PREFACE

Heterocyclic systems are one of the most important classes of organic compounds present in nature or synthesized in the laboratory. These compounds possess an array of biological activities and are employed in the treatment of commonly occurring diseases.

Literature survey revealed that chalcones and pyrazolines possess a broad spectrum of biological activities like antimicrobial, anti-inflammatory, antimalarial, antidepressant, antihistamine, antitubercular and anticancer. This thesis is an endeavour in this direction of the synthesis and characterization of such compounds based on elemental analysis, IR, $^1$H NMR, $^{13}$C NMR and mass spectroscopy. The antimicrobial and anti-inflammatory screening of selected synthesized compounds has also been included.

Chalcones afford a facile route of access to many of the heterocyclic systems containing nitrogen and oxygen. Hence, an attempt is made to synthesize chalcones from 2-acetyl-5-bromo-6-methoxynaphthalene with various substituted aromatic/heterocyclic aldehydes by the Claisen-Schmidt condensation. The resulting chalcones after purification and characterization by physical and spectral methods have been converted successfully into 2-pyrazolines by reaction with phenylhydrazine hydrochloride. The resultant compounds were identified by physical and spectral methods and were also screened for selected biological activities based on the reported literature. These efforts resulted in the synthesis of some promising compounds with significant biological activities.

The synthesized compounds have also been subjected to computational evaluation and the results are consistent with the observed results in the actual screening.
INSTRUMENTATION AND METHODOLOGY

- The melting points were determined by open capillaries and are uncorrected.
- The purity of the compound was checked by TLC using Silica gel-G and the solvent systems are indicated at appropriate places.
- The IR spectra of the compounds were recorded on BRUKER ALPHA-T FT IR spectrophotometer using KBr disc and the values are expressed in cm$^{-1}$.
- The $^1$H NMR spectra of the compounds were recorded on BRUKER Spect, 400 MHz and amx400, 400 MHz NMR spectrophotometer and chemical shifts are expressed in delta ppm by using TMS as an internal standard.
- The mass spectra of the compounds were recorded on Agilent 6320 Ion Trap LC-MS. (Positive/Negative ion electro spray ionization method)
- The elemental analyses of the compounds were recorded on Carlo Erba 1108 elemental analyzer.