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SYNTHESIS, CHARACTERIZATION AND BIOCHEMICAL STUDIES OF SOME MIXED COMPLEXES OF BISMUTH(III) BIS (PYRROLIDINEDITHIOCARBAMATO) WITH THIO AND OXO DONOR LIGANDS

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Abstract : Some complexes of Bi(III) bis(pyrrolidinedithiocarbato) have been prepared along with the thio and oxo donor ligands and their physical and chemical properties were analyzed to study structural diversity. Analyses with UV-visible, IR and proton and carbon resonance have shown the distorted octahedral geometry of these newly synthesized complexes as well as their thermal degradation (TGA) depicts the formation of bismuth sulfide as a final decomposition product. New complexes have also been studied for their biochemical activity and their activity was compared with the free ligands and standard drugs (chloramphenicol as standard antibacterial and terbinafine as standard antifungal drug). These complexes have shown significantly enhanced biochemical activities.

Keywords : Pyrrolidinedithiocarbamate, Oxo, Thio, Thermal studies, Biochemical studies

Introduction :

Dithiocarbamates have been one of the most significant topic of the research interest as they posses geometrical and structural specifications with a variety of commercial applications in many fields (1). Association of dithiocarbamates with group XV metals increases their biochemical as well as commercial efficiency and activities (2). To study this phenomenon some complexes of dithiocarbamates with Bi(III) have been synthesized and characterized for their physicochemical properties(Elemental analysis, molecular weight determination and melting point determination), spectral studies (UV-vis, FT-IR, proton and carbon resonance) for structural aspects and thermograviametric analysis to study thermal properties. These new complexes have also been screened for their biochemical potential using well diffusion method (3).

Materials and Methods :

Solvents were purified using reported metnods (4) and all oxygen and sulfur donor ligands (E. Merck and Fluka) were used as they received. Preparation of Metal procurer bismuth(III) bis(pyrrolidinedithiocarbamato) was done using the reported method (5).

Analytical Methods and Physical Measurements :

Estimation of Bismuth and sulfur were performed in our lab through standard methods (6, 7). Elemental analyses of C, H and N have been performed in CDRI, Lucknow. Infrared at Anusandhan Lab., Rau, Indore and UV-vis. has been carried out at School of Pharmacy, DAVV respectively. Analysis of NMR (^{1}H and ^{13}C) has been done at IISER, Bhopal. Biochemical screening were executed at School of Biotechnology, DAVV, Indore

Preparation of chlorobis(pyrrolidinedithiocarbamato) bismuth(III) :

The acetonitrile (~40 ml) solution of bismuth(III) tris(dipyrrolidinedithiocarbamate) (7.68 g) was mixed to the acetonitrile (~30 ml) solution of bismuth trichloride (1.87 g) in 1:2M ratio. Contents were refluxed for ~5 h and the solvent was removed under reduced pressure, a yellow coloured solid obtained. Dichloromethane was used to recrystallized the obtained product (8).

Yield: 9.07g (95%), Colour: Yellow

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REMOVAL OF NI (II) FROM AQUEOUS SOLUTION BY LEUCAENA LEUCOCEPHALA (SUBABUL) SEED PODS: EQUILIBRIUM AND KINETIC STUDIES

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Abstract : A low cost eco-friendly adsorbent, in the form of fine powder, was developed from abundantly available Leucaena leucocephala (Subabul) seed pods (LLSP). The adsorption process have been carried out in a batch process as a function of pH (2 to 7), contact time (10 to 60 min), initial Ni (II) solution concentrations (10 to 60 mg/l) and adsorbent doses (6 to 8 g/l). Maximum Ni (II) adsorption was found to occur at pH 5. It has been observed that 93 % Ni (II) was removed from 10 mg/l dye solution using 8 g/l adsorbent dose. Equilibrium isotherm data were analyzed according to Langmuir and Freundlich equations. The characteristic parameters for each model have been determined.

Keywords : Adsorption; Ni (II), Leucaena leucocephala, low-cost adsorbent, adsorption kinetics

Introduction :

Among heavy metals, nickel is one of the most utilized in the manufacturing process of stainless steel, super alloys, metallic alloys, coins, batteries etc. Direct exposition to nickel causes dermatitis. Some nickel compounds, as carbonyl, are carcinogenic and easily absorbed by skin (1). Acute poisoning of Ni (II) causes headache, dizziness, nausea and vomiting, chest pain, tightness of the chest, dry cough and shortness of breath, rapid respiration, cyanosis and extreme weakness (2, 3).

