Summary

The work presented in the Thesis entitled “Synthesis and Biological Evaluation of Some Novel Heterocyclic Compounds” can be summarized as below.

Chapter 1 gives a brief introduction to MCRs, and exemplifies various reported multi-component reactions and catalysts employed. Chapter 1 also describes aims and objective of the proposed research work.

Polysubstituted pyrano[2,3-c]pyrazoles play an essential role in biologically active compounds and therefore represent an interesting template for medicinal chemistry. Many of those compounds are known as antimicrobial, insecticidal, and anti-inflammatory. Furthermore, polysubstituted pyrano[2,3-c]pyrazoles showed mollusci-cidal activity and was identified as a screening hit for Chk1 kinase inhibitor. Over the last years, the chemistry of polysubstituted pyrano[2,3-c]pyrazoles has received great deal of interest.

Keeping in mind various biomedical applications and with a view to further assess the pharmacological profile of these class of compounds, forty novel analogues of pyrano[2,3-c]pyrazoles (YUG-104 to YUG-140) are synthesized in chapter 2. The synthesis of pyrano[2,3-c]pyrazoles (YUG-104 to YUG-140) was achieved by a clean, benign, catalyst free and one-pot multicomponent reaction of 1-sub-3-propyl-1H-pyrazol-5(4H)-one, an appropriate aldehyde and malononitrile using ethanol/water (1:1, v/v) as a solvent. The products were characterized by FT-IR, mass spectra, ¹H NMR, ¹³C NMR and elemental analysis. X-ray diffraction study of representative compound has also been provided. The newly synthesized compounds are subjected to various biological activities viz., antimicrobial, antimycobacterial, anticancer and antiviral.

Chapter 3 depicts diversity oriented one-pot multicomponent synthesis and biological evaluation of fifty analogues pertaining to quinoline-3-carboxylate and 3-carboxamide classes, utilizing dimedone as a building block. Synthesis of quinoline-3-carboxylates and 3-carboxamides (YUG-201 to YUG-250) were accomplished by one-pot multicomponent reaction of dimedone, an appropriate 1,3-bifunctional synthon, an appropriate aldehydes, L-proline and ammonium acetate using ethanol as a solvent. The products were characterized by FT-IR, mass spectra, ¹H NMR, ¹³C NMR and elemental analysis. X-ray diffraction study of representative compound has also been provided. The newly synthesized compounds are subjected to various biological activities viz., antimicrobial, antimycobacterial, anticancer and antiviral.
Recently, 1,2,4-triazolo[1,5-a]pyrimidines have aroused increasing from the standpoint of biological activity, due to their diverse pharmacological activities. In chapter 4, synthesis of forty novel analogues of 1,2,4-triazolo[1,5-a]pyrimidines (YUG-301 to YUG-340) containing an appropriate 1,3-bifunctional synthon has been undertaken. The structures of all the newly synthesized compounds are elucidated by FT-IR, mass spectra, $^1$H NMR, $^{13}$C NMR and elemental analysis. The newly synthesized compounds are subjected to various biological activities viz., antimicrobial, antymycobacterial, anticancer and antiviral.

All the synthesized compounds were characterized by IR, Mass, $^1$H NMR, $^{13}$C NMR spectroscopy and elemental analyses.

Single crystal X-ray diffraction study of three of the compounds namely 6-amino-1,4-dihydro-4-phenyl-3-propylpyrano[2,3-c]pyrazole-5-carbonitrile (YUG-110), Ethyl 4-(4-fluorophenyl)-1,4,5,6,7,8-hexahydro-7,7-dimethyl-5-oxo-2-propyl- quinoline-3-carboxylate (YUG-203), Ethyl 1,4,5,6,7,8-hexahydro-4-(2,5-dimethoxyphenyl)-7,7-dimethyl-5-oxo-2-propylquinoline-3-carboxylate (YUG-210) was carried out.

Thus, 130 compounds are synthesized and characterized in entire thesis work. The synthesized compounds are screened for antimicrobial activity, results of which are incorporated in the thesis. Looking at the antimicrobial activity results (i.e. antibacterial and antifungal), remarkable number of compounds have demonstrated excellent antimicrobial activity as compared to the standard drugs.

All the newly synthesized compounds are also under antymycobacterial, anticancer and antiviral evaluation and their results are awaited.