PREFACE

Heterocyclic compounds have a wide variety of applications. Many of them are key components in biological processes. Most of the pharmaceuticals are heterocyclic in nature besides; these compounds are used as fugisides, herbicides, anti-corrosive agents, photostabilizers, agrochemicals, copolymer, photographic developers, sensitizers, flavouring agents, dyes and pigments. Among the various heterocyclic compounds, the significance of quinolines and indoles lies in their unique applications in various fields. For example, quinoline derivatives are well known for their pharmacological properties, especially many of their derivative exhibit effective anti-malarial activities. Some quinoline derivatives exhibit luminescence properties also. Because of their structural diversity, indole derivatives have become structural constituents of many pharmaceuticals. Among the available methods, 1,3-dipolar cycloaddition reactions are one of the simple techniques that can be used in the synthesis of heterocyclic compounds.

Conventional 1,3-dipolar addition between nitrones and electron deficient acetylenes failed to account for the generation of quinolines and indoles in such reactions. In this situation, the thesis entitled ***"STUDIES ON DEVELOPING A FACILE ROUTE FOR THE SYNTHESIS OF HIGHLY SUBSTITUTED QUINOLINE AND INDOLE DERIVATIVES"*** portrays our attempt to revisit the mechanism of 1,3-dipolar additions with a view to establishing whether it follows a concerted pathway or a stepwise reaction sequence through the formation of a zwitterionic intermediate, which will definitely contribute to the

better use of this technique. Furthermore, we propose to develop novel routes for the synthesis of quinoline and indole derivatives with pre-defined substitution pattern.

The thesis is devided into four chapters. The first chapter briefly describes several aspects of 1,3-dipolar cycloaddition reactions and some of its applications in various fields**.** The research problem is defined at the end of this chapter. The synthesis of various substrates, employed in the present investigation is described in the second chapter. Third chapter reveals our findings on the mechanism of 1,3-dipolar cycloaddition reactions. Here we have investigated the course of nitrone cycloaddition reaction when different substituents are introduced and the effect of medium in controlling the course of the reaction. In the fourth chapter, we utilized our findings on reaction of nitrones with electron deficient acetylenes for developing viable synthetic procedure for the preparation of highly substituted quinoline and indole derivatives having pre-determined substitution pattern. Relevant references are included at the end of individual chapters.

The structural formulae, schemes, tables and figures are numbered chapter-wise as each chapter of the thesis is as an independent unit. All important compounds are fully characterized on the basis of their spectral and analytical data including the single crystal X-ray analysis in many cases. A comprehensive list of references is given at the end of each chapter.