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

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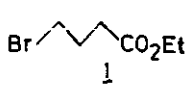
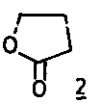
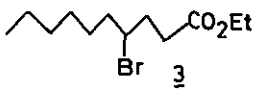
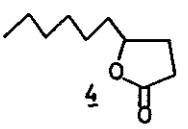
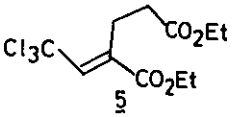
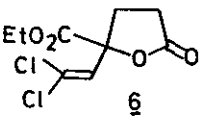
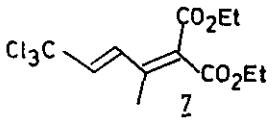
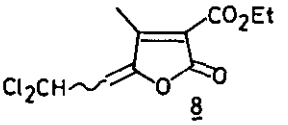
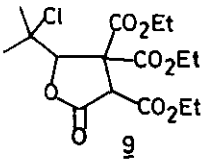
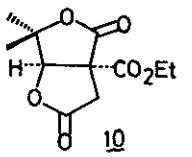
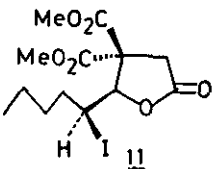
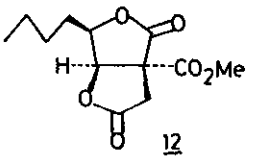
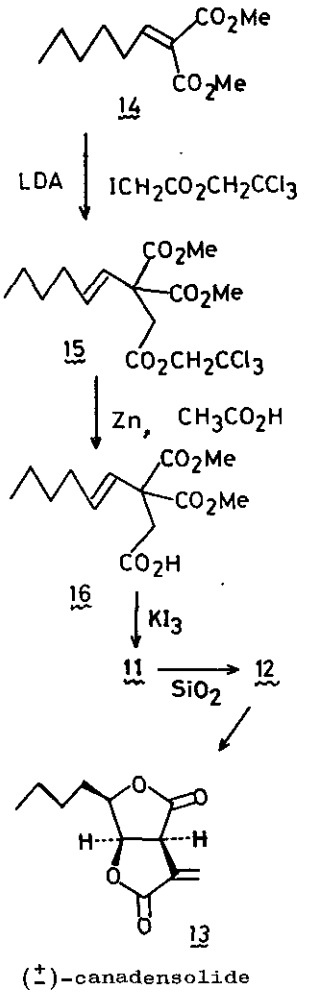
We recently found that silica gel promotes γ-lactonization of γ-halo esters. The mixture of γ-halo esters and silica gel (2-6 equiv.) was heated at reflux temperature of xylene, and the results were summarized in Table 1. This γ-lactonization was applied to the synthesis of (±)-canadensolide, which included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

Table 1.

Halo Esters	γ-Lactones	Yield (%)
 1	 2	66
 3	 4	79
 5	 6	63
 7	 8	46
 9	 10	70
 11	 12	78



(±)-canadensolide