

# ABSTRACT

The thesis entitled “Chemical transformation of Carbocyclic Compounds and Development of Novel Reaction Protocols” comprises six chapters and a brief of their contents are as follows:

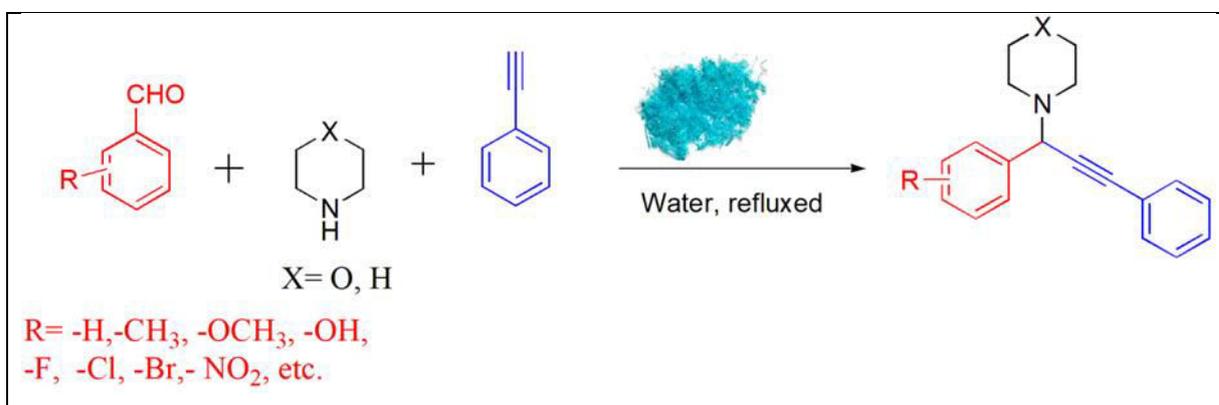
## CHAPTER I

**A brief review on the “Chemical transformation of Carbocyclic Compounds and Development of Novel Reaction Protocols”.** The work is mainly focused on the carbocyclic compounds and development of novel reaction protocols for the transformative reaction on carbocyclic compounds.

## CHAPTER II

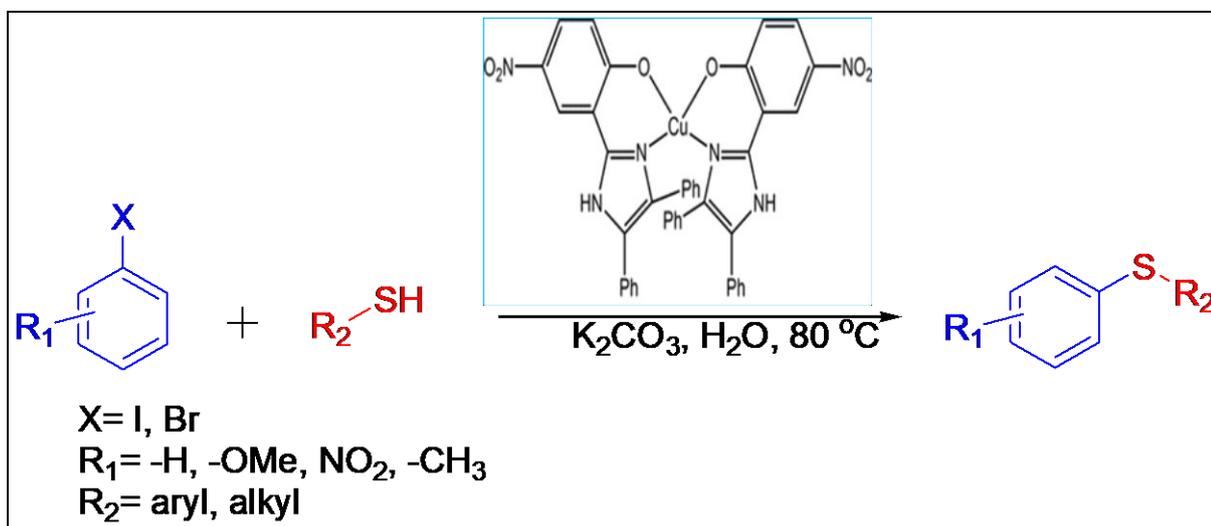
**A greener and sustainable approach towards the synthesis of propargylamine using multicomponent A<sup>3</sup>-coupling reaction**

The abundance of toxic contaminated effluents from the pharmaceutical industries and the serious risk of contamination of the aquatic systems combine to provide strong motivating factors to tackle this environmental problem. Use of non-hazardous chemicals, reaction in aqueous medium is an interesting ecological alternative for the bulk production of important drugs and fine chemicals. Taking advantage of the remarkable ability of the selected catalytic systems, alternative sustainable methods have been exploited for the decontamination of industrial effluents and exhausts. Here we developed a new metal-organic complex [Bis(picolate- $\kappa^2N:O$ ) Cu(II)] catalysed water mediated greener A<sup>3</sup>-coupling reaction for the synthesis of propargylamine. Low toxicity, easy access to active sites, high surface area, high thermal stability, recyclability of the catalyst and easy way to separate the catalyst from the reaction mixture are the added advantage of this developed greener and sustainable protocol.



