Conclusion

Main Conclusion

In view of the promising biological activities of the structurally diverse heterocycles with fused heterocyclic systems, we have designed green chemical multicomponent heterocyclic protocol with the aim of developing new structural motifs of structural complexity with promising bioactivity. We have developed following green chemical protocol for the synthesis of structurally diverse heterocycles with medicinally privileged heterosystems

1) An efficient , simple and environment bening protocol for the synthesis of structurally diverse 3,4-dihydropyrimidin-2(1H)-thiones derivatives by p-TSA promoted one-pot, three component reaction of ethyl acetoacetate with thiourea/phenylthiourea and aryl aldehydes. The present protocol provides excellent yields of structurally complex, biologically relevant dihydropyrimidin-2(1H)-thiones in a single operation.

2) An environmentally benign, efficient and convenient protocol for the synthesis of structurally diverse dihydropyridine fused hetrocycles; 2,3-quinolinedicarboxylate,chromeno[4,3-b]pyridine-2,3-dicarboxylate, pyrido[2,3-d]pyrimidine-6,7-dicarboxylate, pyrano[4,3-b]pyridine-2,3-dicarboxylate incorporating medicinally privileged fused heterosystems by Iron(III)chloride-catalyzed four-component domino reaction of

aromatic aldehydes, acetylenedicarboxylate and arylamines with cyclic 1,3- dicarbonyl compound in an ethanol medium. The selective formation of the very different pyridine fused heterocyclic derivatives depends on the structure of cyclic 1, 3-dicarbonyl compound.

3) A concise and efficient Iron(III)-catalyzed protocols for the synthesis of functionalized dihydrobenzo[4,5-*d*]imidazo[1,2-*a*]pyrimidines and 5H-benzo[4,5-d]thiazolo[2,3-b]pyrimidine-4-carboxalic acid derivatives by one-pot domino reaction of 2-aminobenzimidazole/ 2- aminobenzothiazole with substituted aromatic aldehyde and pyruvic acid in ethanol. This methodology provides a convenient, atom-economical and eco-friendly approach for the synthesis of biologically important benzimidazopyrimidines /benzothiazolopyrimidines from easily available substrates under mild reaction conditions.

Future development and Scope:

Heterocyclic compounds can provide a high degree of structural diversity and have proven to be broadly useful as therapeutic agents. Multicomponent reactions combined with molecular diversity and eco-compatibility are considered cornerstones of combinatorial chemistry and diversity oriented synthesis and have played a critical role in the development of modern synthetic methodologies for pharmaceutical and drug discovery research. The presented green chemical protocols will considerably stimulate the synthetic community for diversity-oriented synthesis and in the discovery and development of pharmaceutical lead structures.