Adsorption is one of the more popular methods for the removal of metals ions from the aqueous solutions. In recent years, numerous studies have been conducted to achieve low-cost, efficient and environmentally friendly adsorbents. Among the low-cost adsorbents, agricultural wastes are the most widely used bio-adsorbents for removing heavy metals and dyes (4). Plant material is easily available and relatively inexpensive, an investigation of its use as an adsorbent seems most appropriate. Earlier researchers used different plant materials such as Delonix regia (Gulmohar) tree bark,, lotus leaf, pomegranate peel, garlic peel, rice bran, cotton plant wastes (5-10) for metal removal from wastewater.

In this study, remove Ni (II) form aqueous solution by Leucaena leucocephala (Subabul) seed pods (LLSP) was studied by a batch technique. The optimum adsorption conditions were determined as a function of initial pH, contact time, initial metal ion concentration and adsorbent dose.

Materials and methods :

Preparation of adsorbent :

Leucaena leucocephala (Subabul) seed pods were collected from a local farm and dried in the sun for 3 to 4 days. The pods were ground to get desired particle size of 100 to 150 μm. The LLSP was washed several times with distilled water till the wash water became colorless and then oven dried at 50^0C for 24 hrs and stored for the study

Preparation of solutions :

All the reagents used were of AR grade.

Ni (II) solution :

Stock Ni (II) solution (1000 mg/l) was prepared by dissolving 4.479 gm of A.R. grade nickel sulphate $NiSO_4$, $6H_2O$ in 1000 ml distilled water. The solutions of lower concentrations were prepared by dilution of appropriate volume of stock solution.

Dimethylglyoxime :

1 gm of dimethylglyoxime was dissolve in 100 ml of

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SYNTHESIS, SPECTRAL STUDIES AND ANTIBACTERIAL SCREENINGOF A NEW MANNICH BASES DERIVED FROM (2R)-2-AMINO-3-(CARBOXYMETHYLSULFANYL) PROPANOIC ACID

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Abstract : In the present study, by following Mannich reaction with the help of primary and secondary amines a new series of Mannich bases of (2R)-2-amino-3-(carboxymethylsulfanyl) propanoic acid were prepared. The structural identification and characterization was made using different elemental analysis and spectral techniques. All newly synthesized product were screened for their antimicrobial activity against different bacteria. Result explain the newly synthesized compound have more potent than their parent compound.

Keywords : Mannich reaction, Mannich base, primary amine, secondary amine, (2R)-2-AMINO-3-(CARBOXYMETHYLSULFANYL) PROPANOIC ACID.

Introduction :

Since the discovery of first antibiotic penicillin, to date, medicinal chemistry provide vast area to researcher to synthesize new drugs. The main principal of new drug design is to develop or synthesize a new drug which have more therapeutic values and less toxic effect and also safe for human and environment. In organic chemistry, there are so many reactions are perform for drug synthesis but in all these reactions Mannich reaction is one of the most prime reaction (1).

Tollens was first scientist who discover Mannich reaction, which is followed by Petrenko Krifs Chenko et al. finally Carl Mannich generalized this reaction so on the basis of name of Carl Mannich this reaction is known as Mannich reaction. When Carl Mannich was working in his laboratory at Gottingen University they performed reaction between acid, salicylantipyrine and urotropine then accidently Mannich reaction was happened.

The product of Mannich reaction is known as Mannich base. In recent times Mannich base acquire an important, beneficial and popular area of research because easy way to synthesis, adaptability and multiple range of applications. Mannich bases display pharmaceutical properties like (2-7) antipsychotic, anti-inflammatory, anticonvulsant, anesthetic, antitubercular, anthelmintic, antibacterial, antimicrobial activity, and antimalarial activities and also use in industrial field. (8-14).

Carbocysteine drug play as a role of mucolytic. It has free radical scavenging properties means, it is similar to the secondary antioxidants which is used to inhibit thermal oxidation. Carbocysteine also has anti-inflammatory properties.(15) It is use in the treatment of respiratory tract disorder and in chronic obstructive airways disease called COPD. It is administered orally in the form of capsule or syrup or in the form of inhaler or nasal spray.(16) Carbocysteine have free sulphydryl group which help to break the bond of mucus and reduce the viscocity of mucus.(17-18) Carbocysteine was first identify in 1951 and it was approve for medicinal use in 1960.(19) It was prepared by alkylation reaction of cysteine with chloroacetic acid. (20)

By the observation of different Mannich bases derived by joshi et al we found that they are more potent and less toxic then their parent sulphonamide. Keeping in view the

