



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Thesis Title: **Exploring synthesis of functionalized tetrahydroquinoline and N-substituted hydrazine via a reductive process using Hantzsch ester as hydrogen source**

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SHORT ABSTRACT

The present thesis, entitled “*Exploring synthesis of functionalized tetrahydroquinoline and N-substituted hydrazine via a reductive process using Hantzsch ester as hydrogen source*” is divided into six chapters based on the results obtained from the experimental works during the course of PhD research period.

**Chapter 1** includes brief introduction of boronic acid catalysis (BAC) and hexafluoroisopropanol (HFIP), and their utilization in organic synthesis, particularly in reduction chemistry. It highlights how BAC and HFIP contribute to improving reaction efficiency and selectivity.

**Chapter 2** reports arylboronic acid-catalyzed a one-pot synthesis of dithiocarbamate-functionalized tetrahydroquinolines. Boronic acid serves a dual role as catalyst and coupling partner.

**Chapter 3** illustrates arylboronic acid-catalyzed a one-pot alkylation of quinoline to N-substituted tetrahydroquinolines bearing a C6-diaryl motif. It showcases the triple role of boronic acid as catalyst.

**Chapter 4** describes a one-pot tandem reduction and reductive alkylation of using aldehydes to form N-alkylated hydrazine derivatives under mild conditions.

**Chapter 5** introduces HFIP-mediated a one-pot tandem reduction and reductive alkylation of quinolines to tetrahydroquinolines *via* hydrogen-bonding network-enabled activation, while showcasing HFIP’s multifunctional role in promoting reduction of N-heteroarene and stabilizing the intermediates.

**Chapter 6** reports green, cost-effective method for synthesis of N-alkyl tetrahydroquinolines using a reusable Brønsted acidic ionic liquid (BAIL) as both catalyst and solvent.