CHAPTER 7
CHEMISTRY

Doctoral Theses

056. ABDULLAH KHAN
Design and Synthesis of Novel Benzo[b] 1,4-oxazine, Pyridin-2 (1H)-one and Quinolin-2 (1H)-one Analogues and Their Biological Activity Evaluation.
Supervisors: Prof. Sunil L. Sharma and Prof. Virinder S. Parmar

Contents

1. Design and synthesis of novel benzo[b] 1,4-oxazine analogues and their biological activity evaluation
2. Design and synthesis of novel N-alkyl 5-benzoyl 2-pyridone derivatives and evaluation of their antiproliferative & antibacterial activity
3. Design and synthesis of N- and O-alkylated quinolin-2(1H)-one derivatives.
Summary.

057. AGGARWAL (Swati)
Design, Synthesis and Biological Evaluation of Anticancer Agents for Imaging Applications.
Supervisors: Prof. Gurmeet Singh and Dr. Anjani K. Tiwari

Contents

1. Introduction and objectives
2. Design and synthesis: Structure based drug design and synthesis of molecules targeting duplex DNA
3. Physico-chemical analysis: UV-Vis spectroscopy to study non-radiative excitation and emission transitions
4. CT-DNA binding assay: Exploration of interaction of newly designed molecules with DNA through spectral modifications
5. In-Vivo and In-Vitro analysis: Pharmacokinetics and pharmacodynamics evaluation by biomedical imaging and cellular studies.
Summary and list of publications.
058. **AHUJA (Preety)**

**Synthesis and Physio Chemical Characterization of Manganese Based Bimetallic Transition Metal Oxides for Supercapacitor Electrode.**

Supervisor : Dr. Raj Kishore Sharma

**Th 21047**

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059. **ALI RAZA**

**Material Synthesis for Forensic Ink Dyes and Explosives Analysis.**

Supervisor : Dr. Basudeb Saha

**Th 21357**

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060. **AMIT KUMAR**

**Development of New Protocols for the Synthesis of Heterocyclic Frameworks Employing Metal-Catalysis (Gold, Platinum and Indium) and Multicomponent Reactions.**

Supervisors : Prof. Sunil K. Sharma and Prof. Virinder S. Parmar

**Th 21045**

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1. Introduction to diversity oriented synthesis (DOS) using metal...

061. AMITA

**Design, Synthesis and Characterization of Novel, Hydrophilic, Unsymmetrically N, N’-disubstituted Benzimidazolium Salts and their Applications as Organocatalysts, Ligands in Heck Reaction and Fluorescent Probes.**

Supervisor : Dr. Marilyn Daisy Milton

Th 21061

**Contents**


062. ARORA (Richa)

**In Silico Studies of Hydroxamic Acids and their Biological Applications.**

Supervisor : Prof. Rita Kakkar

Th 21043

**Contents**

063. AWANISH KUMAR

**Impact of Ionic Liquids on the Stability of Proteins.**
Supervisor : Dr. P. Venkatesu
Th 21040

**Contents**

1. Introduction and review of the literature  
2. Materials and experimental techniques  
3. Impact of imidazolium-based ionic liquids on the structure and stability of insulin  
4. Impact of imidazolium-based ionic liquids on the structure and stability of α-chymotrypsin  
5. Impact of imidazolium-based ionic liquids on the structure and stability of myoglobin  
6. Ionic liquids as novel counteracting agents  
7. Conclusions.

064. BHARDWAJ (Neha)

**Studies on the Synthesis and Characterization of Mixed Metal Oxides by Exploratory Approach Through Cation and Anion Substitutions.**
Supervisor : Dr. S. Uma
Th 21051

**Contents**

1. Introduction  
2. Characterization techniques  
3. Substitutional studies of Cr$^{3+}$ and W$^{6+}$ Ions for V$^{5+}$ Ions in bismuth and vanadium based columnar oxide : Synthesis, characterization and photocatalytic evaluation of Bi$_{13-x}$Te$_x$V$_4$CrO$_{24-4}$ ($2 < x < 1$) and Bi$_{13-x}$Te$_x$V$_4$W$_{34-4}$ ($2 < x < 1$)  
4. Investigation of cationic mixing and ordering in the honeycomb layer of Li$_4$MSbO$_6$ (M(III) = Cr, Mn, Al, Ga) (S.G. C2/c) oxides  
5. Investigation of synthesis of oxynitrides Ln$_2$MoTi(ON)$_{7-\delta}$ (Ln = Eu, Gd, Dy, Y; $\delta$ = vacancies) by the ammonolysis of single phase oxides Ln$_2$MoTiO$_8$ (Ln = Eu, Gd, Dy, Y) and their characterizations  
6. Synthetic attempts of ammonolysis of mixed phase oxides leading to (AA$'$) BO$_{4-x/2+y}$Nx (x ~ 0.1; y ~ 0.5; A = K, Rb, Cs; A$'$ = Sr, Ba; B = W, Mo).