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EFFECT OF SODIUM ARSENITE ON SDH & LDH LEVEL OF DIFFERENCE SOFT TISSUES OF FRESH WATER TEREBIA LINEATA (GRAY)

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Abstract : Toxic effect of sodium arsenite (Sublethal Concentration) on LDH & SDH level of 3 tissue component (Foot, Mantle & hepatopancreas) of fresh water snail Terebia lineata. Arsenic has been associated with a multitude of health problem and various works to study its impact on different part of world. Once absorbed in to the body, arsenic undergoes some accumulation in soft tissue organism such as foot, mantle and hepatopancreas. Acute arsenic poisoning its inflamous for its lethality, which stems from arsenic destruction of the integrity of soft tissue of animals as well as human.

In present study the impact of sodium arsenite on LDH & SDH level of foot, mantle and hepatopancreas fresh water Terebia lineata. The snail exposed to 0.325 ppm sodium arsenite as acute treatment. There were significant decrease in overall SDH in all tissues of Terebia lineata. While LDH activity increased in mantle tissue but decreased in foot & hepatopancreas tissue. Whereas, the activity of SDH & LDH showed significant decrease on exposure to sodium arsenite.

Key word : Terebia lineata, Arsenic, Sodium arsenite, Foot, Mantle and Hepatopancreas.

Introduction :

Assenic compound cause acute effect in individuals, populations and communities at concentration ranging from a few microgram to milligrams per liter, depending on species, time of exposure and end points measured. If level of arsenate are high enough, only species which exhibit resistance may be present (9) centre for Hazardous substance research). Today arsenic consider as a serious toxicant metallic pollutant of wide health concern and is indiscriminately available in ground water by natural way and in agricultural run off an mining process by anthropogenic way (18).

Arsenic has its source from ground water enriched with arsenic, arsenic containing pesticides, mining operations and agricultural run off. Uptake of significant amount of inorganic arsenic can intensity the chances of cancer development especially skin cancer, Lung Cancer, Lung Cancer and lymphatic cancer (8). Arsenic induced biochemical changes in the liver tissues of fresh water fingerlings a fish Labeo rohita, was reported by (16).

In present investigation due to sodium arsenite toxicity showed overall decrease in the total SDH content in all the soft part tissue like foot, mantle and hepatopancreas of fresh water pros branch snail Terebia lineata while LDH activity increased in mantle tissue but decreased in foot & hepatopancreas.

Materials and methods :

For the laboratory study fresh water snails Terebia lineata were collected from Girna river near Jalgaon State Maharashtra, India. They were brought to the laboratory with river water. The snail were acclimatized in laboratory condition at room temperature for 4 to 6 days. The snail which was normal and active selected for experiment. The experiment conducted by using sodium arsenite for LDH and SDH activity. The animal were divided in to two groups, one kept as control and second was experimental. For acute treatment experimental animal were exposed to 0.325 ppm up to 96 hours. At the end of 24 hours / 48 hrs / 72 hrs and

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GC-MS ANALYSIS AND ANTIBACTERIAL ACTIVITY OF ACETONE EXTRACT OF JUSTICIA ADHATODA STEM

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Abstract : Synthetic antibacterial agents provide broad spectrum characteristics, but often associated with the adverse side effects on the host, including several allergic responses. Medicinal plants beers potent antibacterial potential, many of them used in traditional system of medicine. the Stem of Justicia adhatoda contains many secondary metabolites and phytochemicals. The present work is to evaluate the phytochemicals by GC-MS analysis of Justicia adhatoda Stems extract. The acetone extract were subjected to GC-MS analysis of phytochemicals using standard procedure. The result showed that the phytochemicals present in the acetone extract of Stems of J.adhatoda are alkaloid, fatty alcohol, heterocyclic derivatives, and phenols. responsible for its biological properties. From the present study it is noticed that Justicia adhatoda Stem have significant antibacterial activity. The antibacterial activity of stems acetone extract of Justicia adhatoda was found to be quite satisfactory.

Keywords : Antibacterial agents, Phytochemicals, Justicia adhatoda

Introduction :

Justicia Adhatoda is a vital multipurpose medicinal plant because its leaf, flower and root are used for many drug formulations in ayurveda. Synthetic antibacterial agents provide broad spectrum characteristics, but often associated with the adverse side effects on the host, including several allergic responses (1-3). Medicinal plants beers potent antibacterial potential, many of them used in traditional system of medicine (4). The Stems of Justicia adhatoda contains many secondary metabolites and phytochemicals. The present work is to evaluate the phytochemicals by GC-MS analysis of Justicia adhatoda Stems extract. The acetone extract were subjected to GC-MS analysis of phytochemicals using standard procedure.

