

# Abstract

Title of the thesis: *Studies on [4+2] anionic annulation of allene carboxylates with phthalides, and synthesis of vitamin K and furoindolones*

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Submitted by **Supriti Jana (12CY90J07)**

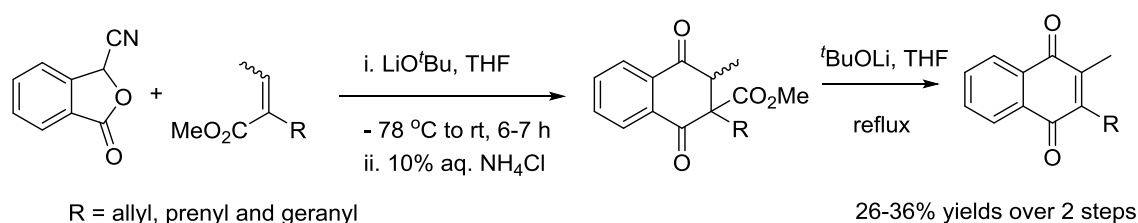
**Keywords:** Organic synthesis, anionic annulation, C3-nucleofugal phthalides, demethoxycarbonylative benzannulation, total synthesis, vitamin K, allene carboxylates, aryl naphthalene lignans, furoindolones.

The thesis entitled “**Studies on [4+2] anionic annulation of allene carboxylates with phthalides, and synthesis of vitamin K and furoindolones**” deals with the development and application of new synthetic methodologies in organic chemistry based on anionic annulations.

**Chapter 1** describes the concept of anionic annulations, exploration of which is described in next three chapters.

**Chapter 2** illustrates the development of a synthesis of 2,3-disubstituted naphthoquinones by means of a demethoxycarbonylative benzannulation and its application as a key-step in a total synthesis of vitamin K<sub>2</sub> (Scheme 1).

**Scheme 1:** Synthesis of 2,3-disubstituted naphthoquinones (including vitamin K<sub>2</sub>)



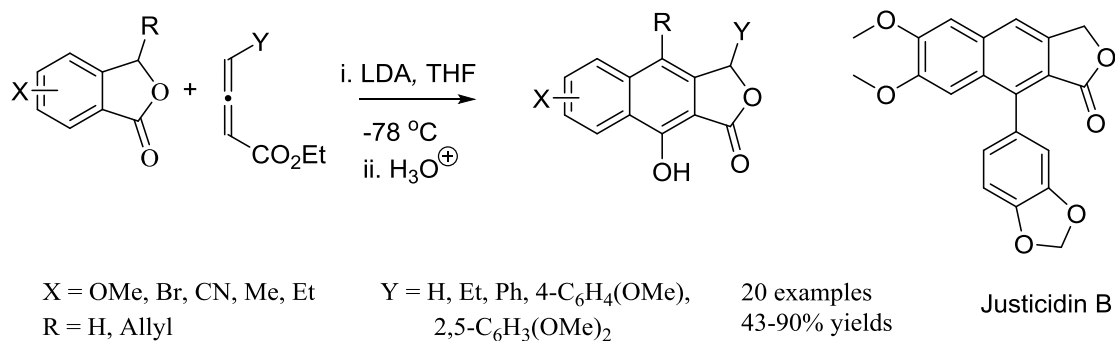
In **Chapter 3**, a new methodology for the synthesis of naphtho[*b*]furanones and naphtho[*c*]furanones from allene carboxylates is described. For the first time, allene carboxylates have been used as acceptors in an annulation for the synthesis of carbocycles. This methodology has been applied in the formal synthesis of aryl naphthalene lignans justicidin B and taiwanin C (Scheme 2 and 3).

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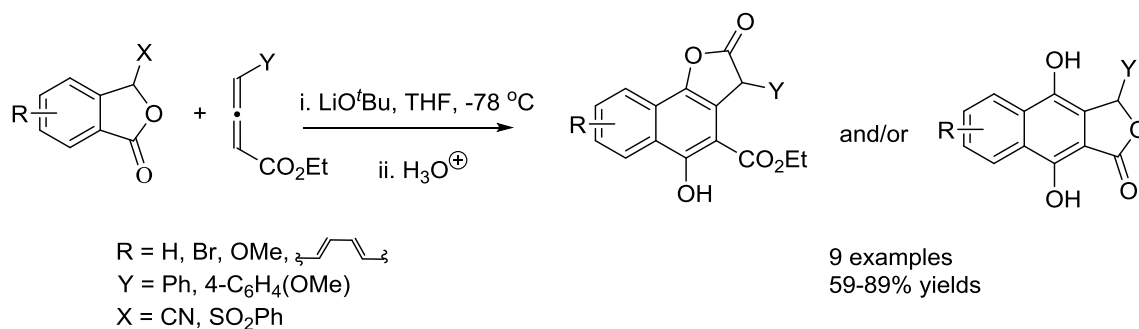
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### Scheme 2: Reaction of allene carboxylates with phthalides under anionic conditions



### Scheme 3: Reaction of allene carboxylates with C3-nucleofugal phthalides under anionic conditions



The last chapter i.e. **Chapter 4** depicts a new and concise synthesis of furo[*b*]indol-1-ones and its thio derivative. Anionic activities of these furoindolones have briefly been examined in a study directed towards their annulations (Scheme 4).

### Scheme 4: Synthesis of furoindolones by intramolecular Heck-type cyclization