065. DANODIA (Abhinandan Kumar)

**Palladium-Catalyzed Tandem Synthesis of Carbocycles and Heterocycles by Sequential Coupling Reaction.**
Supervisor : Dr. Akhilesh Kumar Verma
Th 21046

**Contents**

1. Palladium-catalyzed sequential cross-coupling reaction of

066. GABA (Garima)
**Studies on the Interaction of Metal ions with Curcumin and its Analogues : NF-κβ-DNA Binding Inhibitors.**
Supervisor : Prof. R. K. Sharma
Th 21054

Contents


067. GULIA (Sunita)
**Theoretical Studies of Bioconjugated and Transition Metal Doped ZnO Quantum Dots.**
Supervisor : Prof. Rita Kakkar
Th 21058

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068. GUPTA (Dinesh)  
**Catalytic Oxidation and Dehydration of Substrates of Industrial Relevance.**  
Supervisors: Dr. Basudeb Saha and R. K. Sharma  
Th 21354

*Contents*

1. General introduction  
2. Design of green heterogeneous, stable many times reusable nanocatalyst. (a) Glu TsOH-Ti and (b) Ni-Cu/HT (C) Ru/CNS  
3. Dehydration of lignocellulosic biomass using large-pore mesoporous tin phosphate (LPSnP-1 as catalyst)  
4. Biorenewable sulfonated carbonaceous material: An efficient solid acid catalyst for 5-Hydroxymethylfurfural and furfural production  
5. Aerobic oxidation of 5-hydroxymethylfurfural to 2,5-diformylfuran and 2,5 furandicarboxylic acid  
6. Green environmental friendly routes For p-Xylene oxidation to terephthalic acid.

069. HEMLATA NIMESH  
**Design, Synthesis and Pharmacological Evaluation of Novel Bisbenzimidazole Analogues as Radioprotectors.**  
Supervisor: Prof. Vibha Tandon  
Th 21358

*Contents*

1. Review of literature  
2. Synthesis of novel bisbenzimidazole derivatives as radioprotectors  
3. To study the toxicity, pharmacokinetics and biodistribution of DMA in Balb/c Mice  
4. To Elucidate the radioprotective efficacy of DMA in Balb/c Mice exposed to ionizing radiation.

070. JHA (Rajeev Ranjan)  
**Transition-Metal-Catalyzed Tandem Synthesis of Heterocycles/ Polyheterocycles from Alkynes.**  
Supervisor: Dr. Akhilesh Kumar Verma  
Th 21039

*Contents*

1. Catalyst-controlled regio-and stereoselective synthesis of oxazolo fused pyrroloquinolines and naphthyridines from 0-alkynylaldehydes  
2. Stereoselective tandem synthesis of thiazolo fused naphthyridines and pyridines from o-alkynylaldehydes via 6-endo-dig ring closure  
3. Palladium-catalyzed-regioselective (3+2) annudlation of internal alkynes and iodo-pyranquinolines

Summary of the work.

071. KAPIL
Click-Chemistry Route to Triazol-Linked Nonionic Bicyclonucleoside Dimers, Fluorescent Coumarin-4-yl-triazolyglycosides and Solvent-Free Synthesis of 4-Coumarin-4'-yl-dihydropyridines.
Supervisor: Prof. Ashok K. Prasad
Th 21056

Contents

2. Synthesis and fluorescence study of coumarin-4-yl-triazolyglycosides.
3. Biocatalytic separation of α- and β-anomers of coumarin-4-yl-triazolyldeoxyriboglycosides.
4. Solvent-free multi-component one-pot synthesis of novel 4-coumarin-4'-yl-dihydropyridines.
Summary and List of Publications.

072. MANJU KUMARI SAROJ
Photophysical Study of Some Indole Based Chalcones in Homogeneous and Heterogeneous Media Using Their Absorption and Fluorescence Spectral Profiles.
Supervisor: Prof. R. C. Rastogi
Th 21041

Contents

1. Introduction.
2. Materials and methods.
3. Solvatochromic study: Ground and excited state dipole moments using solvent polarity parameters.
4. Prototropic study: Effect of $H_2/PH/H_3$ on absorption and fluorescence spectra.
5. Solubilization studies in CTAB, SDS, and Tx-100.
6. Inclusion complexation with β-cyclodextrin.
Concluding remarks and Publications/Posters presented.