Material and Methods :

Collection and extraction of plant materials -Sufficient quantity of Justicia adhatoda plants were collected from Sendhwa (west nimar) District Barwani, Madhya pradesh, India and were identified by Dr. Kishor panwar, Department of Botany, Govt. Holkar Science College, Indore. Plants were appropriately rinsed with distilled water to purge dust, dirt and other possible parasites and then were shade dried at 25-30^{0}C. The dried parts of stems were pulverized incoherently and then stored in clean, dried plastic bags for extraction. The dried stem material was crushed into fine powder. The 100 gm powder extracted in soxhlet apparatus with 400 ml Acetone. All the extracts were concentrated by distilling the solvent and dried after distillation.

Gas Chromatography Mass Spectrum (GC-MS) Analysis :

GC-MS technique was performed using SHIMADZU GC-MS-TQ8040 system and gas chromatograph interfaced to a Mass Spectrometer (GC-MS) equipped with Elite-I fused silica capillary column (Length: 30.0 m, Diameter: 0.32 mm, Film thickness: V.3.0 Is Composed of 100/0 Dimethyl poly siloxane). An electron Ionization energy system with ionization energy of 7 Ue was used. Helium gas (99.999%) was used as the carrier gas at a constant flow rate of 1.50 ml/min and an injection volume of 2μl was employed (split ratio: 20). Injector temperature 220°C: Ion-source temperature 250°C. The oven temperature was programmed

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SYNTHESIS, STRUCTURAL INVESTIGATION, THERMAL STUDY AND ANTIMICROBIAL STUDIES OF DERIVATIVES OF ARSENIC(III) BIS(PYRROLIDINEDITHIOCARBAMATE) WITH SOME OXYGEN AND SULFUR DONOR LIGANDS

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Abstract : To study the structural properties and their biochemical importance, some arsenic(III) bis(pyrrolidinedithiocarbamato) derivatives have been synthesized with oxygen and sulfur donor ligands and characterized through various physicochemical and spectral analyses (UV-vis., IR, ^{1}H and ^{13}C NMR and TGA). Their antimicrobial activity has also been evaluated. These new derivatives have been found to be in distorted octahedral geometry. Such derivatives tend to give arsenic sulfide as a last decomposition product which is a semiconductor material and useful in a number of electronic devices. Antimicrobial analysis has shown equal or greater antimicrobial activity on comparison with free ligands, standard antibacterial drug chloramphenicol and standard antifungal drug terbinafine.

Keywords : Arsenic(III), Pyrrolidinedithiocarbamate, Spectra, Thermal studies, Antimicrobial activities

Introduction :

Tremendous structural diversity, co-ordination geometries have attracted a significant attention towards the study of dithiocarbamates (1, 2). It is also because of their use in several industrial and biochemical processes. Main group metals tend to depict the diversified bonding with dithiocarbamates. Here some of As(III) derivatives of pyrrolidinedithiocarbamate with oxygen and sulfur donor ligands have been studied. After the synthesis these derivatives, their physicochemical properties (Elemental analysis, melting point and molecular weight determination) and spectral characteristics (UV-vis., IR, ^{1}H and ^{13}C NMR) have been analyzed. Thermogravimetric analysis reflects some important information after the degradation of derivatives. Dithiocarbamates have antimicrobial properties, hence a comparative study of antimicrobial activities of free ligands and arsenic(III) bis(pyrrolidinedithiocarbamato) derivatives have been performed using the chloramphenicol as a standard antibacterial drug and terbinafine as a standard antifungal drug (3).

Materials and Methods :

Metal precurer chlorobis(pyrrolidinedithiocarbamato) arsenic(III) has been prepared by the reported method (4). All solvents were dried through appropriate methods suggested in reported literature. Sulfur and oxygen donor ligands (E. Merck) have been used as received.

