ABSTRACT OF THE THESIS

The entire work of the thesis entitled “Design, synthesis and biological studies of imidazo[1,2-a]pyridine derivatives" is divided in to five chapters.

CHAPTER-I:

This chapter deals with general chemistry of imidazopyridines and their analogues, the types of imidazopyridines such as imidazo[1,2-a]pyridine, imidazo[1,5-a]pyridine, imidazo[4,5-b]pyridine and imidazo[4,5-c]pyridine. Discussion about various potent molecules of this derivatives in the market and also provided brief introduction of biological activity.

CHAPTER-II:

This chapter describes synthesis of various imidazo[1,2-a]pyridine derivatives containing benzothiazole moiety and second position. The biological activity of imidazo[1,2-a]pyridines are shown to be critically dependent on the nature of the substitution at C-2 and C-3 positions. Imidazo[1,2-a]pyridine and benzothiazole moieties exhibit a wide range of biological activity. In view of that, we prepared combination of these two moieties and prepared a series of compounds with various acetamide derivatives in third position and different substituents in pyridine ring. Structure elucidation of all the compounds done by NMR, Mass, IR and X-ray crystallography analysis and studied their antitubercular activity.

CHAPTER-III:

This chapter illustrates importance of bis compounds and their biological activity. Synthesized a series of various substituted Bis-Imidazo[1,2-a]Pyridinylmethane derivatives and confirmed their structures by NMR, IR, Mass and X-Ray crystallography.

CHAPTER-IV:

This chapter depicts a new approach for the synthesis Imidazo[1,2-a]pyridine-3-acetonitrile derivative, which is a key intermediate of anti hypnotic agent Zolpidem. We prepared a series of acetonitrile derivatives various substituted imidazo[1,2-a]pyridines and confirmed their structure by NMR, IR and Mass analysis. By using this approach simplified the process for synthesis zolpidem and presented.

CHAPTER-V:

This chapter represents for the synthesis of a series of substituted 3-methylsulfanyl imidazo[1,2-a]pyridine derivatives. Imidazo[1,2-a]pyridine derivatives on treatment with alkylbromides in dimethylsulfoxide solvent produce the anticipated products. All the compounds confirmed by their NMR, IR, Mass analysis. Depicted the plausible mechanism for the formation of 3-thiomethyl derivatives.

METHODOLOGY AND INSTRUMENTATION

Most of the reagents used in the work were obtained from commercial suppliers and were of LR/AR grade. Solvents were purified before use by standard procedures. Melting points were determined using open capillary tubes on POLMON melting points apparatus (Model-96) and are uncorrected. The purity of all the compounds was routinely checked by TLC on silica gel-GF 245(Merck) coated plates. Visualization of TLC plates was done by iodine or under UV light. Yields have been reported throughout this thesis are presented on molar basis on the immediate precursor of the reaction.

IR spectra were recorded using Perkin-Elmer Model-2000 instrument (KBr), ^{1}H NMR and ^{13}C NMR spectra were recorded on Brucker corporation (Model-AVN 400) operating at 400 MHz for ^{1}H NMR & 100 MHz for ^{13}C-NMR respectively. $CDCl_3$ or DMSO-d_6 were used as solvent and TMS as internal standard for ^{1}H and ^{13}C NMR spectra (chemical shift in δ, ppm). Mass spectra have been recorded under Chemical Ionization condition on ESI-MS Mass Spectrometer (Model API-2000LCMS-MS). X-Ray crystaloography data obtained from Indian Institute of Chemical Technology using Bruker Smart Apex CCD diffractometer with graphite monochromated MoKα radiation (λ=0.71073Å) with ω-scan method. Preliminary lattice parameters and orientation matrices were obtained from four sets of frames.

GLOSSARY OF ABBREVIATION

Ac	acetyl
AcOH	aceticacid
ACN	acetonitrile
Aq	aqueous
Bn	benzyl
Bu	butyl
^{13}C NMR	Carbon-13 nuclear magnetic resonance
^{o}C	Celsius
CDI	carbonyldiimidazole
cm	Centimeter
δ	Delta (chemical shift)
d	doublet
DMF	dimethyl formamide
DMI	dimethylimidazolidinone
DMSO	dimethylsulfoxide
eq	Equivalent
ESMS	Eletro-spray mass spectrometry
Et	ethyl
ESI	Electo-spray ionization
g	Gram
^{1}H NMR	Proton nuclear magnetic resonance Spectroscopy.
HCl	hydrochloricacid
Hz	Hertz
h	Hour
J	Coupling constant
IR	Infrared spectrometry

KCN	potassium cyanide
KOH	potassium hydroxide
MDC	dichloromethane
m/z	mass-to- charge ratio
MHz	Mega hertz
Me	methyl
mg	Milligram
ml	Milliliter
mmol	Millimole
mol%	Molar percentage
min	Minute
M	Molar
m	Multiplet
NaCN	sodium cyanide
$NaBH_4$	sodium borohydride
q	quartet
RT	Room temperature
s	singlet
TEA	triethylamine
THF	tetrahydrofuran
TFA	trifluoroaceticacid
TLC	Thin-layer chromatography
t	triplet
TB	Tuberculosis
uv	Ultraviolet
WHO	world health organization
wt	Weight