SILICA GEL-PROMOTED Y-LACTONIZATION OF Y-HALO ESTERS

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We recently found that silica gel promotes γ -lactonization of γ -halo esters. The mixture of γ -halo esters and silica gel (2-6 equiv.) was heated at reflux temperature of xylene, and the results were summarized in Table 1. This γ lactonization was applied to the synthesis of ($\frac{1}{2}$)-canadensolide, which included highly stereoselective alkylation of n-hexylidenemalonate and the following regioand stereo-specific iodolactonization. The synthesis of optically active canadensolide was also attempted.

	Table 1.			$\wedge \vee \vee \forall$
I	Halo Esters	γ-Lactones	Yield (%)	со ₂ Ме <u>14</u>
	Br CO ₂ Et		66	LDA
	Br 3	4	79	CO ₂ Me CO ₂ Me <u>15</u> CO ₂ CH ₂ CCl ₃
	Cl ₃ C 5 CO ₂ Et	EtO ₂ C Cl <u>6</u>	⊳ ⁶³	Zn, CH ₃ CO ₂ H CO ₂ Me
	Cl ₃ C CO ₂ Et CO ₂ Et	CI2CH~	,CO ₂ Et ≈0 ⁴⁶	со ₂ н 16 ↓кі ₃
	CI CO ₂ Et CO ₂ Et CO ₂ Et	H C	70 0 ₂ Et	$\begin{array}{c} 11 & 12 \\ \hline SiO_2 & 12 \\ \hline \end{array}$
	MeO ₂ C MeO ₂ C H 1 11		0 ₂ Me ⁷⁸	H.H.H J.3 ([±])-canadensolide