073. MOHD. RASHID
Supervisors: Prof. S. C. Jain and Dr. Surendra Singh
Th 21057
Contents

1. Synthesis and antimicrobial activity of novel methyl 2-methoxy-6-substitutedbenzoates
2. Design and synthesis of some novel methyl 2-methoxy-6-(7-N/S-heterocyclyl-1-(phenylsulfonyl)heptyl)benzoates and their antimicrobial activity.
3. Synthesis of some new 4-[(6-4-(((N/O-heterocyclyl)methyl)-1H-1,2,3-triazol-1-yl)hexyl)-2H-benzo[b][1,4]oxazin-3(4H)-ones with their antimicrobial evaluation
4. Synthesis and biological activity of 4-((5-(((1-aryl-1H-1,2,3-triazol-4-yl)methyl(thio)-1,3,4-oxadiazol-2-yl)methyl)-2H-benzo[b][1,4]oxazin-3(4H)-ones.

Summary.

074. PAL (Renu)
Supervisor : Dr. Anil Kumar Nain
Th 21053

Contents

1. Introduction
2. Experimental
3. Volumetric, ultrasonic and viscometric behavior of l-histidine in aqueous-glucose solutions at different temperatures
4. Study of solute-solute and solute-solvent interactions of l-histidine in aqueous-sucrose solutions at different temperatures using volumetric, ultrasonic and viscometric methods
5. Physicochemical studies of solute-solute and solute-solvent interaction of l-threonine in water and water +glucose solutions at 293.15, 298.15, 303.15, 308.15, 313.15 and 318.15 K
6. Thermodynamic and physicochemical studies of solute-solute and solute-solvent interactions of l-threonine in water and aqueous-sucrose solutions at different temperatures
7. Study of solute-solute and solute-solvent interactions of l-phenylalanine in water and water +arabinose/glucose/sucrose (2.5%, 5%) solutions at different temperatures
8. Investigation of solute-solute and solute-solvent interactions and group contributions of glycine/ l-alanine/l-valine/l-isoleucine in water + aqueous-streptomycin (1%, 2%) solutions at different temperatures.
Summary and List of Publications.
075. PRAMOD KUMAR

*Synthesis of Core and Core-Shell Inorganic Nanoparticles for Application in Drug Delivery.*

Supervisor: Dr. Indrajit Roy

Th 21355

Contents

1. Introduction  
2. Literature review  
3. Experimental and characterization techniques  
4. Preparation and characterization of gold nanospheres and nanorods, with potential application in catalysis and light-activated therapy  
5. Preparation and characterization of superparamagnetic Iron-Oxide nanoparticles for magnetically guided drug delivery  
6. Preparation and characterization of organically modified silica (Ormosil) nanoparticles as a sustained release drug delivery vehicle  
7. Preparation and characterization of a Dual-Modality, core (Iron-Oxide)-Shell (Ormosil) nanoprobe, co-encapsulating a fluorophore, for application in In vitro bioimaging.  
8. Conclusion and list of publication.

076. PRASHANT KUMAR


Supervisor: Dr. S. Uma

Th 21353

Contents

1. Introduction  
2. Characterization techniques  
3. Copper-Sulfur system  
4. Iron-Sulfur system  
5. Copper-Iron-Sulfur system  
6. References and publications.

077. RAVINDER KUMAR


Supervisor: Prof. Pavan Mathur

Th 21042

Contents

1. Introduction  
2. Principles of techniques employed for characterizing schiff base ligands and their copper (II) complexes  
3. Synthesis, structural and spectral characterization

078. REENA

**Design, Synthesis and Biological Studies of Some Novel Pyridine and Triazole Based Heterocycles.**

Supervisor: Prof. S. C. Jain

**Contents**

1. Synthesis of some novel pharmacophores using sulfone chemistry 2A. Synthesis of some biologically active novel (E)-1-(5-methyl-1-(pyridin-3-yI)-1H-1,2,3-triazol-4-yl)-3-aryl-prop-2-en-1-odnes. 2B. Synthesis and biological evaluation of some new triazolopyridines bearing peptide bond 3A. Design and synthesis of N’-(indolinylidene/arylidene)-5-methyl-1-(pyridin-3-yI)-1H-1,2,3-triazole-4-carbohydrazides in aqueous medium. 3B. Synthesis of some novel 4-arylidnamino-5-(5-methyl-1-(pyridin-3-yI)-1H-1,2,3-triazol-4-yl)-4H-1,2,4-triazole-3-thiols of biological importance 4. Synthesis of some novel peptidic thiazoles and oxadiazoles of biological interest 5. Design, synthesis and antimicrobial evaluation of some novel triazoles using click chemistry. Summary.

