ABSTRACT

The thesis entitled as, *"**Functionalization of Indoles and Pyrroles through Vinylogous Imine Intermediate: A Domino Approach towards Indole Terpenoids**"* has been divided into four chapters.

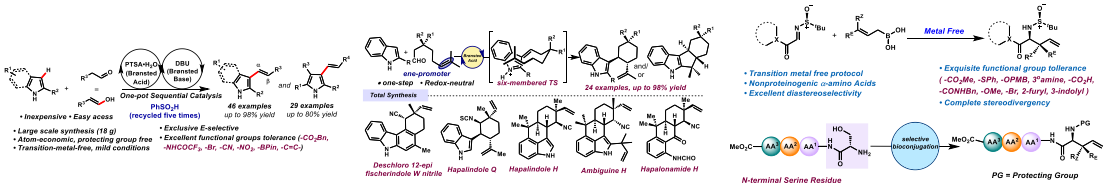
Chapter I portrays a brief outline about the areas which are of relevance in this thesis work, such as importance of indoles in drug-discovery, pharmaceutical industry, natural product. It also describes current state of the art methodological procedures for the functionalization of indole and its application towards natural products.

Chapter II of the thesis describes the C3-alkenylation of indoles and pyrroles using one-pot, transition-metal-free, redox neutral procedure under sequential Brønsted acid/base catalysis. It employs aldehydes as an alkenylating agent. The developed strategy has a versatile broad substrate scope with exquisite functional group tolerance, scalability, and recycling.

Chapter III describes a stereodivergent total synthesis of several Hapalindole, Fischerindole, and Ambiguine alkaloids via Brønsted acid catalyzed one-pot Prins-cyclization between indole and aldehyde. The mildness of the protocol enables tolerance of many important functionalities for further modification.

Chapter IV illustrates the strategy for diastereoselective allylation of α-iminoesters using allylboronic acids for the rapid generation of sterically encumbered non-proteinogenic α-amino acids, and homoallylic amines. Using this protocol, a late-stage peptide modification was achieved by incorporating an unnatural amino acid into natural sequences.

Chapter II **Chapter III** **Chapter IV**



Keywords: *Indole, Indole terpenoids, Pyrroles, Non-proteinogenic α-amino acids, Peptide functionalization.*