

Synthesis and characterization of UO_2^{VI} , ZrO^{IV} and VO^{IV} complexes with Schiff base macrocyclic tetradentate ligand and their derivatives with chloroacetic acid

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Manuscript received 28 January 2008, revised 22 September 2008, accepted 25 September 2008

Abstract : A series of complexes of the type $[\text{M}(\text{L})(\text{NO}_3)_2] \cdot m\text{H}_2\text{O}$ and $[\text{VO}(\text{L})(\text{SO}_4)] \cdot 2\text{H}_2\text{O}$, where L is a Schiff base "2,3,5,6,10,11,13,14-octaaza-1,7,9,15-tetramethyl-1,6,9,14-cyclohexadecatetraene-4,12-dithione" derived from thiocarbo-hydrazide and acetylacetone have been synthesized. Reaction of these complexes with monochloroacetic acid yielded another series of complexes of the type $[\text{M}(\text{L}')(\text{NO}_3)_2] \cdot m\text{H}_2\text{O}$ and $[\text{VO}(\text{L}')(\text{SO}_4)] \cdot 2\text{H}_2\text{O}$, where L' is another Schiff base "4-oxo-2,3,4,5-tetrahydrothiazolo[2,3-b]-2',3',5',6',10',11',13',14'-octaaza-1',7',9',15'-tetramethyl-1',4',6',9',14'-cyclohexadecapentaene-12'-thione" obtained after cyclization with chloroacetic acid, where $\text{M} = \text{UO}_2^{\text{VI}}$ and ZrO^{IV} ; $m = 2$ and 3 . All the complexes are characterized on the basis of elemental analysis, thermal analysis, molar conductivity, magnetic moment, electronic, infrared, ^1H NMR and ESR spectral studies. The results indicate that the VO^{IV} ion is penta coordinated yielding paramagnetic complexes where as UO_2^{VI} , ZrO^{IV} ions are hexa coordinated yielding diamagnetic complexes of above stoichiometry.

Keywords : Schiff base, electronic, infrared spectra, ESR spectra, ^1H NMR spectra.

Synthetic, spectral and antimicrobial activity studies of first row transition metal complexes derived from lansoprazole drug

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Manuscript received 22 May 2008, accepted 25 September 2008

Abstract : Transition metal complexes of ZrO^{II} , VO^{II} , Mn^{II} , Fe^{III} , Co^{II} , Ni^{II} , Cu^{II} , Zn^{II} , Cd^{II} and Hg^{II} have been synthesized with lansoprazole drug, that is 2-[3-methyl-4-(2,2,2-trifluoroethane)-2-pyridyl)methyl]sulphonyl benzimidazole. Elemental analysis suggest that these metal ions forms ML_2Cl_2 stoichiometry for Mn^{II} , Fe^{III} , Co^{II} , Ni^{II} , Cu^{II} , Zn^{II} , Cd^{II} and Hg^{II} and ML_2 (metal-ligand) stoichiometry for ZrO^{II} and VO^{II} . These complexes are non-electrolytic in nature. The ligand behaves as bidentate ON donor and forms coordinate bonds through C=N and S=O groups. Magnetic susceptibility, IR, UV-Visible and ESR spectral studies suggest that Mn^{II} , Fe^{III} , Co^{II} , Ni^{II} , Cu^{II} , Zn^{II} , Cd^{II} and Hg^{II} complexes posses octahedral geometry, whereas, ZrO^{II} and VO^{II} exhibit square pyramidal geometry. The ligand and its complexes were tested for their antimicrobial activity against *Klebsiella*, *Pseudomonas arginosa*, *Aspergillus niger* and *Aspergillus flavous*.

Keywords : Lansoprazole, antimicrobial activity, electrical conductivity, transition metal complexes, ESR.

