PREFACE

A central objective in synthetic organic chemistry has been to develop greener and more economically competitive processes for the efficient synthesis of biologically active compounds with potential application in the pharmaceutical and related industries.

Isatin and its derivatives represent an important class of 'privileged structures' capable of serving as ligands for a wide range of biological targets. Due to this reason, in past few decades, isatin and its derivatives have been used extensively as key intermediates in organic synthesis.

The content of the thesis have been divided into five chapters.

Chapter 1 gives an overview of the chemistry of isatin, it starts from short introduction followed by methods of synthesis and after that chemical reactivity of isatin. In this section, reduction, oxidation, electrophilic aromatic substitution, *N*-substitution and reactivity of the carbonyl group of isatin are briefly covered. After that, synthesis of isatin based spiro-fused heterocyclic scaffolds and at last, recent applications of isatin in organic synthesis have been briefly included. The actual investigations and findings are presented in the subsequent four chapters. **Chapter 2** deals with the eco-friendly and facile synthesis of substituted imidazoles *via* nano zirconia catalyzed one-pot multicomponent reaction of isatin derivatives with ammonium acetate and substituted aromatic aldehydes under solvent free conditions. **Chapter 3** gives an account for the monoclinic nano zirconia catalyzed synthesis of substituted spirooxindoles *via* one-pot multicomponent reaction of isatin derivatives with ethylcyanoacetate and 1, 3- dicarbonyl compounds in a ball mill. **Chapter 4** gives an investigation of condensation reaction of isatin derivatives 1, 2 -diaminobenzene in EtOH/H_2O solvent system by using catalytic amount of bentonite clay under microwave irradiation. **Chapter 5** describes an easy and efficient synthesis of quinoxaline derivatives *via* TiO_2Nps catalyzed condensation reaction of substituted isatin derivatives with *o*-phenylenediamine under solvent free conditions.