ABSTRACT

The research work incorporated in this thesis entitled **" SYNTHESIS OF BIOACTIVE ORGANIC HETEROCYCLIC COMPOUNDS USING NOVEL CATALYSTS "** is mainly focused on the development of efficient and environment benign methodologies for the new and efficient methodologies to synthesize synthons of bioactive compounds. The entire work depicted in this thesis has been divided into four chapters. In the beginning, **Chapter I** which deals with a brief idea about bioactive compound. The area of application of bioactive compounds are wide such as: plant science, modern pharmacology, geo-medicine, agrochemicals, cosmetics, food industry, nano-bioscience...etc. Thus it is a very promising area in full development, which has resulted in research works more and more numerous, designed to diversify the resources of bioactive compounds and improve their salvage pathways or synthesis. At first we need to prepare the synthon of such bioactive compound. As their natural availability is not so promising, henceforth we feel to pursue our research interest to synthesize the precursor of bioactive compounds in a novel way. In **Chapter II**, It deals with green synthetic approach towards one pot multi component synthesis of hexahydroquinoline and 9-arylhexahydroacridine-1,8-dione derivatives catalyzed by sulphonated rice husk. An efficient, straight

forward, eco-friendly procedure to the synthesis of biologically active hexahydroquinoline derivatives and hexahydroacridine-1,8-diones have been designed using a novel bio-degradable heterogeneous catalyst, sulphonated rice-husk (SRH). SRH provide high density of acid groups making it different from conventional solid acids containing single acid groups. An efficient protocol for the synthesis of hexahydroquinolines and hexahydroacridine-1,8-diones using acid catalyst (SRH) under both solvent free and greener solvent condition respectively. Operational simplicity, greener reaction condition, reusability of the catalyst, excellent product yields (upto 98%) are the fundamental features of this procedure. The metal free catalyst was characterised using different spectroscopic techniques-FTIR, SEM, EDX, Powder XRD, ICP-AES.

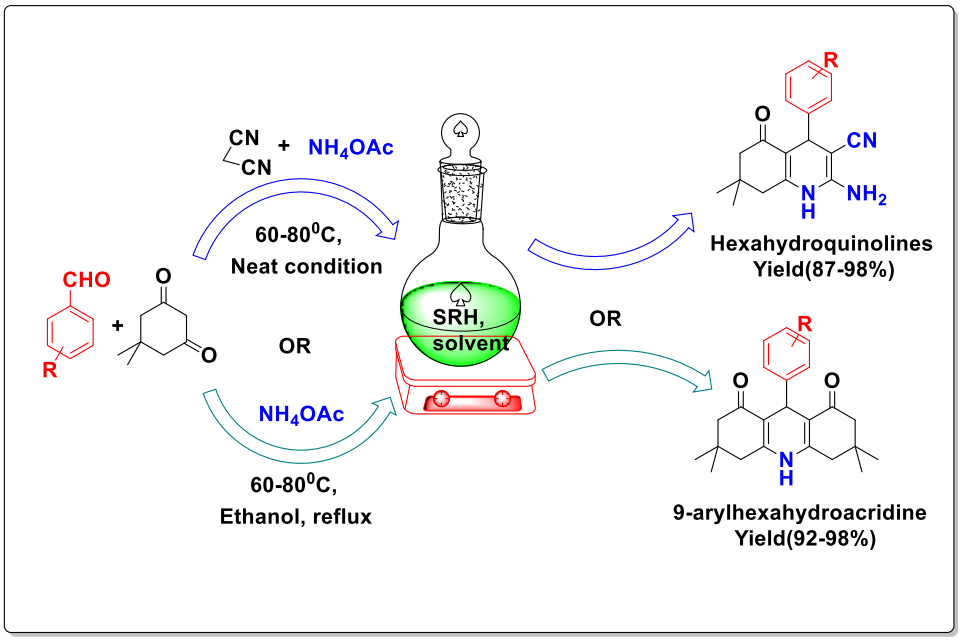

Figure: Graphical abstract of Chapter II

In **Chapter III**, It describes about convenient and greener root towards one pot multi-component synthesis of substituted pyrano-dichromeneo-dione and chromeno-pyrido-pyrimidinone derivatives using rice husk based heterogeneous catalyst. Very good to excellent yields in reasonably short reaction times, high atom economy and usage of readily available starting material, operational simplicity and easy workup are the fundamental features of this protocol. An efficient pseudo three component synthetic method for 7-aryl/heteroaryl substituted pyranodichromene-6,8-dione and 7-aryl/heteroaryl substituted chromeno[4,3-*d*]pyrido[1,2-*a*]pyrimidinone derivatives using this greener catalyst (SRH) under reasonable reaction condition. The operational simplicity, hassle free recovery of product and reusability of the catalyst with excellent product yield (up to 98%) are the fundamental features of this procedure. The toxic metal free catalyst was prepared in a convenient manner, characterized by using different spectroscopic techniques-FTIR, Powder XRD, SEM, & EDX an finally used up for the greener synthetic target.

