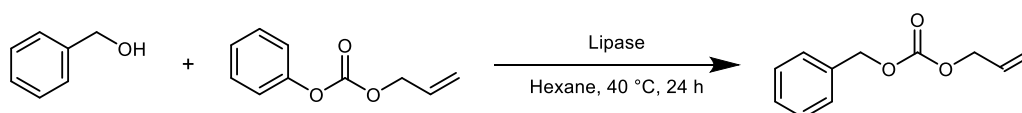
(<sup>1</sup>Graduate School of Science, Osaka Prefecture University, <sup>2</sup>College of Life, Environment, and Advanced Sciences, Osaka Prefecture University) ○Yuki Hatayama,<sup>1</sup> Yuto Yamamoto,<sup>2</sup> Hideo Kojima<sup>1</sup>

**Keywords:** Lipase; Alcohols; Alkoxy carbonylation

Protection of functional groups are very important in multistep organic synthesis. The alkoxy carbonyl group has been used as a protecting group for alcohols because carbonates are generally more stable against a wide range of nucleophiles under basic conditions than esters.

Recently, enzymatic protecting techniques have increased importance in promoting green sustainable chemistry. We have previously developed the lipase-catalyzed *tert*-butoxy carbonylation of primary alcohols using Boc<sub>2</sub>O.<sup>1</sup> In this research, we have investigated the scope of lipase-catalyzed alkoxy carbonylation of alcohols.

We explored the use of various reagents for alkoxy carbonylation of alcohols. For example, the reaction of benzyl alcohol with allyl phenyl carbonate was carried out in the presence of lipases such as *Aspergillus niger* lipase, *Pseudomonas fluorescens* lipase, *Candida rugosa* lipase, and *Burkholderia cepacia* lipase in hexane at 40 °C for 24 h (Scheme 1). From these results, we confirmed that *Pseudomonas fluorescens* lipase, *Candida rugosa* lipase, and *Burkholderia cepacia* lipase were suitable catalysts for the allyloxy carbonylation of benzyl alcohol (Table 1, entries 3–5).



Scheme 1.

Table 1. Reaction of benzyl alcohol with allyl phenyl carbonate in the presence of lipase.

Entry	Lipase	Yield (%) <sup>a</sup>
1	No lipase	-
2	<i>Aspergillus niger</i> lipase	6
3	<i>Pseudomonas fluorescens</i> lipase	95
4	<i>Candida rugosa</i> lipase	99
5	<i>Burkholderia cepacia</i> lipase	99

a) Determined by gas chromatography.

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