ABSTRACT

The research work incorporated in this thesis entitled "**STUDIES ON NOVEL METHODOLOGIES FOR THE SYNTHESIS OF PRECURSOR OF BIOACTIVE COMPOUNDS**" 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 five chapters.

In the beginning, **Chapter I** 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-bio-science... 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**, chemo selective reduction of a wide range of aromatic nitro compound has been performed by using inexpensive Zn powder and $CuSO_4$ system in water medium at room temperature. This system has high tolerance to other highly reducible groups present in nitro substance along with high conversation and selectivity. This chemo-selective reduction also provides a facile root for the synthesis of other industrially important fine chemicals or biologically important compounds where other highly reducible groups are present in close proximity to the targeted nitro groups.

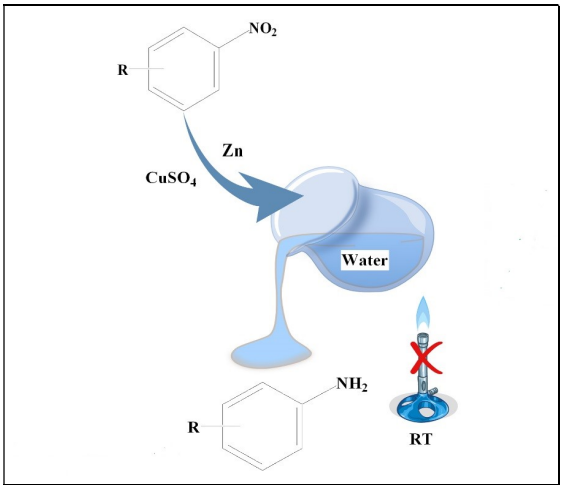

Figure: Graphical abstract of chapter I

In **Chapter III**, Small amount of Zn dust and $NaHSO_3$ is utilized to efficiently synthesize benzimidazole derivatives via one pot reductive cyclocondensation process in water medium at 100°C temperature. 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.

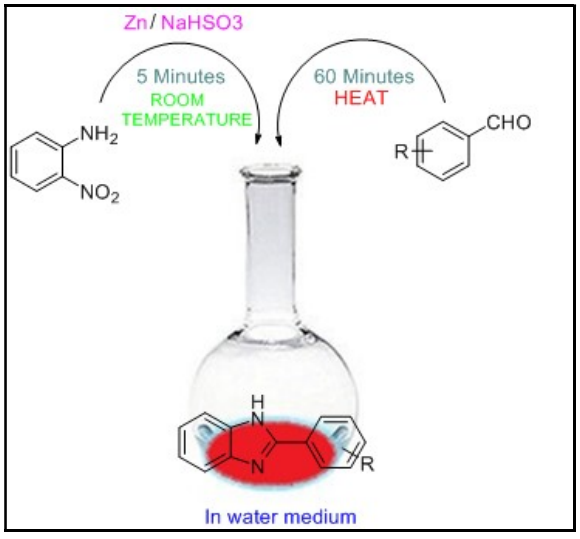

Figure: Graphical abstract of chapter II

In **Chapter IV**, an efficient catalytic system for the synthesis of Pyrazine derivatives using an extract of onion at room temperature is discussed. A very good to excellent

yields in reasonably short reaction time, high atom economy, usage of readily available starting material, operational simplicity and easy workup are the fundamental features of this protocol. The versatility of our method is determined by synthesizing a large number of pyrazine derivatives with (85-96%) good yield.

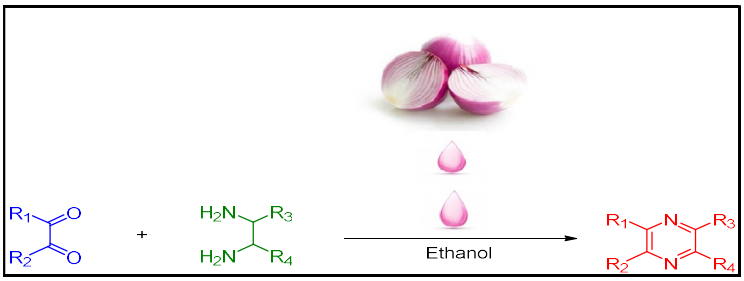

Figure: Graphical abstract of chapter III

At last, in **Chapter V**, on observing the usefulness of imidazole ring as a starting material for the synthesis of wide range of nitrogen containing physiologically active natural as well as synthetic compounds and limitations to synthesize the important moiety, we felt necessity to investigate the synthesis of same imidazole derivatives from same starting materials with different reagents by solid as well as in liquid phase and comparing the processes to know which one are the better path or which one we should follow.