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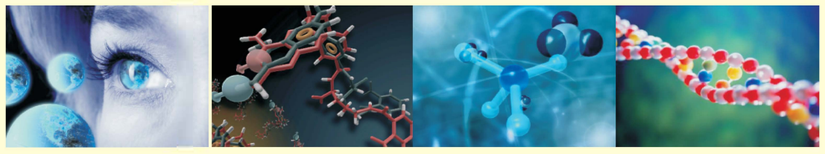

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NOVEL ADSORBENT MIXTURE FOR STUDIES OF REMOVAL OF VARIOUS INDUSTRIAL EFFLUENTS POLLUTANTS

BALVANT SINGH DANGI[1], DIWA MISHRA[2] AND ARUN SINGH[3]

[1]Department of Chemistrty,Govt Maharani Laxmibai Girls PG College, Bhopal - 462 001 (India)

[2]Department of Chemistrty,Govt Geetanjali Girls PG College Bhopal - 462 001 (India)

[3]Department of Chemistrty,Govt Maharani Laxmibai Girls PG College Bhopal - 462 001 (India)

E - Mail : dr.arunsingh68@gmail.com

Abstract : The unsaturated Co-polyester (MGR) based on maleic anhydride, glycerol and receacetophenone was prepared and characterized. The MGR was modified by treatment with bisulfate. It was designated as SMGR. Various mixtures of SMGR, activated charcoal (AC), saw dust (SD) and Bageessee powder (BP) were prepared. Different industrial effluent samples (i.e. wastewater) were collected and their quality parameters like pH, Conductivity, TDS, BOD, COD etc were measured. All the samples treated with such novel adsorption mixtures SMGR-1 to 4. The data before and after adsorption were tabulated and interpreted.

Keywords : Adsorbent, unsaturated Co-polyester, Conductivity, TDS, BOD, COD.

Introduction :

The industrial wastewater is creating major environmental pollution. More particularly the textile dyeing effluents are toxic to human and animal beings. More than thousands of dyes are manufactured and employed for textile dyeing worldwide (1-3) and create water pollution. Thus it is badly need to remove colour and dyes before the effluent discharging in water sources. Number of methods develop for textile water treatment like oxidation, membrane separation, coagulation etc. (4-7). However adsorption is found as best method for enabling ease of chemical plant designing (8). Recently the low cost polymers (7-10) are found to be efficient adsorbents for dye effluents. The present communication comprises the treatment study of dye effluents by novel adsorption prepared by present author. The polymer adsorbents prepared as follows:

Material and Methods :

All the chemicals used were of pure grade. The unsaturated polyester was analyzed by elemental contentment, IR spectroscopy and thermogravimetry. Various adsorbent mixtures were prepared as shown in Table-1 shown below. The saw dust and bagasce powder used in dry state.

The effluent samples collected from various industrial ions of M.P. Their pH, electrical conductivity, dissolved oxygen, BOD, COD and TDS were measured by standard techniques.

Synthesis of unsaturated polyester (maleic anhydride, glycerol and receacetophenone Co-polyester (MGR)): It is prepared by general method (9) for unsaturated polyester.

In a round bottom flask maleic anhydride (0.2 mol), glycerol (0.1mol) and receacetophenone (0.13mol) were charged. The few drop of triethylamines added. The resultant mixture was heated at 130°C for 4hr to get viscous liquid. It was poured into cold water to get solid mass. It was washed and air dried.

The solid was ground to fine powder. Such powder was soaked into saturated sodium bisulfate solution to get its to bisulfate adduct. It was designated as SMGR.

Adsorption Study :

Various effluent samples 100ml charged in 250ml Erlenmeyer flask at room temperature. 2g of adsorbent mixtures M-1 to 3 shown in Table-1, added into each of sample. The flasks were put on the shaker with rotation 150rpm. After 24 hrs the samples were drawn and checked

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RESPONSES OF 5-HYDROXYTRYPTAMINE ON ISOLATED SCALES OF DERMAL MELANOPHORES OF RASBORA DANICONIUS (HAM.)