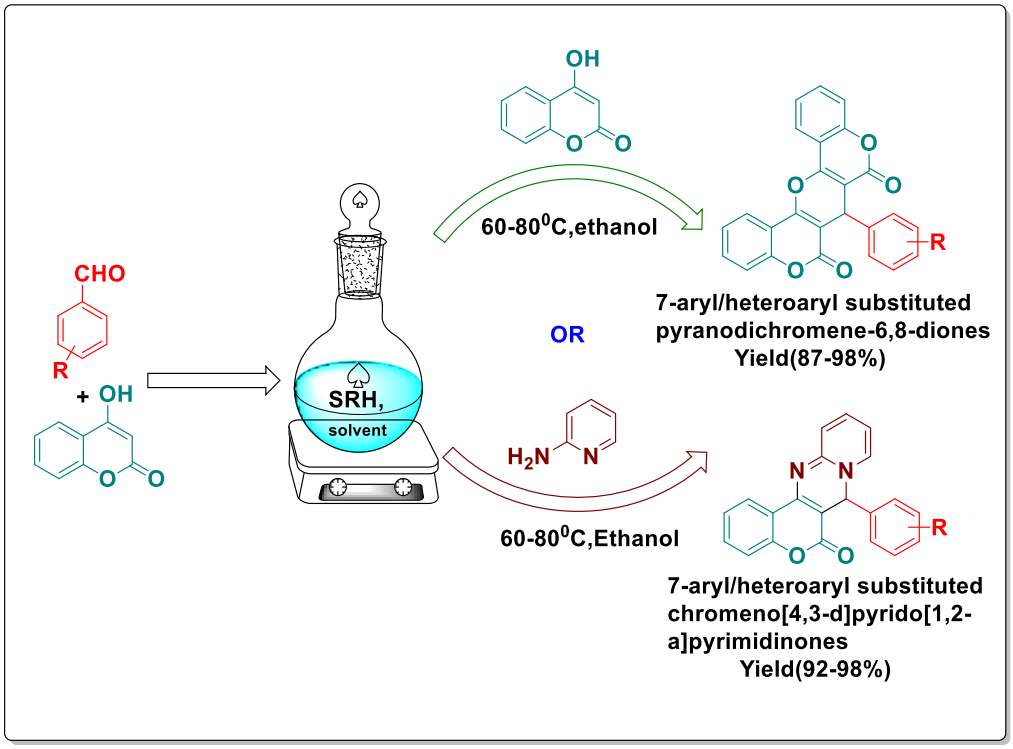

Figure: Graphical abstract of Chapter III

In Chapter IV, it deals with laboratory studies on one pot multi-component synthesis of a few varieties of heterocyclic compounds (dihydro-dichromeno-pyridine-6,8-diones, tetrahydrotetrazolo[5,1-*b*]quinazolinones and 2,4-diaryl hexahydroquinoline-5-ones) following greener approach using rice husk based greener catalyst. A straight forward and sustainable synthetic procedures for these important class of bioactive heterocyclic compounds have been designed using a novel bio-degradable heterogeneous catalyst-sulphonated rice-husk (SRH). The greener catalyst contains high density of acid groups with high porosity which has made it a different and advantageous material for green

catalysis as compared to other conventional homogenous solid acid catalyst. The operational simplicity, easy recovery of the product, avoidance, metal free technique and reusability of the catalyst along with excellent product yield (up to 98%) are the important and promising fundamental features of this procedure. The prepared solid heterogeneous catalyst was subjected for characterization using different spectroscopic techniques like FTIR, SEM, EDX, Powder XRD before its application for the the particular desired reactions for the synthesis of above heterocyclic compounds.

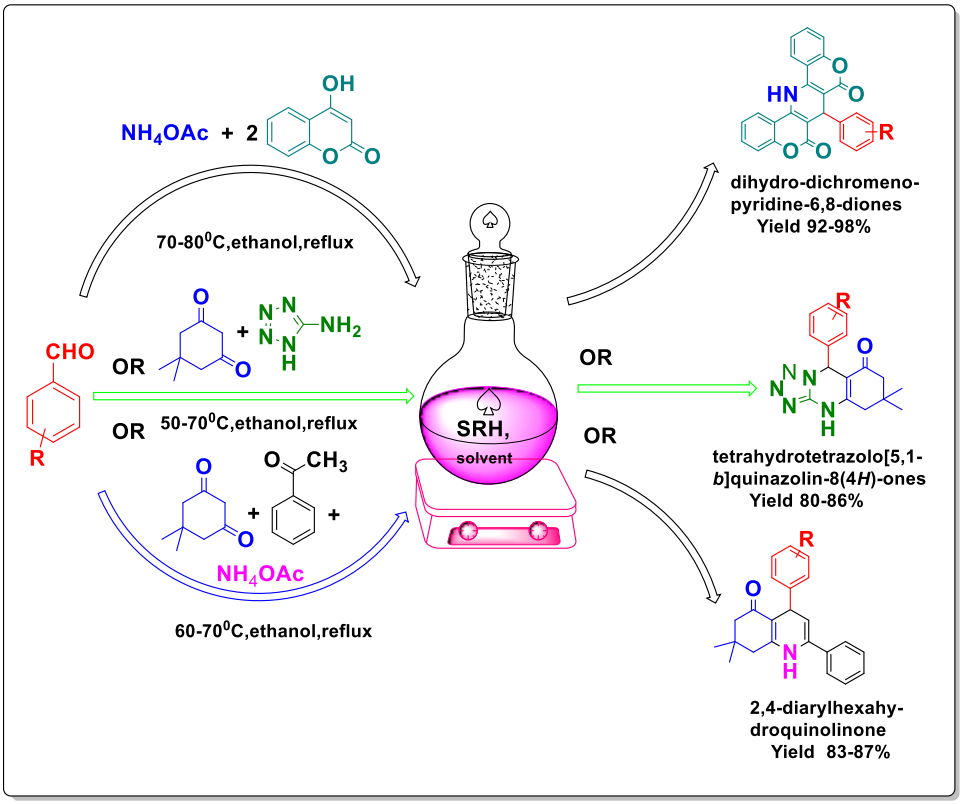

Figure: Graphical abstract of Chapter IV