



## Deacetylation of $\alpha$ -Bromo- $\alpha$ -substituted-acetoacetates

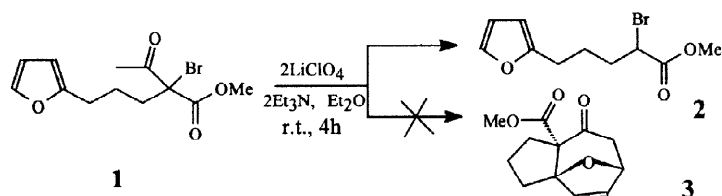
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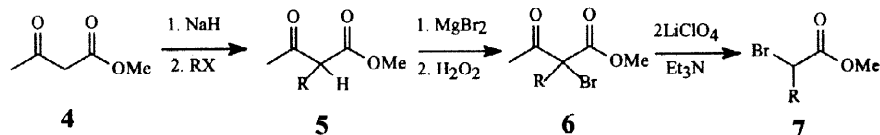
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**Abstract:** A new and efficient method for the deacetylation of  $\alpha$ -bromo- $\alpha$ -substituted-acetoacetates to obtain  $\alpha$ -bromoesters has been achieved by treatment with  $\text{LiClO}_4/\text{Et}_3\text{N}$  in ether at room temperature.  
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During the course of the study of [4+3] intramolecular cycloaddition, we used  $\alpha$ -bromo- $\alpha$ -3-(2-furyl)propylacetoacetate (**1**) as one of the precursors. Under the conditions for the formation of allylic cation (Scheme 1), only deacetylated product **2** was obtained instead of the desired [4+3] cycloadduct **3**. It is well-known that the hydrolysis of acetoacetates is readily accompanied with decarboxylation,<sup>1</sup> but the efficient removal of the acetyl group from acetoacetates is rare.<sup>2</sup>  $\alpha$ -Bromoesters are versatile intermediates in organic synthesis for the preparation of phosphoranes and phosphonates in Wittig reaction or of  $\alpha$ -amino acids and esters. This communication describes a facile method for the preparation of  $\alpha$ -bromoesters by means of deacetylation of  $\alpha$ -bromo- $\alpha$ -substituted-acetoacetates (Scheme 2).



Scheme 1



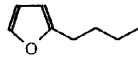

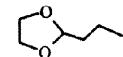
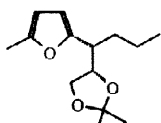
Scheme 2

Methyl acetoacetate was converted to **5** in high yields by alkylation. The  $\alpha$ -methine in **5** was brominated

by using  $\text{MgBr}_2$  in the presence of  $\text{H}_2\text{O}_2$ , affording  $\alpha$ -bromides **6**<sup>3</sup> in 72–82% yields. Deacetylation of **6** was achieved by treatment with  $\text{LiClO}_4/\text{Et}_3\text{N}$  in ether at room temperature for 4h to obtain  $\alpha$ -bromoesters. The reaction sequence in Scheme 2 offers the possibility for preparation of  $\alpha$ -bromoesters containing sensitive functionality in the substituent R to bromine and  $\text{Ba}(\text{OH})_2$ .<sup>2a</sup>

A typical procedure is as follows: Methyl  $\alpha$ -bromo- $\alpha$ -3-(2-furyl)propylacetoacetate(**1**) (303mg, 1mmol) was dissolved in freshly distilled ether (20mL),  $\text{LiClO}_4$  (203mg, 2mmol) and freshly distilled (from  $\text{CaH}_2$ ) triethylamine (0.28mL, 2mmol) were added. The mixture was stirred at room temperature for 4h. The reaction was quenched with  $\text{H}_2\text{O}$  (5mL), and the mixture was extracted with  $\text{Et}_2\text{O}$  (15mL $\times$ 3). The combined organic layer was washed with  $\text{H}_2\text{O}$  (10mL), brine (10mL), and dried over anhydrous  $\text{Na}_2\text{SO}_4$ . The solvent of the organic layer was removed in vacuum. The residual oil was purified by column chromatography on silica gel (petroleum ether :  $\text{EtOAc}$  = 20 : 1) to give compound **2** as a colorless oil (215mg) in 83% yield. In order to verify the generality of this reaction, the other five  $\alpha$ -bromo- $\alpha$ -substituted-acetoacetates were tested and the yields of the deacetylated products **7** is in a range of 70 ~ 82% (Table 1). All the compounds obtained were characterized by  $^1\text{H}$  NMR and IR spectra and new compounds were also characterized by MS, HRMS or elemental analysis.

**Table 1.** Deacetylation of  $\alpha$ -bromo- $\alpha$ -substituted-acetoacetate **6**

R	Reaction Time	Product	Yield%
	<b>1</b> 4h	<b>2*</b>	83
	<b>6a</b> 6h	<b>7a</b>	76
$\text{CH}_3(\text{CH}_2)_2\text{CH}_2$	<b>6b</b> 5h	<b>7b</b>	72
	<b>6c</b> 4h	<b>7c*</b>	82
	<b>6d</b> 2d	<b>7d*</b>	70

\* New compound

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