Analytical Methods and Physical Measurements :

Arsenic and sulfur were analysed using standard methods (6, 7). Analyses of C, H and N have been carried out CDRI, Lucknow. UV and IR were performed at School of Chemical Sciences, DAVV. NMR (^{1}H and ^{13}C) were analysed at IISER, Bhopal. Antimicrobial screening were executed at School of Biochemistry, DAVV, Indore

Preparation of chlorobis (pyrrolidinedithiocarbamato) arsenic(III) :

To the acetone solution (~30 ml) of arsenic trichloride (1.32g), acetone solution (~40 ml) of arsenic(III) tris(dipyrrolidinedithiocarbamate) (7.53g) was added in the

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SYNTHESIS, ANALYTICAL AND BIOLOGICAL ACTIVITY OF SOME NEW MN(Ⅱ) HYDRAZONE COMPLEXES

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Abstract : The new Mn (II) macrocyclic complexes the formulae M[DPODH](BF_4)2 and M[DCODH](BF_4)2 (where M = Mn(II), [DPODH] = 2,6-diacetyl pyridine-2,22 -oxydiacetoyl dihydrazone) [DCODH] = 2,6-pyridine dicarbonyl dichloride2,22 -oxydiacetoyl dihydrazone, BF_4 = tetrafluoro borate have been synthesized and their characteristics have analyzed by elemental analysis, spectral studies and magnetic measurements. These complexes have also been screened in vitro antimicrobially against specific bacteria Escherichia coli, Staphylococcus aureus and fungal strain Aspergillus Niger and Candida albicans. The results of the biological studies have shown that the complexes are more active than the ligand fragments.

Key words : Mn (II) Complexes. 2,6-diacetyl pyridine-2,22 -oxydiacetoyl dihydrazone, 2,6-pyridine dicarbonyl dichloride 2, 22 -oxydiacetoyl dihydrazone, Antimicrobial Studies.

Introduction :

Recently, the chemistry of transition metal complexes containing macrocyclic ligands has become increasingly important (1-5). There are several reasons for this interest in the complexes, e.g., the azamacrocyclic ligands have been used successfully for diverse processes such as separation of ions by transport through artificial and natural membranes, liquid-liquid or solid phase-transfer reactions, dissolution in a polar solvent of metal and organic salts, preparation of ion-selective electrodes, isotope separations and in the understanding of some natural process through mimicry of metallo enzymes (6-10). Some Co (II), Ni (II) and Cu (II) complexes of macrocyclic ligands have been synthesized and contain intense biological activity (11-14). The research of hydrazones has been increasing interest because of their antituberculosis, antimicrobial and antitumor activities (92-93). Hydrazones containing an azomethine (–NHN = CH-) proton form a significant class of compounds for novel drug evolved. The synthesized hydrazones are analyzed for antimicrobial activity. These compounds show only low activity against gram positive bacteria (Enterococcus faecalis and Staphylococcusaureus) and gram negative bacteria (Pseudomonas aeruginosa and Escherichia coli).

In this paper, we describe the synthesis, characterization and antimicrobial studies of some Mn (II) complexes are reported. The structure of the newly obtained complex was identified by elemental analyses, FT-IR, UV-vis, mass and ^{1}H, NMR specta.

Materials and methods :

Hydrazine hydrate, ethanol, anhydrous $CaCl_2$ was obtained from Merck or BDH. All the chemicals used were of AR grade. Organic solvents (ethanol, absolute ethanol, methanol, diethylether, acetone, dimethylformamide (DMF) and dimethylsulfoxide (DMSO) were reagent grade and were used without futher purification.

Synthesis of the ligand :

The ligand, oxydiacetic acid dihydrazide, was synthesized by mixing 1:2 stoichiometric quantities of oxydiacetic acid ester (1.64 g - 0.01 M) in hydrazine hydrate (0.513 mL, 0.01 M) in 20 mL ethanol was continuous stirring. The reaction mixture was heated to reflux for 10 h on a water bath for 8 hours. Thereafter, it was concentrated to one-third of its original volume. On cooling solution the bright-white crystals are obtained. The solution was filtered, washed and recrystallized in ethanol then dried in vaccum over

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DEVELOPMENT EFFECTIVE CHIRAL ANALYTICAL METHOD FOR PROTHIOCONAZOLE (R & S ENANTIOMER) BY NORMAL PHASE HPLC OR DETERMINATION OF CHIRAL ISOMERS [R&S] IN PROTHIOCONAZOLE BY NORMAL PHASE HPLC

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Abstract : We have developed a novel, simple, efficient, and cost-effective normal phase HPLC Method for the determination of Chiral isomers in Prothioconazole and its formulation

Keywords : Prothioconazole, R &S isomers, normal phase HPLC

Introduction :

Chiral separation in high-performance liquid chromatography (HPLC) is keeping to be of great interest in diverse areas in agrochemicals. Many chemical products used in the agrochemical industries contain chiral compound and consist of one or two pairs of enantiomers, which can have important consequences regarding bio active efficiecy. The resolution of racemic mixture an analytical level for fungicides development is important. Current chiral analysis method for the Prothioconazole is available by reverse phase high performance liquid chromatography (HPLC) with Lux Cellulose -3 column and but the not good separation of R & S isomer.

