A Convenient Synthesis of Diacyl Selenides by Selenium Transfer Reaction of Primary Selenoamides

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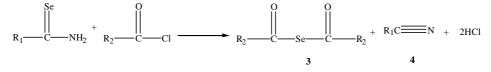
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Abstract: As a selenium transfer reagent, arylselenoamides react with acyl chlorides in chloroform to give diacyl selenides conveniently in good yield.

Keywords: Diacyl, selenides, selenium transfer reaction.

Aryl selenoamides are rather interesting compounds because they are versatile intermediates in organic chemistry¹. It was reported that selenobenzamides have been used as selenium transfer reagents in the synthesis of alkyl diselenides from reactive halides². We began to investigate the reactivity of arylselenoamides toward acyl chlorides and guess that this reaction would produce acyl diselenides. In surprise we could not find the diacyl diselenides (**Scheme 1**). Instead diacyl selenides and byproducts aryl nitriles were obtained in good yieldes (**Table 1**).

Scheme 1



The possible mechanism of above reaction might be as shown in **Scheme 2** that the seleniun of selenoamides attacked acyl chlorides twice and formed the intermediate **6**, which then decomposed into diacyl selenides **3** and nitriles **4**.

Diacyl selenides are good acylating agents in organic synthesis. In literature a variety of synthetic methods for diacyl selenides have been reported³⁻⁵. However, those methods have the disadvantages of using harmful gases, being in strict conditions, multiple steps or long reaction time.

Compared with them, the present method for preparation of diacyl selenides has the advantage of easily available starting materals, simple operation and mild condition.

General Procedure: Under nitrogen, the mixture of selenobenzoamide 1 (1.0 mmol) and benzoyl chloride 2 (2.5 mmol) in chloroform (30 mL) was stirred at 60° C for 1 h to give a light yellow colour solution. Then the reaction mixture was washed with

water (40 mL×3) and 10% Na_2CO_3 (20 mL), dried over MgSO₄. After removal of the solvent, the residue was chromatographed on a silica gel plate (cyclohexane-acetic acid as an eluent) to give pure solid product **3** in 80.1% yield.

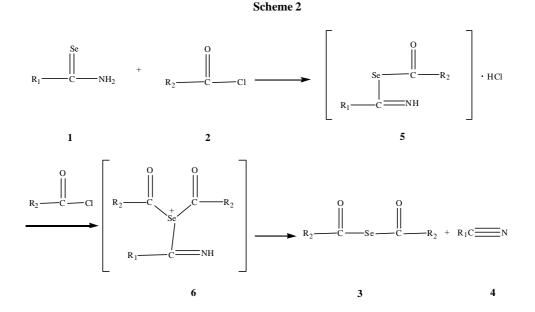


Table 1 Synthesis of diacyl Selenides

Product 3	R_1	R_2	React time (min)	Yield(%) ^a
3a	C_6H_5	C_6H_5	60	80.1
3a	$3-MeC_6H_4$	C_6H_5	60	82.0
3b	C_6H_5	4-MeOC ₆ H ₄	45	85.0
3b	$3-MeC_6H_4$	4-MeOC ₆ H ₅	40	86.6
3c	C_6H_5	$4-CH_3C_6H_4$	60	81.2
3d	C_6H_5	$4-ClC_6H_4$	90	75.2
3e	C_6H_5	$3-ClC_6H_4$	120	69.4
3f	C_6H_5	2-Furanyl	40	80.2

^aYield of isolated product. All products were characterized by IR, ¹H-NMR and elemental analysis.

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