Synthesis, spectral and thermal studies of copper(II) complexes of azodyes derived from 2,3-dimethyl-1-phenyl-4-amino-5-pyrazolone

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Manuscript received 11 January 2008, revised 14 July 2008, accepted 21 October 2008

Abstract : Some novel metal complexes of copper(II) with azodyes derived from 4-aminoantipyrine and *p*-bromophenol have been synthesized and characterized by elemental analysis, IR, UV-Visible and ESR spectra, thermal studies, magnetic and conductance measurements. The X-ray diffraction patterns of the complex [Cu(PBPAAP)(NCS)(Cl)] (where PBPAAP = parabromophenolazoantipyrine) have been examined and were indexed. The results show that the complex belongs to the orthorhombic crystal system with unit cell dimensions : $a = 7.21 \text{ \AA}$, $b = 9.77 \text{ \AA}$ and $c = 12.65 \text{ \AA}$. The ligands are found to behave in a neutral bidentate manner. The X-band ESR spectra of the complex [Cu(PBPAAP)(CH₃COO)₂] shows an axial ligand field symmetry. All the complexes show square planar geometry with magnetic moments ranging from 1.79 to 1.85 B.M.

Keywords : Cu^{II}, azodyes, thermal studies.

Cyclic voltammetric and spectral studies of some mixed-ligand copper(II) complexes involving 2,2'-bipyridine/1,10-phenanthroline and amino acids

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Manuscript received 10 September 2007, revised 24 October 2008, accepted 27 October 2008

Abstract : Cyclic voltammetric and electronic spectral studies of some mixed ligand copper(II) complexes, viz. [Cu(bipy)(glu)], 1; [Cu(bipy)(tyro)]Cl, 2; [Cu(phen)(asp)], 3; [Cu(phen)(glu)].2H₂O, 4 and [Cu(phen)(tyro)]Cl.H₂O, 5 (where, bipy = 2,2'-bipyridine, phen = 1,10-phenanthroline, asp = L-aspartate dianion, glu = L-glutamate dianion and tyro = L-tyrosinate anion) have been studied in aqueous medium at pH 5.0. All these complexes displayed a single-electron redox couple (Cu^{2+/+}) in the potential range +1000 to -400 mV vs Ag/AgCl. The cathodic peak potential shifts positively with increasing scan rate (ν) and peak current ratio (I_{pa}/I_{pc}) is greater than 1.0, representing a decrease in dissolved Cu^I species near the electrode surface because of weak adsorption of the reduced species at the surface of working electrode in the case of phen mixed ligand complexes, 3 to 5. It is important to note that for a given amino acid, the reduction potential (E_{pc}) of these mixed ligand Cu^{II} complexes is less negative for the phen complex than the bipy complex (1 vs 4 and 2 vs 5), owing to the stronger *p*-acceptor character of phen over bipy.

Keywords : Electrochemistry, cyclic voltammetry, bipyridine, phenanthroline, mixed ligand Cu^{II} complexes, amino acids.

Synthesis and characterization of mixed ligand complexes of zinc and cadmium ions with some nitrogen and sulphur donors

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Manuscript received 8 September 2008, accepted 16 September 2008

Abstract : Mixed ligand complexes of Zn^{II} and Cd^{II} ions with 1-cyano-1-carboethoxyethylene-2,2-dithiolate [CED²⁻, {S₂C=C(CN)(COOC₂H₅)₂}²⁻] as a primary ligand and *o*-phenylenediamine (OPD), pyridine (py), *a*-picoline (*a*-pic), *b*-picoline (*b*-pic) or *g*-picoline (*g*-pic) as secondary ligands have been synthesized and characterized on the basis of analytical data, molar conductance, infrared and ¹H NMR spectral studies. The molar conductance data reveal that all the complexes have non-electrolytic nature in DMF solution. Infrared spectral studies suggest bidentate chelating behaviour of CED²⁻ ion and OPD while other nitrogen donors show unidentate behaviour in its complexes.

Keywords : Mixed ligand complex, cadmium, zinc.

Synthesis and fungicidal activity of 4,4'-bis[2''-(aryl/alkylimino)-4''-oxothiazolin-3''-yl-acetamidoxy]bibenzyls and 4,4'-bis(oxadiazolylmethoxy)bibenzyls

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Manuscript received 2 February 2007, revised 11 July 2008, accepted 24 September 2008

Abstract : Chemoselective facile synthesis of novel 4,4'-bis[2''-(aryl/alkylimino)-4''-oxothiazolin-3''-ylacetamidoxy]-bibenzyls (5a-e) and 4,4'-bis(oxadiazolylmethoxy)bibenzyls (6a-e) are reported. Cycloaddition of chloroacetic acid on 1,2-bis[4-(2-oxo-substituted-2-thiosemicarbazinoethoxy)phenyl]ethane (4a-e) yielded (5a-e) and cyclisation of (4a-e) in presence of iodine in KI gave (6a-e). These compounds have been evaluated for their antifungal activity.

