



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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Thesis Title: Synthesis of Furan, Pyran, Pyrrolidine, and Piperidine Scaffolds via Tandem Prins Cyclization Reactions

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SHORT ABSTRACT

The content of this thesis has been divided into five chapters on the basis of results of experimental work performed during the complete course of the PhD tenure. The chapter **1** describes the tandem Prins cyclization reactions and their mechanisms to construct Furan, Pyran, pyrrolidine and piperidine scaffolds in brief. The chapter **2** deals with the stereoselective synthesis of hexahydrofuro[3,4-b] furan-4-ol and its dimer via tandem Prins and pinacol rearrangement. The dimer was conveniently converted into its corresponding monomer using aqueous zinc(II) chloride in THF in quantitative yields. Chapter **3** describes synthesis of spiro[furan-2,1'-isoindolin]-3'-ones from 2-(4-hydroxybut-1-yn-1-yl)benzotriles and aryl aldehydes under the action of triflic acid. The plausible mechanism of the reaction has been drawn on the basis of control experiments and literature evidence. The synthetic utility of the reaction was performed using Sonogashira reaction and click reaction conditions. In chapter **4**, nitrile stabilized synthesis of pyrrolidine and piperidine derivatives via tandem alkynyl aza-Prins-Ritter reactions is described. In chapter **5**, regio- and chemoselective synthesis of 3-(dihydrofuran-3(2H)-ylidene)isobenzofuran-1(3H)-imines via tandem alkynyl Prins- and intramolecular oxycyclization reaction is disclosed. The methodology was extended towards synthesis of its pyran derivatives. The post synthetic applications of the reaction were extended towards synthesis of furanylidene-isobenzofuranones in excellent yields. The mechanistic investigation of the reaction was performed on the basis of controlled experiment.