079. SALUJA (Pooja)

**Synthesis of Heterocycles Using DBU, Gl. AcOH and TSIL, their Photophysical and Biological Studies, and Oxidations Catalyzed by La(OTf).**

Supervisor: Prof. J. M. Khurana

**Contents**

acetic acid catalyzed three component condensation and evaluation of their antimicrobial activities. 5. Lanthanum triflate catalyzed rapid oxidation of 1,2-diols, α-hydroxyketones and alcohols with urea-hydrogen peroxide (UHP) in ionic liquid. 6. Summary and conclusions.

080. SANJEEV KUMAR
Synthesis and Characterization of Cobalt and Ruthenium Dithiocarbamate Coordination Polymer Nanoparticles and their Application in Photovoltaics, Sensing and Targeted.
Supervisor: Dr. Raj Kishore Sharma
Th 21351

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081. SHARMA (Vivek Kumar)
Chemo-enzymatic Synthesis of C-4'-Spiro- & Locked-ribonucleosides and Efficient Route to Mercaptoacetamido- & Triazolo-linked sugar Modified Nucleoside Dimers.
Supervisor: Prof. Ashok K. Prasad
Th 21062

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082. SINGH (Harjinder)
Synthesis of Substituted-1,2,3-Triazoles, their Conjugates and Evaluation of Biological and/or Photophysical Properties.
Supervisor: Prof. J. M. Khurana
Th 21038
1. 1,2,3-triazoles: A versatile tool for developing novel molecules with biological and industrial applications: A brief review  
2. Efficient, green and regioselective synthesis of 1,4,5-trisubstituted-1,2,3-triazoles in ionic liquid [bmim]BF$_4$ and in TSIL [bmim]OH 3. Ultrasound promoted one pot synthesis of novel fluorescent triazolyl spirocyclic oxindoles using DBU based TSILs and their antimicrobial activity 4. A facile eco-friendly one pot five-component syntheses of novel 1,2,3-triazole linked pentasubstituted-1,4-dihydropyridines and their biological and photophysical studies 5. Efficient one pot synthesis of xanthene-triazole-quinoline/phenyl conjugates and their antimicrobial activity 6. Syntheses, biological evaluation and photophysical studies of novel 1,2,3-triazole containing azo dyes 7. Determination of dipole moment, solvatochromic studies and application as turn off-on fluorescence chemosensor of new 3-(4-(dimethylamono)phenyl)-1-(5-methyl-1-(naphthalen-1-yl)-1H-1,2,3-triazol-4-yl)prop-2-en-1-one 8. Summary and conclusions.

083. SINGH (Henam Premananada)  
**Synthesis of Some Inorganic Nanoparticles and their Applications as Catalyst, MRI Contrast and Drug Delivery Agents.**  
Supervisor: Dr. Rakesh Kumar Sharma  
Th 21059

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084. SOHAIL AHMAD  
**Chemical Studies of Selected Synthetic Porphyrinoids and Core Modified Porphyrinoids.**  
Supervisor: Prof. S. M. S. Chauhan  
Th 21060

**Contents**

1. Synthesis of 5,10,15,20-tetraarylporphyrinatoiron(III) chlo-

085. SRIVASTAV (Shruti)
**Modeling for Chronoamperometry, Chronocoulometry, Potential and Light Modulated Admittance for Stochastically Rough Electrode in Moderately Supported Conditions.**
Supervisor : Prof. Rama Kant
Th 21055

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086. VANDANA
**Transition Metal Complexes of Some Schiff’s Base Ligands : Synthesis, Spectral Characterization and Biological Studies.**
Supervisor : Dr. Sulekh Chandra
Th 21050

**Contents**
1. Introduction 2. Synthesis and characterization of semicarbazone

087. VIKRAM SINGH

Copper Complex Based Monolayers for DNA Cleavage.
Supervisor: Dr. Satish K. Awasthi
Th 21352

Contents

1. Introduction: An overview of copper complex based nuclease activity and DNA cleavage on solid support. 2. Synthesis of polypyridine and imidazole based copper complexes. 3. DNA binding and cleavage activity of copper complexes. 4. Fabrication of monolayers and their nuclease activity. 5. Further perspective of the monolayers.

088. YOGESH KUMAR

Microwave-Assisted, D-Glucose Mediated Synthesis of Triazoles, Triazolylated-Benzimidazoles and Triazolylated-Thiazolidinones.
Supervisor: Dr. B. K. Singh
Th 21052

Contents

1. Microwave-assisted, D-glucose mediated copper(I) catalyzed triazoles synthesis. 2. Microwave-assisted, D-glucose mediated copper(I) catalyzed, one-pot, three-component 1,2,3-triazolylated-benzimidazoles synthesis. 3. Microwave-assisted, D-glucose mediated copper(I) catalyzed, one-pot, four-component triazolylated-thiazolidinones synthesis. Summary.