PREFACE

Heterocyclic molecules have been extensively used in the designing of various pharmaceutically significant compounds. These molecules also have their noteworthy influence in the field of agrochemical industries. Apart from this, they are considered to be powerful starting materials for the construction of naturally occurring biologically active compounds like amino acids, glycosides, heterocyclic compounds etc.

The present work describes methodologies for construction of a vast range of bioactive heterocyclic molecules. This thesis starts with **Chapter I**, where a brief review of various approaches towards the synthesis of heterocyclic molecules is described. **Chapter II** deals with the synthesis of tetrazole derivatives from aldehydes using cerric ammonium sulphate as catalyst in DMF though one-pot three-component pathway. **Chapter III** demonstrates a methodology for solvent and metal catalyst-free *p*-TsOH mediated synthesis of nitriles from aldehydes following Schmidt reaction type protocol on silica surface using sodium azide as a source of nitrogen. **Chapter IV** represents one-pot four-component synthesis of nicotinonitrile derivatives from aldehydes using β-cyclodextrin, an environmentally benign supramolecular oraganocatalyst in water medium. **Chapter V** is divided into two sections. **Section A** illustrates synthesis of bis(indolyl)methanes and **Section B** provides the preparation of bis(pyrazolyl)methanes assisted by humic acid under solvent-free condition. **Chapter VI** also has two sections. **Section A** depicts the synthesis of thioamide by modified Willgerodt-Kindler Reaction and in **Section B** formation of 4*H*-thiopyran is designed *via* one-pot multi-component synthesis from aldehydes using bio-degradable non-coventional solvent, glycerol.