Preface

The nitrone moiety can be regarded as a 3 centered dipolar 4π system, which enables 1,3-dipolar cycloaddition reactions with different dipolarophilic reagent to occur. 1,3-dipolar cycloadditions are susceptible to both electronic and steric influences. 1,3-dipolar cycloaddition reaction between a nitrone and an olefinic dipolarophiles is an efficient method for the synthesis of isoxazolidine systems.

The question of reactivity and substituent effects in 1,3-dipolar cycloaddition reaction has been rationalized successfully using frontier molecular orbital theory which provides relative interaction energies of frontier orbitals between 1,3-dipole and dipolarophiles. The electron attracting or electron releasing moiety influences the atomic orbital co-efficience and have a significant influence on the regiselectivity of the reaction.

Further more, the cycloadducts have found numerous applications in synthesis through reductive cleavage of the $N-O$ bond to give γ-amino alcohols. Asymmetric induction in nitrone olefin cycloaddition has been achieved through the incorporation of chirality in both the dipole and the dipolarophiles. More recently advances have been made in the use of water as the solvent to influence the rate, regioselectivity and stereoselectivity of cycloaddition reactions. The present work entitled ***"N-cyclohexyl, N-phenyl nitrones & their potentiality in isoxazolidine & isoxazoline syntheses"*** reports newly discovered α-chloro nitrone from chlorohydrin and α-amino nitrone from *N,N*-dimethyl formamide and their cycloaddition reactions with different olefins and alkynes leading to the formation of regio and stereoselective products. An important application of the nitrones and the cycloadducts are aldehyde synthesis and antimicrobial activities.

The following chapters fulfill these ideas:-

Chapter I This chapter deals with the general theoretical approach of different 1,3-dipoles and their stabilities and general nature of intra and inter molecular 1,3-dipolar cycloaddition reactions of nitrones. Special emphasis has been given on HOMO – LUMO approach in this regard. Attempts have been made in this chapter to cover a complete review of the literature and latest developments up to February, 2010 in a rather comprehensive manner.

Chapter II It deals with the most important experimental section. In this section, the method of formation of different nitrones (*N*-cyclohexyl-α-chloro nitrone, *N*-cyclohexyl-α-amino nitrone, *N*-phenyl-α-amino nitrone), cycloaddition reaction with different olefins and alkynes are studied along with their reaction conditions in solvent less condition and in aqueous phase.

Chapter III This chapter deals with results and discussion and achievements of the work done. Spectral interpretation *viz.* ^{1}H NMR, ^{13}C NMR, MS, IR, HRMS and elemental analysis have been discussed in detail.

Chapter IV This chapter is focused on the future perspective of the work done and is referred to as scope and objectives of the present work.