INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title	:	Lewis Acid Driven Synthetic Approaches for Benzannulated *N*-Heterocycles from 2-Aminobenzonitrile
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SHORT ABSTRACT

Chapter 1 highlights an overview on cascade reactions and the reactivity of 2-aminobenzonitriles. This includes a brief discussion about synthetic reactivity and utility of 2-aminobenzonitriles as a precursor for synthesis of various simple or complex heterocyclic frameworks. **Chapter 2** represents a tunable one pot synthesis of tetrahydro-4*H*-pyrrolo[3,2-*c*]quinolin-4-ones and dihydro-1*H*-benzo[*b*]azepines from 2-aminobenzonitriles and donor-acceptor cyclopropanes in presence of $SnCl_4$. The reaction proceeds via the initial ring opening of cyclopropane ring by 2-aminobenzonitrile followed by nucleophilic attack by amine to give adduct, which after unprecedented rearrangement at two different reaction temperatures provide two sets of structurally diverse nitrogen heterocyclic compounds. This methodology can be used for the synthesis of tricyclic hexahydropyrrolo[3,2-*c*]quinolinones (tricyclic core of martinelline). **Chapter 3** describes an efficient methodology for the synthesis of highly diverse 4-methylene substituted tetrahydroquinazoline scaffolds from 2-aminobenzonitriles and alkylidene malonates in presence of $SnCl_4$. The reaction proceeds via initial 1,4-conjugate addition of 2-aminobenzonitrile to the activated alkene followed by an unprecedented rearrangement. The methodology can be extended towards the synthesis of quinazoline analogues as well as tetracyclic dihydroisoquinolino[1,2-*b*]quinazoline derivatives. Some of the synthesized compounds show excellent photophysical properties. **Chapter 4** demonstrates an efficient methodology for the synthesis of highly diverse 2,3-disubstituted 4-aminoquinoline derivatives from 2-aminobenzonitriles and activated alkynes in presence of $FeCl_3$. The reaction proceeds via sequential aza-Michael addition and intramolecular annulation to afford highly substituted 4-aminoquinolines in good yields. The salient features of this protocol include the use of a minimally toxic, eco-benign and less expensive Fe(III)-salt and has high atom-economy with broad substrate scope and operational simplicity. The post synthetic application of the reaction provides 4*H*-benzo[*de*][1,6]naphthyridines. **Chapter 5** highlights an efficient methodology for the synthesis of 2,4-diaminoquinazolines and 2-amino-4-iminoquinazolines from 2-aminobenzonitriles and carbodiimides. This $SnCl_4$ mediated reaction exhibits substrate driven switchable selectivity in product formation based on the substituents of the carbodiimides used. Aryl and primary alkyl-substituted carbodiimides predominantly give 2-amino-4-iminoquinazolines, while secondary or tertiary alkyl and benzyl-substituted carbodiimides yield 2,4-diaminoquinazolines. The methodology can be extended towards the synthesis of 2-aminoquinazolin-4(3*H*)-one analogues as well as pentacyclic annulated derivatives.