Keywords : Bibenzyl, bryophytes, anticonvulsant, thiosemicarbazides, *Aspergillus niger*, *Fusarium oxysporum*.

Synthesis of tetraaza macrocyclic Pd^{II} complexes; antibacterial and catalytic studies

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Manuscript received 25 January 2008, revised 11 September 2008, accepted 16 September 2008

Abstract : A series of new Schiff base Pd^{II} complexes of the type [Pd(L)]X₂ [where, L = HBOADO, TBACD, OBACD, HBOADT, DBACDT, TBAHD and X = Cl⁻] have been synthesized by non-template method. The complexes were characterized with the help of elemental analyses, conductance measurements, magnetic measurements, infrared, NMR (¹H, ¹³C), mass, electronic spectral studies and thermal analysis. Based on the spectral data, square-planar geometry is tentatively proposed to all the complexes. The biological activities of these complexes have been tested *in vitro* to evaluate their activity against Gram +ve and Gram -ve bacteria and were found to be more active than streptomycin and ampicillin. [Pd(HBOADO)]Cl₂ and [Pd(OBACD)]Cl₂ complexes were studied on the catalytic reduction reactions of 2-nitroanisole, 3-nitroanisole, 4-nitroanisole, 2-nitrobenzoic acid, 3-nitrobenzoic acid, 4-nitrobenzoic acid under mild conditions. The reduced products were treated with nitrous acid followed by b-naphthol and the developed colored products were determined spectrophotometrically. [Pd(HBOADO)]Cl₂ is found to be more efficient than [Pd(OBACD)]Cl₂.

Keywords : Synthesis, macrocyclic, palladium(II), antibacterial, catalytic studies.

Spectrophotometric determination of mercury(II) in water, soil and biological samples using heterocyclic thiosemicarbazones

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Manuscript received 17 June 2008, revised 23 October 2008, accepted 23 October 2008

Abstract : Analytical applications of 2-acetylpyridine-4-methyl-3-thiosemicarbazone (APMT) and 2-acetylfuran thiosemi-carbazone (AFT) are reported for the first time. The reagents have been synthesized and characterized using IR and NMR spectral data. APMT and AFT have been used for the spectrophotometric determination of mercury (II). The reagents give yellow colour with mercury (II) in sodium acetate-acetic acids buffers. Many cations and anions do not interfere in the determination of mercury. The methods were successfully applied to a number of water (potable and polluted), biological and soil samples containing mercury (II). The results of the proposed method in the analysis of samples are comparable with those obtained by dithizone method. The methods have high precision and accuracy (*s* = 0.007 and 0.018 for 4 ng/mL in APMT and AFT methods respectively).

Keywords : Spectrophotometry, mercury determination, heterocyclic thiosemicarbazones, environmental, biological and soil samples.

Chemical equilibrium studies on some bivalent transition metal chelates of biologically active molecules (drugs)

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Manuscript received 27 May 2008, revised 22 September 2008, accepted 25 September 2008

Abstract : Stability constants of metal chelates of dicyclomine hydrochloride (dcm), metformin hydrochloride (mfm) drugs with the Co^{II}, Ni^{II} and Cu^{II} transition metal ions have been evaluated pH metrically in aqueous solution at 25 °C and 0.1 M (NaClO₄) fixed ionic strength. Proton ligand stability constant and metal ligand stability constant were determined by Calvin-Bjerrum pH titration techniques as modified by Irving and Rossotti.

Keywords : Transition metal complex, stability constant, ligand.

