



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Programme of Study : **Ph.D.**  
Thesis Title: **Annulation and Directing Group Strategies as Tools for the Construction of Heterocycles**  
Name of Thesis Supervisor(s) : **Prof. Bhisma K. Patel**  
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**SHORT ABSTRACT**

The contents of the thesis have been divided into four chapters with initial one as introductory and the rest of the chapters are based on experimental results obtained during the research period. The introductory chapter of the thesis is a summary of alkyl isocyanoacetate's reactivity and its usefulness in diverse (3 + n) annulation/cycloaddition reactions. Along with this, a brief description of the directing group (DG) strategy for the functionalization of C–H bond has also been added. A brief account of the formation of important heterocyclic scaffolds following annulation/cycloaddition and DG-assisted C–H activation has been included.

Chapter II demonstrates a step-economical *in situ* cycloaddition lactonization strategy for the synthesis of chromenopyrrole. The developed protocol exploits all the reactive centres of alkyl isocyanoacetate while reacting with 2-hydroxy chalcone.

Chapter III demonstrates a tandem cycloaddition and C–O coupling strategy for the efficient construction of chromenopyrrole. This step economical Ag salt-catalyzed reaction proceeded in mild reaction conditions with excellent functional group tolerance.

Chapter IV illustrates the utilization of phenyl isocyanate as a transient directing group for *o*-olefination. Synthesized *o*-alkenylated anilines have been further transformed into substituted aza-coumarins.

Each of these chapters comprises seven subsections which include an introduction, previous work, present work, experimental section, references, spectral data, and a few representative spectra.

