EXECUTIVE SUMMARY OF THE UGC MINOR RESEARCH PROJECT

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Title of the project: "Synthesis of *N*'-{(1)-substituted phenyl [phenyldiazenyl] methylene} isonicotinohydrazides and 4-[5-(alkyl thio)-1,3,4-oxadiazol-2-yl] pyridine compounds their Chromatographic separation, characterization by spectroscopic methods and study of their biological behavior"

A literature survey revealed that the resistance to number of antimicrobial agents among a variety of clinically significant species of bacteria is becoming increasingly important global problem. There are various problems arising with the use of antimicrobials such as local tissue irritation, interference with wound healing process, hypersensitivity reactions, systemic toxicity, narrow antimicrobial spectrum, emergence of resistance. So the increasing clinical importance of drug-resistant microbial pathogens has lent additional urgency in microbiological and antifungal research. A wide variety of heterocyclic systems have been explored for developing pharmaceutically important molecules. Nicotinic acid (pyridine-3-carboxylic acid), its derivatives and isomers form an important class of heterocyclic compounds with a wide range of applications, among which the use thereof as starting materials for the synthesis of biological active compounds such as Nevirapine, namely an anti-HIV drug Nicotinic acid, also known as vitamin and niacin, as well as its amide niacinamide are found in several aliments and animals, and play a critical role in different biological processes This class of heterocyclic compounds also showed a broad spectrum of biological activities, such as anti-carcinogenic, antioxidant anti-inflammatory and anti-bacterial ones. Isoniazid (isonicotinylhydrazine), an important first-line anti-tuberculosis drug, which keeps an analogy with isonicotinic acid, an isomer of nicotinic acid

Formazans are known for their spectrum of biological activities such as antibacterial] anti-fertility, anticonvulsant and therapeutic agents and antifungal activity.

In the present study *N*'-phenyl substituted phenyldiazenyl]methylidene}pyridine-4-carbohydrazide were prepared from *N*'-substituted phenylmethylidene]pyridine-4-carbohydrazide Condensation of substituted Benzaldehyde and pyridine-4-carbohydrazide resulted into *N*'-[phenylmethylidene]pyridine-4-carbohydrazide, which upon further reacted with diazonium chloride of benzothiazole.

. The compounds obtained were purified by column chromatography using silica gel. The chemical structures of the compounds were confirmed using IR, ^{1}H-NMR and mass spectroscopy. Synthesized compounds were screened for their antibacterial activities.

Part-I covers the synthesis of *N*'-[phenyl (phenyldiazenyl) methylene] isonicotinohydrazide derivatives. Isonicotinohydrazide was condensed with with substituted benzaldehyde in presence of ethanol and glacial acetic acid to get the schiffs base. Diazonium salt of substituted aromatic amine was prepared by using sodium nitrite and concentrated hydrochloric acid at ice cold condition. Diazonium salt was further coupled with the schiffs base in presence of pyridine to get the final product. Final products obtained were purified with column chromatography. It also involves the characterization of synthesized organic compounds. Structures of the organic compounds were confirmed from the spectroscopic data using IR, ^{1}H-NMR and mass spectroscopy.

Part-II deals with the biological studies of the synthesized compounds. All the derivatives of the synthesized organic compounds were screened for their antibacterial activity. Compounds were screened against s*taphylococcus aureus* which is Gram-positive bacteria and Escherichia coli Gram-negative bacteria. Synthesized compounds showed moderate to good antibacterial activities against both gram positive and gram-negative bacteria.

Chapter-III includes synthesis of N-[5-(4-methoxyphenyl)-1,3,4-thiadiazol-2-yl]-2-{[5-(pyridin-4-yl)-1,3,4-thiadiazol-2-yl]sulfanyl}acetamide. Isoniazid was converted to thiadiazol -2-thiol compound by reacting with carbon disulphide. Anisic acid was cyclyzed to 2-amino thiadiazole by reaction with thiosemicarbazone and phosphorous oxychloride. It was further reacted with chloroacetylchloride and then reaction of both the compounds by conventional and microwave assisted method results in the final product.

All the synthesized compounds were separated by chromatographic technique, characterized by IR, NMR and Mass and were studied for their antibacterial activities.

Synthesized compounds exhibit moderate to good antibacterial activity against both gram positive and gram-negative bacteria.

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