### CHAPTER III

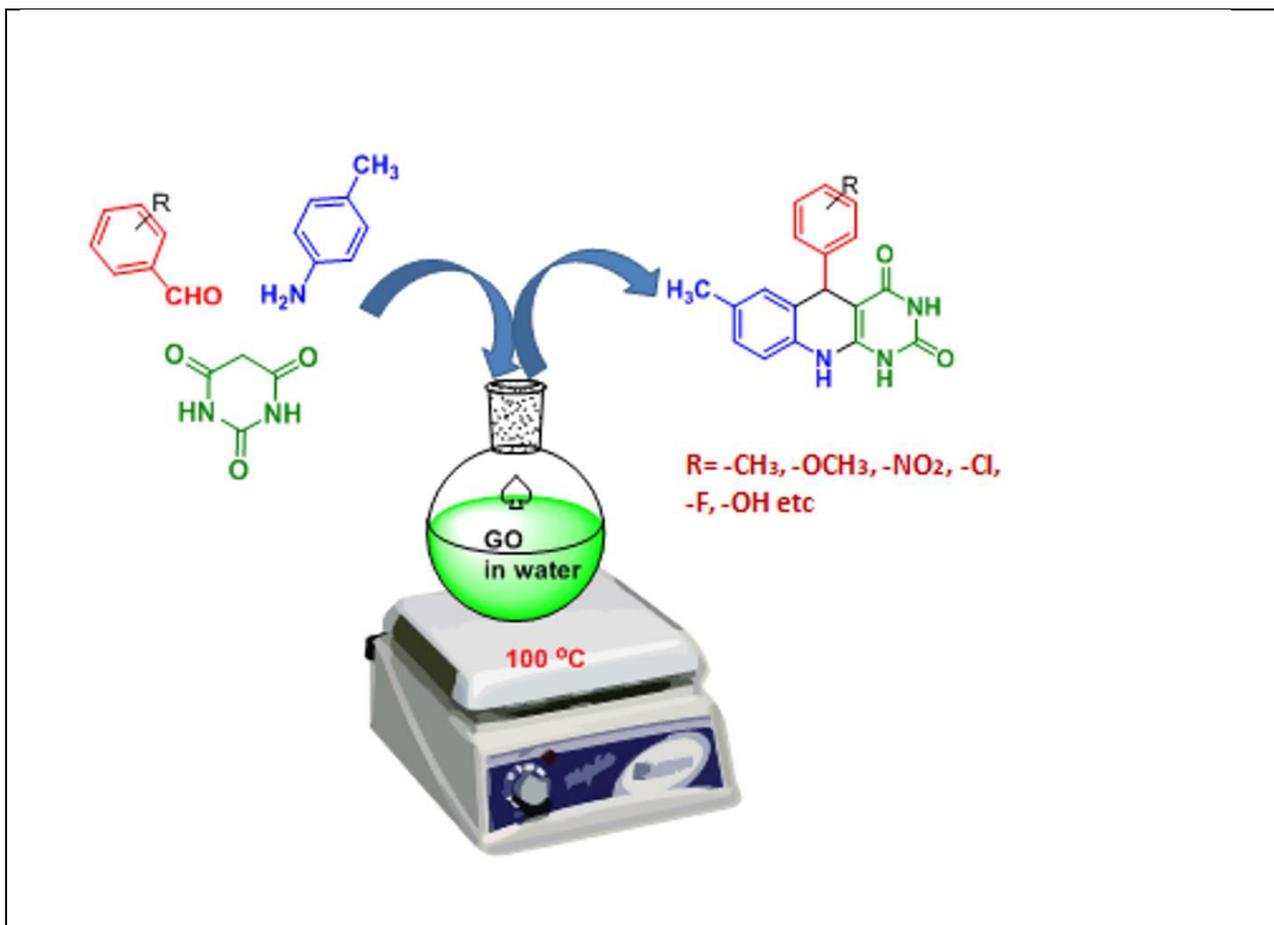
**Environmentally benign approach towards C-S cross-coupling reaction by organo-copper(II) complex,** C-S cross coupling reaction in water giving excellent yield of the desired C-S coupled product using a newly developed Bis[2-(4,5-diphenyl-1H-imidazol-2-yl)-4-nitrophenolato]copper(II) dehydrate complex as catalyst. The catalyst has low toxicity, easy access to the active sites, high surface area, high thermal stability, easy to separate from the reaction mixture and yielded the best result of the developed greener reaction protocol for the synthesis of C-S coupled product. Although it was the first report of the synthesis of such a novel organo-copper complex from our laboratory, its potential catalytic application was not tested so far. Keeping this in mind and based on our anticipation, recently we developed a greener route for the C-S coupling reaction. The result is very interesting and comprises the subject matter of this report.