Formation constants and thermodynamic parameters of some tri-ligand complexes of lanthanides

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Manuscript received 30 June 2008, revised 15 October 2008, accepted 23 October 2008

Abstract : Potentiometric evidences have been cited for the formation of 1 : 1 : 1 : 1; MLL₂L² quaternary complexes [M^{III} = La^{III}, Pr^{III} and Nd^{III}, L = ethyleneglycol-bis(b-aminoethylether)-N,N,N',N'-tetraacetic acid (EGTA), L¹ = pyridine-2,6-dicarboxylic acid (PDA) and L² = 2,2'-dithiodisalicic acid (DTSA)] have been studied potentiometrically with a view to determine their formation constants, thermodynamic parameters and to explore and confirm the possibility of their expanded coordination number. The formation constants log K_{MLL₂L²} and log K_{MLL₂L²} for the resulting ternary and quaternary complexes at constant ionic strength (m = 0.05 KNO₃) and different temperatures (15 ± 0.1 °C, 25 ± 0.1 °C, 35 ± 0.1 °C and 45 ± 0.1 °C) have been evaluated. The order of formation constants with respect to Ln^{III} ions has been found to be La^{III} < Pr^{III} < Nd^{III} for both ternary and quaternary complexes whereas ternary < quaternary for mixed-ligand complexes.

Keywords : Stability constant, lanthanides, ternary complexes, quaternary complexes.

The comparative studies of micellization and electrolytic behaviour of dysprosium soaps in methanol

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Manuscript received 23 April 2008, revised 15 October 2008, accepted 23 October 2008

Abstract : Dysprosium butyrate, valerate, myristate and stearate behave as weak electrolyte in dilute solutions. The critical micelle concentrations (CMC) of dysprosium soaps in methanol have been determined by conductometric measurement. The value of CMC decreases with increasing chain length of fatty acid component. The molar conductances at infinite dilution and degree of ionization have been evaluated.

Keywords : Dysprosium soaps, weak electrolyte, conductivity, critical micelle concentration.

Voltammetric study of copper(I)-thiuram disulphide reaction and its application to the determination of thiuram disulphides

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Manuscript received 22 May 2008, revised 26 September 2008, accepted 23 October 2008

Abstract : The reaction between thiuram disulphide and copper(I) perchlorate (1 : 1 molar ratio) in acetonitrile has been investigated voltammetrically with a view to arrive at a convincing mechanism of this reaction. The cyclic voltammetric study of this reaction showed the formation of a new product most plausibly copper(III) dithiocarbamate complex. Prompted by the observation that the new complex afforded analytically useful diffusion-controlled peaks at -85 to -120 mV (vs SCE) in differential pulse polarography, a new method has been developed for the microdetermination of thiuram disulphides.

Keywords : Thiuram disulphides, copper(I) perchlorate, cyclic voltammetry, pulse polarography.

Flavonoids of *Zizyphus rugosa*

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Manuscript received 28 May 2008, accepted 17 September 2008

Abstract : Three flavonoids – kaempferol-4-methylether, luteolin and luteolin-7-*O*-glucoside have been isolated from the barks of *Zizyphus rugosa* and their structures were established by spectral evidences. This is the first report of these flavonoids from *Z. rugosa*.

Keywords : *Zizyphus rugosa*, flavonoids.

Chemoselective acylation of amines, thiols and phenols using 2,4,6-triacyloxy-1,3,5-triazine (TAT) as a new and effective reagent under mild condition

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Manuscript received 14 November 2007, revised 30 June 2008, accepted 24 September 2008

Abstract : A facile chemoselective acylation of amines, thiols and phenols using 2,4,6-triacyloxy-1,3,5-triazine (TAT) under mild condition is described. New reagent, high product yield, short reaction time, ease of operation and solvent free reaction condition is the most acceptable feature of the present method.

Keywords : Thiol, phenol, amine, acylation, chemoselective.

Structural elucidations in flavones using ^1H NMR 3-oxygenation shifts

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Manuscript received 9 April 2008, revised 2 September 2008, accepted 21 October 2008

Abstract : A comparison of ^1H NMR (CDCl_3) of 3-acetoxyflavone with that of corresponding 3-deacetoxyflavone shows that the H-2 α and H-6 α of the both have comparable values. The observation is useful for structural studies in naturally occurring flavones.

Keywords : Flavones, ^1H NMR, oxygenation.

