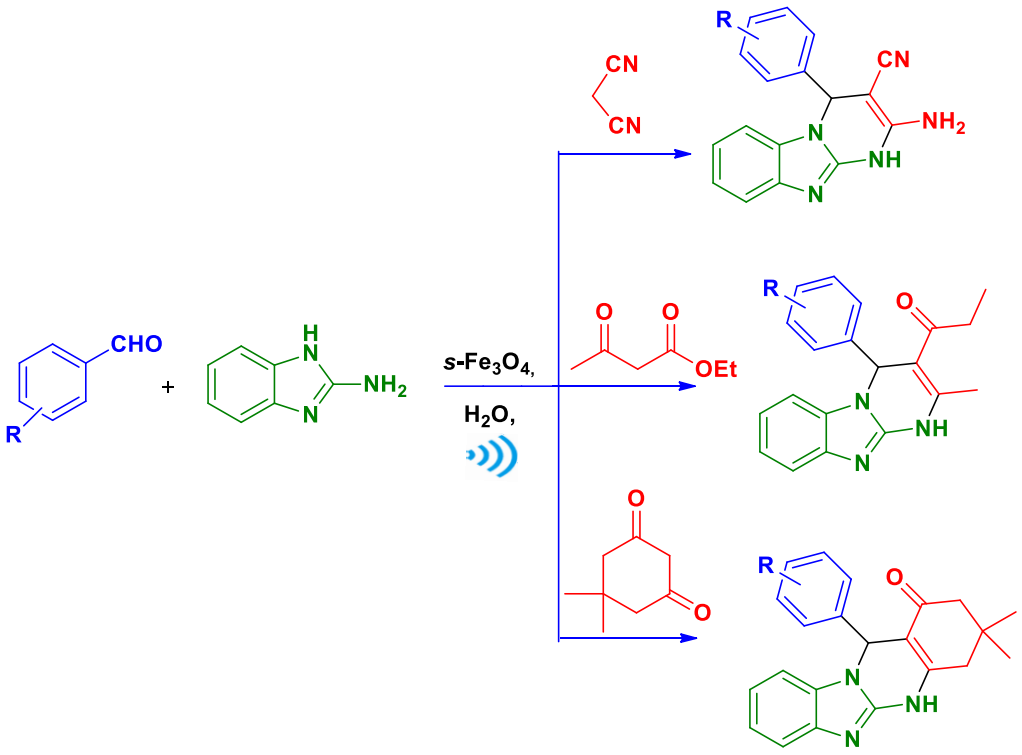
# Summary and Conclusions

The thesis entitled, "New Avenues for the Synthesis of Some Biologically Relevant Nitrogen Containing Compounds" embodies the synthesis and reactivity of biologically important compounds containing nitrogen atoms. The content of the thesis has been divided into five chapters.

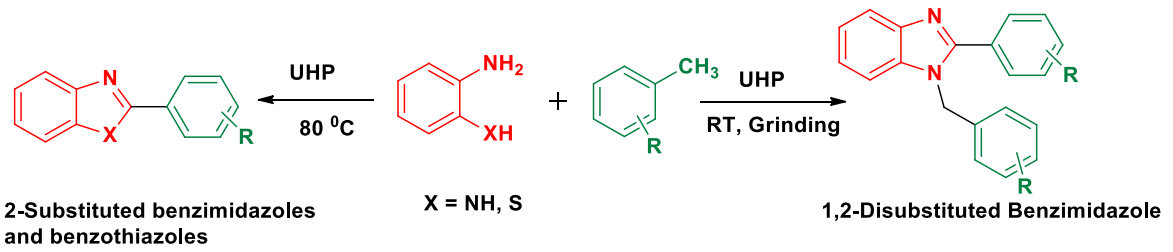
**Chapter 1** provides a general introduction and literature review of some main class of nitrogen containing organic compounds such as amine, imine, oxime, amides, pyrrole, pyridine and fused heterocycles indoles, imidazopyrimidine, pyranopyrazoles, benzimidazole, benzoxazoles and benzothaizole.

**Chapter 2** describes ultrasound induced chemoselective green synthesis of imidazopyrimidine from aldehyde derivatives, malanonitrile and 2-aminobenzimidazole and the reaction was catalyzed by starch functionalized superparamagnetic nanoparticles (*s*-$Fe_3O_4$). The syntheses were successfully achieved by domino Knoevenagel–Michael reaction in water with variety of aldehyde and active methylene compounds. The developed method is simple, efficient and provides good to excellent yields in short span of time (**Scheme A**).



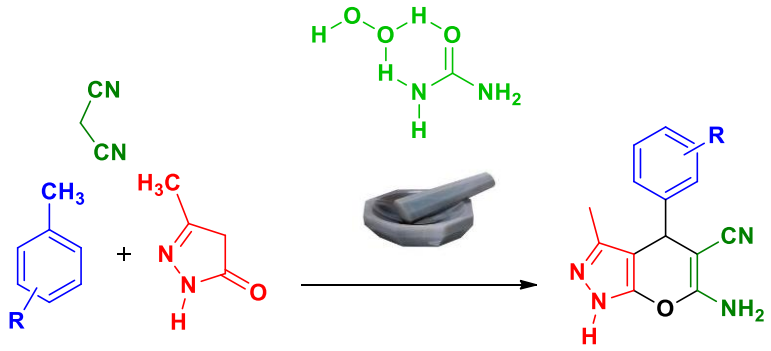

(**Scheme A**)

**Chapter 3** exploits a highly efficient, practical and environmentally benign approach for the synthesis of 1,2-disubstitituted benzimidazole and 2-substitited benzimidazole/ benzothaizole from *o*-phenylenediamine/ aminothiophenol and methyl arenes derivatives under different reaction conditions. Herein we have developed a rapid and facile method to achieve the fused heterocycles using simple urea hydrogen peroxide under catalyst-free condition at room temperature. The methodology shows extensive functional group tolerance and good to excellent yield in short span of time (**Scheme B**).



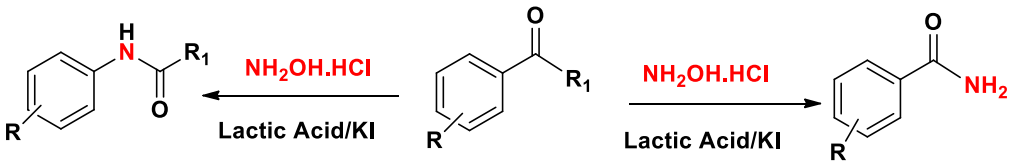

(**Scheme B**)

**Chapter 4** illustrates a high yielding and environment benign synthesis of pyranopyrazoles derivatives using urea hydrogen peroxide (UHP) under physical grinding method. The present methodology offers several benefits such as available green and cheap starting materials, solvent-free, mild reaction conditions, high atom-economy, excellent yields and easy isolation of products without column chromatographic separation (**Scheme C**).




(**Scheme C**)

**Chapter 5** presents an efficient synthesis of primary and secondary amide through Beckmann reaction. This reaction was catalyzed lactic acid and potassium iodide catalyst system. The highlights of present methodology is low-cost starting material, high atom-economic strategy, simple with cleaner reaction profile, high yield of products in shorter reaction time which builds a genuinely green protocol (**Scheme D**).




$R_1$ = H, $CH_3$, phenyl

(**Scheme D**)