

# Synthesis of New Scaffolds of Isoxazolidine & Isoxazoline Derivatives using Some Novel Class of Nitrones via 1,3-Dipolar Cycloaddition Reaction using Greener Methodologies and Biological activities of the Cycloadducts

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## Abstract

Some environment friendly greener methodologies have been described for the synthesis of new isoxazolidine and isoxazoline derivatives using new nitrones via 1,3-dipolar cycloaddition reactions. These also include synthesis of bisisoxazolidine and bisisoxazoline derivatives synthesized from glyoxal and terephthalaldehyde respectively. Few new spiro isoxazolidine derivatives have been also reported using new dipolarophiles. Furthermore, these new isoxazolidine and isoxazoline derivatives are found to have vast synthetic potential as they could be used as precursors for the synthesis of a variety of new organic molecules including peptides, 1,3-amino alcohols with potential biological activities. For the synthesis of peptides, it has been observed that CDMT (chloro dimethyl triazine) has found to be better coupling reagent than conventional DCC (dicyclohexyl carbodiimide) due to the formation of insoluble by-product (N,N-dicyclohexylurea) and purification becomes tedious. The new nitrones reported are synthesized from dihydropyran, chlorohydrin, glyoxal, terephthalaldehyde and formamide respectively. Significant increase in the reaction rates, excellent yields, and high selectivity (diastereo and regioselectivity) are the important features observed in these cycloaddition reactions following greener methodologies. It has been observed that high diastereoselectivity in these cycloaddition reactions have been observed when the reactions are performed in water. Synthesis of aldehydes and ketones with new nitrones in atom efficient reactions are the most attractive features as they have future scopes in these reactions. The side products (enamines) obtained during the synthesis of aldehydes and ketones has been successfully utilized as new dipolarophiles in these cycloaddition reactions for the synthesis of spiro cycloadducts. Potential biological activities including cytotoxicity of the new molecules have made these new syntheses much more attractive and useful as well.

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## Biography

Professor and Head of the department of Chemistry at Sikkim Government College (Deemed University), Gangtok, Sikkim, India with 23 years of teaching experience in teaching Undergraduate and Post graduate Chemistry students. Has active research experience of 22 years in synthetic organic chemistry in the field of "Nitrono cycloaddition reactions and their further applications following green chemistry methodologies". Has established few environment friendly greener methodologies along with atom efficient reactions in the synthesis of few novel isoxazolidine and isoxazoline derivatives using new nitrones via 1,3-dipolar cycloaddition reactions. These novel isoxazolidine and isoxazoline derivatives are found to have vast synthetic potential as they could be used as precursor for the synthesis of a variety of new organic molecules including peptides with potential biological activities. Supervisor of research scholars leading to Ph.D degree for

14 years. Has 17 years of administrative experience as "Head of Department" in the institution. Has sufficient expertise in conducting DST/CSIR/UGC national research projects. Has published 60 nos of research publications in international and national journals of high repute and impact factors. Honorary referee and editorial board member for reviewing research manuscripts for various international and national journals with good impact factors. Has authored two books on the "Synthetic applications of nitrono cycloaddition reactions". Has been awarded with many international and national awards. Has been associated as "Life member" with various international and national scientific organizations. Has presented research papers in various international and national conferences as "Invited Speaker" in UK, Germany, Greece and India.