Conclusion & Scope for the Future Work

In the dissertation entitled "**Synthetic Studies on *N*-Aryl γ-lactam & *N*-Aryl γ-thio-lactam: Chemoselective Transformation to *N*-Aryl-Pyrrolidine, *N*-Aryl Succinimide and other Bioactive Compounds**" controlled synthetic strategies towards the development of methodologies for the construction of heterocycles have been furnished.

In Chapter IA we have disclosed a one-pot protocol for the convertion of ***γ-lactam diesters*** to the corresponding ***γ-thio-lactam diesters*** in one step with good yields. Certainly, this demonstrates the potential of the P_4S_{10} reagent system as a stereoselective thionating agent under refluxing THF. This work can also be utilizes in synthesizing thio-caffeine and thio-piperine from the corresponding caffeine and piperine which are so biologically important compounds.

In Chapter IB we have developed a novel method for the $NaBH_4$-I_2 mediated chemoselective reduction of thio-carbonyl groups in presence of *gem*-diesters, in one step, with good yields that will provide a simple and novel approach for the conversion of γ-lactam derivatives to substituted pyrrolidine derivatives. Application of the $NaBH_4$-I_2 system on thio-lactam helps to generalize the use of this regent in a wider way.

The present study in our 2nd chapter delineate our endeavor in developing simple methodologies for selective functional group transformations of *N*-aryl-γ-lactam-carboxylic acid derivatives.

In Chapter IIA we have delineated an efficient one-pot protocol for the decarboxylative oxidation of γ-lactam carboxylic acids at room temperature. Although we propose a radical mediated mechanism, but attempts to throw light on the exact mechanistic route of the reaction required further studies.

Maleimides are an important class of substrates for biological, pharmacological and chemical applications. As part of a program aimed at exploring new reactivity patterns for the γ-lactam nucleus and subsequent synthetic applications, in chapter IIB we document a transition-metal-free method for the decarboxylative oxidation by using $NaIO_4$/LiBr combinations which furnished pyrrole-2,5-diones (maleimides).

The development of simple and general synthetic routes for widely used organic compounds from readily available reagents is one of the major challenges in organic synthesis. Extensive studies on the synthesis and chemical behaviors of pyrroles continued throughout the 20th century. Chapter IIIA and IIIB define our effort towards the development of new synthetic strategies for conversion of *N*-aryl-γ-lactams to substituted pyrrole and thienopyrrole derivatives respectively. The construction of heterocycles will led us to development of methodology resulting in the formation of fused substituted other pyrrolcore heteocycle derivatives.

In an end analysis the trials and tribunals presented in this thesis is expected to evoke interest to heterocylic chemists working in the field of reactivity and mechanism. How best our developed methods can be transpired to the field of γ-lactams remains to be answered by future studies.