Hence, we have developed the simple chiral analysis method for the separation of enantiomeric isomers (R & S) of Prothioconazole with Chiral OD-H column containing & n-Hexane & ethanol mobile phase by normal phase high performance liquid chromatography (HPLC) with following advantages

- Shorter run time
- Ease to separation
- Economical
- High sensitivity

Method :

Apparatus :

A high-performance liquid chromatograph Shimadzu Prominence -I LC-2030 C equipped with PDA detector is used for developing the method. The enantiomers of Prothioconazole are separated by Chiral column Chiralcel OD-H (250 ´ 4.6 mm, 5 m) with a UV at 254 nm using normal phase HPLC and flow rate 1.0 ml/min

Chemicals

1. n-Hexane (HPLC grade)
2. Iso propyl alcohol (HPLC grade)

HPLC Conditions :

A)	Column	:	Chiralcel OD-H (250 ´ 4.6 mm, 5 m)
B)	Mobile Phase	:	n-Hexane: Ethanol (99: 1)
C)	Flow	:	2.0 ml/min
D)	UV wavelength	:	254 nm
E)	Injection volume	:	20 ul
F)	Column temperature	:	Ambient
G)	Run time	:	25 min

Preparation of Prothioconazole Sample :

Weigh accurately about 50 mg Prothioconazole sample into a 50 ml volumetric flask, dissolve and make up the volume with mobile phase.

Analysis :

Inject the sample solution and note down the peak areas.

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ANALYTICAL AND BIOCIDAL STUDIES OF SOME NEWLY SYNTHESIZED Sm(III) HYDRAZONE COMPLEXES.

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Abstract : Very recently some new hydrazone complexes of Sm(III) were synthesized which bear the formulae M(DPTPH)(BF4)2 and M(DCTPH)(BF4)2 where M = Sm(III), (DPTPH) = (2,6-diacetyl pyridine-N,N'-thiodipropionoyl dihydrazone), (DCTPH) = (2,6-pyridine dicarbonyl dichloride) and (BF4)2 = Bis tetrafluoro borate. These complexes were analyzed by preliminary laboratory methods and then by elemental estimation and spectroscopic techniques like UV-Visible, IR and NMR spectra. The complexes were found to be hard, colored solids which had high decomposition points. The complexes had high conductivity values. These complexes showed octahedral geometries in their structures. Then these were also treated against some bacteria viz. E. coli and S.alternaria and fungi C. albicans and A. niger. The results of these studies showed that both complexes are biocidal in nature and their activity is four times greater than that of the ligand.

Keywords :

Experimental :

The synthesized ligand and its complexes were analyzed first by preliminary laboratory methods and then by elemental estimation and spectroscopic techniques like UV-Visible IR and NMR spectra. The results of these studies showed that both complexes are solid, highly stable, colored and possess high decomposition points. Materials used for synthesis of ligand and its complexes:- (1). 2, 6-diacetyl pyridine. (2) 2,6-pyridine dicarbonyl dichloride. (3) Hydrazine hydrate. (4) Thiodipropionic acid. (5) Samarium acetate. The ligand was synthesized by mixing 1:2 ratios of Thiodipropionic acid and Hydrazine hydrate in a R.B. flask and then refluxed over water-bath for four hours. The complexes were formed by mixing 1:1:1 stoichiometric ratios of ligand, 2,6-diacetyl pyridine/2,6- pyridine dicarbonyl dichloride and metal acetate. Then mixture was refluxed over water-bath for three hours when an off white/ light yellow solid separated out. The solid was cooled, filtered and dried over anhydrous CaCl2 in a desiccator.

Results and discussion :

The compounds synthesized were analysed by preliminary laboratory methods and then by spectroscopic techniques like UV-Visible IR and NMR spectra. The ligand and both the complexes were found to be hard solids, stable, colored and possess high decomposition points. The complexes when analysed for conductivity showed quite high conductance values. Both complexes showed strong, sharp peaks at 3,000 cm-1, 1100, 1650, 1550, 2250, 550, 460 cm-1 which confirmed the presence of CH3 group, aromatic benzyl ring, C=O, C=N, NH, M-N and M-O groups in the complexes. The results of IR spectra showed that both complexes were found to be octahedral in their structures. Further the spectra of UV-Visible method exhibited presence of two main bands, one at 12,500 to 12,200 cm-1 and other at 23,000 to 22,600 cm-1 showing one due to charge transfer bands and other due to t2g.....eg band.

