INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: Direct C(sp^3)-H Functionalization of Aliphatic Amines

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SHORT ABSTRACT

The contents of this thesis entitled "***Direct sp^3 (C-H) Functionalization of Aliphatic Amines"*** have been divided into eight chapters based on the results of experimental works performed during the complete course of the research period. The first chapter of the thesis is dedicated to introduce C-H functionalization and to summarize current development in the field of amine functionalization. All the other chapters describe the results on the C-O and C-C bond formations *via* direct C-H functionalization. Chapter 2 focuses on the silver mediated diastereoselective intramolecular oxidative *α*-functionalization of *N*-heterocycles. The method could be applied for direct C-H functionalization of wide variety of saturated *N*-heterocycles leading to synthetically as well as biologically important and structurally diverse ring-fused oxazines. Chapter 3 illustrates iterative C-H functionalization of *N*-heterocycles producing *syn*- α, α' –difunctionalized carbocyclic amines. The two substituents at both the *α*-position of the *N*-heterocycles could be varied easily by the choice of appropriate Grignard reagents. Chapter 4 demonstrates microwave assisted metal and oxidant free direct C-H aryloxylation of *N*-heterocycles. Chapter 5 discusses synthesis of *β* -C(sp^3)-H functionalization of aliphatic amines to *α, β*-unsaturated aldehydes, chromenes, chromene-2-ol derivatives. The method is based on a reaction that yields enamine directly from corresponding aliphatic amine, which otherwise requires the aid of metallic reagent and/or external oxidant. Chapter 6 presents *in silico* studies and *in vitro* evaluation for antioxidant and antibacterial properties of diarylmethylamines. A potent antibacterial (15 µg/mL) diarylmeyhylamine was discovered. This was found to be effective against both *Listeria monocytogenes* and *Escherichia coli* enterotoxic. The experimental and analytical details with copies of NMR spectra are included in the last two chapters, respectively.