### CHAPTER IV

**Graphene oxide catalysed one pot synthesis of pyrimido[4,5-*b*]quinolinone-2,4-diones and their biological evaluation.**

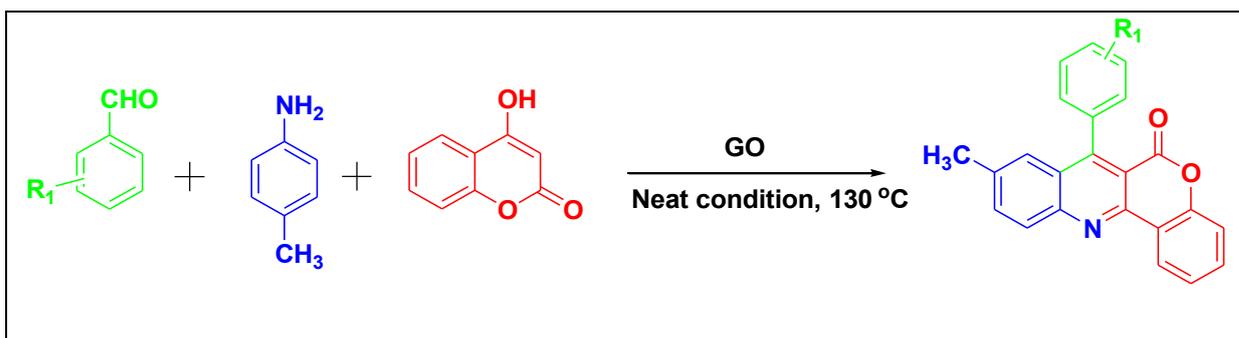
A simple and highly efficient method for the synthesis of 5-aryl-pyrimido quinoline 2,4-diones has been demonstrated. Graphene oxide (GO) has proved to be a new class of carbocatalyst for the synthesis of Pyrimido[4,5,*b*]quinolinone-2,4-diones through one pot three component reaction using aromatic amines, aldehydes and barbituric acid. The effects of reaction temperature, catalyst amount, reaction time, molar ratio of reactants were investigated. The GO could easily be recovered and reused upto 5<sup>th</sup> run.



## CHAPTER V

### One-pot three-component tandem annulation of 4-hydroxycoumarin with aldehyde and aromatic amines using Graphene oxide as an efficient catalyst.

We demonstrate a facile, efficient and environmentally benign graphene oxide one-pot multi-component reaction method for the synthesis of a variety of chromeno[4,3-*b*]quinolin-6-ones derivative from aromatic amines, aldehydes and 4-hydroxycoumarin under solvent free condition. This heterogeneous solid Carbocatalyst GO was found to be highly efficient for furnishing the corresponding products good to excellent yield. GO was cheap and easy recoverable catalyst and its catalytic activity sustained up to fifth run.



## CHAPTER VI

### Transformative reaction on triterpenoids: Action of hydrogen peroxide in presence of selenium dioxide on the oxime derivative of taraxerone and antimicrobial activity of the isolated compounds

Although studies on oxidation of triterpenoid ketones with hydrogen peroxide and selenium dioxide have been reported but literature reports on the effect of the above oxidizing agent on the oxime derivative of triterpenoid ketones are scanty. Thus in continuation of our studies on the transformative reactions on pentacyclic triterpenoids of lupane and friedelin skeleton and in order to examine the nature of the products formed on the oxidation of oxime derivatives of 3-keto-triterpenoids having gem dimethyl group at C4 and a double bond at ring D (between C14-C15), the oxidation of keto-oximes of taraxerone with hydrogen peroxide and selenium dioxide has been taken up and characterisation of the products (A -D) along with the evaluation of their preliminary biological activity are presented in this paper. The oxime derivative of taraxerone in tertiary butanol was refluxed with selenium dioxide and hydrogen peroxide. The residue obtained after recovery of solvent by distillation was extracted with ether and separated into neutral and acid parts by usual method.