Biocidal studies :

Both complexes and their ligand were studied for their biological activities against bacterial strains E. coli and S. alternaria and fungal strains C.albicans and A. niger. Both complexes showed greater biocidal activity against both bacteria and the fungi in comparison to the ligand.

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MONITORING OF AMBIENT AIR QUALITY OF NANDURBAR, MAHARASHTRA, INDIAN

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Abstract : Ambient air quality of Nandurbar city was monitored during the year 2021. Criteria pollutants selected for the monitoring was, sulphur dioxide (SO_2) & nitrogen dioxide (NO_2) and PM10 (Particulate Matter having aerodynamic diameter less than or equal to 10 Ľm) for the period of November 2021 to September 2021. Sampling was done for successive periods of about 4 hours for sulphur dioxides (SO_2), nitrogen dioxide (NO_2) and 8 hours for Respirable suspended particulate matter (PM10) for 24 hours. The results reported pertain to an eight hour successive continuous air sampling exercise carried out at each of the four selected locations in Nandurbar city. The value of PM10 (Particles ≥ 10μ, PM 10μg/m^3) was noted to be crossing the permissible limit and exceeded the National Ambient Air Quality Standard (NAAQS) at all locations. The concentration of SO_2 and NO_2 was within the National Ambient Air Quality Standard (NAAQS, National Ambient Air Quality Standers, November 18, 2009) at all the locations.

Keywards : Ambient air quality, particulate matter, NAAQS, sulphur dioxide

Introduction :

The ambient air quality monitoring was carried out at three different locations in Nandurbar city during the period of 21st October 2021 to 30st November 2022. The parameters likes Respirable suspended particulate matter (RSPM) i.e. PM_{10} (particulate matter having diameter or equal to 10Ľm), $PM_{2.5}$ (particulate matter having diameter or equal to 2.5 μm), SPM (suspended particulate matter having size greater than 10 μm were estimated by gravimetrically (1-5). Also, the gases concentration presence in air such as Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), was estimated with help of air gas sampler machine. The eight and four hour continuous air sampling was done for the collection of RSPM and gas samples at each location respectively (6-14). Following locations which have been shortlisted for Ambient Air Quality Monitoring under NAMP.

Materials and methods :

Repairable Suspended Particulate Matter (PM_{10}) was measured by Cyclonic Flow Technique. Nitrogen oxides were measured by Modified Jacobs and Hochheiser Method (Sodium Arsenite method). Sulphur oxides were measured by Modified West and Gaeke Method (15).

Sr. No.	Location Finalized	Latitude	Longitude
1	Maharashtra Oil Extraction, MIDC Nandurbar (Industrial), **Station Code: S1**	$21^0$22′44″ N	74^0 15′ 28″ E
2	Nandurbar Municipal Corporation, Nandurbar (Commercial), **Station Code: S2**	$21^0$22′4.8″ N	74^0 14′ 31″ E
3	Dhule Chaufuli, Nandurbar (Residential/ Commercial), **Station Code: S3**	$21^0$21′43″ N	74^0 15′ 3.6″ E

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XANES AND EXAFS STUDIES OF ACETATO 5,5- DIMETHYL-2-(2-(4-METHOXYPHENYL) HYDRAZONO) CYCLOHEXANE-1, 3-DIONE COBALT(II) HYDRATE SCHIFF BASE COMPLEX

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Abstract : XAFS study of cobalt(II) complex in which primary ligand 5,5- dimethyl-2-(2-(4-methoxyphenyl)hydrazono)cyclohexane-1,3-dione, have been studied. The XRD shows the crystalline nature of complex. XANES data analyzed to calculate, shift of principal absorption maximum, edge width, chemical shift and effective nuclear charge. Different graphical methods were used to calculate bond length by EXAFS data. Fourier transforms of the normalized spectra have also been used to obtain bond length. Software Athena and Origin were used to analyzed data.

Keyword : XRD, XANES, EXAFS, Chemical Shift, Edge width, Athena.

