



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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Thesis Title: Use of 3-Halobut-3-en-1-ol and *N*-(3-Halobut-3-en-1-yl)-4-Methylbenzenesulfonamide in the Prins Reaction: Access to Oxygen and Nitrogen Heterocycles

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The content of this thesis is systematically organized into five chapters, each reflecting the outcomes of the experimental investigations conducted throughout the research period. Chapter 1 provides an overview of heterocyclic compounds and their biological significance and summarizes the reported methodologies for their synthesis. Chapter 2 focuses on the diastereoselective synthesis of 2,6-disubstituted tetrahydropyranones through Prins cyclization of 3-bromobut-3-en-1-ols and aldehydes. Chapter 3 describes the stereoselective synthesis of *gem*-dihalopiperidines through halo-aza-Prins cyclization reaction of halogenated homoallylic amine and aldehydes. Chapter 4 presents BF<sub>3</sub>·OEt<sub>2</sub> mediated cascade synthesis of 4*H*-3,1-Benzoxazines from 2-azidobenzaldehydes and homoallylic alcohols. Finally, Chapter 5 elaborates on the use of halogenated homoallylic amine for the highly diastereoselective synthesis of *gem*-dihalopiperidines and regioselective synthesis of 4-halo-1,2,3,6-tetrahydropyridines.