Synthesis, antitubercular and antimicrobial activity of some new *N*-aryl-1,4-dihydropyridines containing furan nucleus

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Manuscript received 27 August 2008, accepted 21 October 2008

Abstract : A wide range of biological activities are associated with 1,4-dihydropyridines individually or in combination. The synthesis of *N*-aryl-2,6-dimethyl-3,5-dicarbomethoxy-4-[5 α -(*m*-chloro-*p*-fourophenyl)-2 α -furyl]-1,4-dihydropyridines (6a-j) and *N*-aryl-2,6-dimethyl-3,5-dicarbomethoxy-4-[5 α -(*m*-chloro-*p*-fourophenyl)-2 α -furyl]-1,4-dihydropyridines (7a-j) was under-taken with hope that they may be biologically active molecules with improved activity, less toxicity and undesirable side effects. The newly synthesized compounds were characterized on the basis of elemental analysis, IR, ^1H NMR and mass spectral data. All newly synthesized compounds were tested for their antitubercular activity against *Mycobacterium tuberculosis* H₃₇RV ATCC 27294, antibacterial activity against different Gram +ve and Gram-ve bacteria and antifungal activity.

Keywords : *N*-Aryl-1,4-dihydropyridines, antitubercular activity, antimicrobial activity.

Standardisation of Fenugreek extract using 4-hydroxyisoleucine as a marker compound

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Manuscript received 20 December 2005, revised 7 August 2006, accepted 23 October 2008

Abstract : 4-Hydroxyisoleucine is reported as bioactive compound, which is responsible for antidiabetic activity of Fenugreek. Our present work includes standardization and preparation of different extracts, which are enriched with 4-hydroxyisoleucine. The paper includes some unexpected observation in extraction pattern of 4-hydroxyisoleucine with different solvents. The quantitative estimation of 4-hydroxyisoleucine is done by spectrophotometry on the basis of its reaction with ninhydrin.

Keywords : 4-Hydroxyisoleucine, antidiabetic, herbal, extraction, HPTLC, spectrophotometry.

Evaluation of antimicrobial and diuretic activities of some new synthesized : 5-(substituted arylidenes)-2-(substituted aryl)-3-(4-nitrophenoxy acetamido)-4-oxo-thiazolidines derivatives

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Manuscript received 21 February 2008, revised 6 August 2008, accepted 24 September 2008

Abstract : Twenty seven new arylidino phenoxy acetamido 4oxo-thiazolidine derivatives were synthesized and evaluated for their antimicrobial and diuretic activities. The structures of all newly synthesized compounds have been determined by elemental analysis, IR, ¹H NMR and mass spectroscopic techniques. Some of the compounds shows good pharmacological results.

Keywords : Antimicrobial, diuretic, nitrophenoxy acetamido thiazolidines.

Arid zone plants as natural antioxidant agents

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Manuscript received 12 May 2008, accepted 16 September 2008

Abstract : Methanol and dichloromethane extracts of flowers for total phenolic content along with antioxidant potential were examined using 2,2-diphenyl-1-picrylhydrazyl radical (DPPH) solution-based chemical assay of 15 medicinally important arid zone plants. The results showed that of all these extracts, highest total phenolic content was observed in *Acacia nilotica* (58.60 ± 0.40 GAE/100 g FW) followed by *Tephrosia hamiltonii* (52.00 ± 0.41 GAE/100 g FW). Likewise, each studied extract demonstrated potential antioxidant activity but the highest activity was recorded in dichloromethane extract of *T. hamiltonii* ($RC_{50} = 5.5$ mg/ml) and in methanol extract of *Calotropis procera* ($RC_{50} = 4.5$ mg/ml). All the arid zone plants selected in this study exhibited stronger antioxidant activity and significantly higher levels of total phenolics, which may prove to be potential natural sources of potent antioxidant and beneficial chemopreventive agents.

Keywords : Arid zone plants, total phenolics, antioxidant agents.

In vitro antioxidative property of polyphenols present in two common aquatic leafy vegetables

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Manuscript received 25 June 2008, accepted 16 September 2008

Abstract : *Enydra fluctuans* Lour. (Hinch or helencha) and *Ipomea aquatica* Forssk. (Kalmisak) are traditionally consumed as leafy vegetables by the Indians. But little is known about its potential as sources of antioxidants. The 80% methanol extraction of these two vegetables showed the polyphenol content of 30.7 and 18.42 mg per g of dry matter. Both the extracts have shown reducing activity, DPPH radical scavenging activity and prolonged ABTS^{•+} radical scavenging activity. The result of the study indicates that the above vegetables are rich in active polyphenolic antioxidants, which are very much important from nutritional point of view.

Keywords : *Enydra fluctuans*, *Ipomea aquatica*, polyphenol, antioxidant.