Introduction :

Schiff base cobalt(II) complexes exhibit so many interesting and useful biological and pharmaceutical properties such as antibacterial, antiviral, antioxidant, antitumor and anticancer (1,2). Arylhydrazones of cyclic 1-3, diones have been extensively used as the precursor of potential antidiabetic drugs (3-6). These complexes also were in use as a remedy for the cure of cancer, anti-inflammation and cardiovascular disease (7-10). It also behaves as dynamic catalysts in some particular chemical reaction i.e. Hennery reaction. The schiff base cobalt complexes also were useful in the area of photophysics, photochemistry and biochemistry. In current paper we were investigated XANES, EXAFS and XRD of acetato 5,5- dimethyl-2-(2-(4-methoxyphenyl)hydrazono) cyclohexane-1,3-dione cobalt(II) hydrate schiff base complex. XANES study gives shift of K-edge, shift of principal absorption maximum, edge width, chemical shift and effective nuclear charge (ENC). EXAFS study gives first shell bond lengths of complex by Levy's, Lytle's, L.S.S. and Fourier transforms(FT) methods. The XRD pattern shown that studied complex was polycrystalline in structure and gives the values of space group, particle size etc. The purpose of determine the different parameters by XANES and EXAFS is to provide a better platform to further study in biological, chemical, pharmaceutical and medicinal properties, also we can predict the chemical behaviour of complexes.

Experimental :

The complex acetato 5,5- dimethyl-2-(2-(4-methoxyphenyl)hydrazono) cyclohexane-1,3-dione cobalt(II) hydrate schiff base complex considered in current paper, was synthesized by chemical route method at School of Chemistry, DAVV, Indore, India. X-ray absorption spectroscopy of titled complex entirely observed by BL-8 dispersive EXAFS beamline at 2.5 GeV Synchrotron named Indus-2 established at RRCAT Indore, India (11). The complete absorption spectra have been recorded in a single shot. The investigational data obtained has been evaluated by software Athena (Demeter 0.9.25) available at website xafs.org. The XRD patterns of the complex are recorded by using Bruker D-8, at IUC, DAE-CSR, Indore, India. XRD gives the resourceful information about the crystallographic structure and various crystallographic data of complex. Obtained XRD data was analyzed by computer software Origin Pro 2016.

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A REVIEW- USE OF NANO MATERIALS IN MEDICINE

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Abstract : Nanomaterials can be applied in Nano medicine for medical purposes in three different areas; diagnosis (Nano diagnosis), controlled drug delivery (Nano therapy), and regenerative medicine current modalities of diagnosis and treatment of various diseases, especially cancer have major limitations such as poor sensitivity or specificity and drug toxicities respectively. Newer and improved methods of cancer detection based on nanoparticles are being developed. This review articles is being written on use of nanomaterial in medicine. Over the past few decades Nanoparticles have gained recognition in the medical field as an effective means of drug delivery and therapy. Nanotechnology involving nanomaterials is a developing field that is being widely used for Nano medicine. Health care consisting of artificially developed enzymes are made from these nanomaterial. These enzymes are useful in the diagnosis of a tumor and biosensing.

Keywords : Nanomaterial, Nano medicine, Nanodevices, Drug delivery, Diagnostic drugs.

Introduction :

The term nanoparticles is a collective name for both Nano spheres and Nano capsules. Drug is confined to a cavity enclosed by a unique polymer membrane called Nano capsules, while Nano spheres are matrix systems in which Drug is physically and uniformly dispersed. The particles are made with extremely tiny materials to possess unique physical as well as chemical properties is referred to as nanomaterial. The single dimension of this materials is less or equivalent to 100 nanometers. The same composition materials from bulk to reduce in size by changing its conductivity and reactivity.

The Nano sized particles are available in nature. It can be created from carbons or any minerals like silver. They must have the dimension lying from 1 nm to about 100 nm.

The use of nanotechnology in various sectors of therapeutics has revolutionized the field of medicine where nanoparticles of dimensions ranging between 1-100nm are designed and used for diagnostics, therapeutics, and as a biomedical tools for research (4). It is now possible to provide therapy at a molecular level with the help of these tools, thus treating the diseases and assisting in study of pathogenesis of diseases (2). Conventional drugs suffer from major limitation of adverse effects occurring as a result of non-specificity of drug action and lack of efficacy due to improper or ineffective dosage formulations (e.g. cancer chemotherapy and anti-diabetics agents) (2). Designing of drugs with greater degree of cell specificity improves efficacy and minimizes adverse effects (2). Diagnostic methods with greater degree of sensitivity aid in early detection of the diseases and provide better prognosis. Nanotechnology is being applied extensively to provide targeted drug therapy, diagnostics, tissue regeneration, cell culture, biosensors and other tools in the field of molecular biology. Various nanotechnology platforms like fullerenes, nanotubes, quantum dots, Nano pores, dendrimers, liposomes, magnetics Nano probes and radio controlled nano particles are being developed (2).

Nanomaterial are mainly classified into two classes, either inorganic nanoparticles such as gold, silica, and iron oxide. Organic nanoparticles such as polymeric, liposomes, and micelles.