SUDHIR KUMAR SRIVASTAVA
Department of Zoology, Arts, Commerce & Science College,
Taloda - 425 413 (India)

Abstract : The drug 5-Hydroxytryptamine was examined on the isolated scale of dermal melanophores of Rasbora daniconius. 5-Hydroxytryptamine elicited dispersion in dorso-lateral region melanophores while in band region it elicited dispersion as well as aggregation. In both these regions the responses were not concentration related and a clear difference in the sensitivity of the melanophores between the two regions melanophores observed. The melanophore size index (MSI) was employed as a recording parameter for the responses of melanophores to 5-Hydroxytryptamine.

Key words : Fish melanophores, 5-Hydroxytryptamine, Rasbora daniconius (Ham.)

Introduction :

5-Hydroxytryptamine (5-HT) is a basic monoamine and is important neurotransmitter substance and is formed by the hydroxylation and decarboxylation of tryptophan. 5-Hydroxytryptamine is found in greatest concentration in enterochromaffin cells of gastrointestinal tract. It also affect in cardiovascular system & respiratory system. 5-Hydroxytryptamine produces its effects through a variety of membrane bound receptors. 5-HT has been implicated in the aetiology of numerous diseases like depression, anxiety, social phobia, schizophrenia and panic disorders.

Melanophores or melanocytes are the melanin bearing cells of vertebrate, which originate from the neural crest during the development. The color changes in the fish, frogs and lizard are due to motile activities of these highly specialized cells (1,2). As per the finding (1,3) pigment translocation in the fish melanophores is under the control of nerve or hormones or a combination of both in varying degrees. Pattern formed by melanophores are often used as identical marks in taxonomic studies of the fishes (4). The melanophores display an aggregation of the pigment granules at the centre or re-dispersion throughout the cytoplasm. The granules move along radial microtubules by means of molecular motor families of proteins comprising of dynein causing aggregation or kinesin that leads to dispersion (5).

First time Rapport, Green & Page (6) reported 5-Hydroxytryptamine and its activity of constriction of melanophores. 5-Hydroxytryptamine is distributed both in vertebrates & invertebrates and act as neurotransmitter in many central and peripheral nervous system (7, 8). Cerletti & Berde (9) first observed that 5-Hydroxytryptamine inhibited the melanin dispersing action of D-Lysergic acid diethylamide (LSD). 5-Hydroxytryptamine itself had no effect on guppy melanophores either invivo or invitro. Fujii (10) noted that 5-Hydroxytryptamine had no aggregating effect up to 10- 4M on goby, Chasmichthys.

The aim of this study was to examine the effects of 5-Hydroxytryptamine in melanophores from dorso-lateral and band region of the fish body Rasbora daniconius (Ham.)

Material and methods :

The young fish of both sexes of Rasbora daniconius (Ham.) were procured from local lakes and transported to the laboratory alive. The fish belong to the family Cyprinidae and order Cypriniformes. It is a fresh water fish, found mostly in clear streams ponds and lakes. The fish Rasbora daniconius is larvaecidal in habit. The fishes were 5 – 7cm long and weighing 1.5 – 3.5g. The fishes were acclimatized in the laboratory for 48hrs, with normal day and night cycle and water temperature in aquaria ranging in between 20 - 250C. The scales were removed according to

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ANALYTICAL AND BIOLOGICAL STUDIES OF SOME NEWLY FORMED CE(III) HYDRAZONE COMPLEXES

JITENDRAAMBWANI AND RAJANIKUMARI

Department of Chemistry, S.M.S. Govt. Model Science College Gwalior - 474 001 (India)

Abstract : Some new hydrazone complexes of Ce(III) were synthesized bearing the formulae Ce(III)(PDODH)BF4 where (DPODH)-2,6-diacetyl pyridine-N,N'-oxydiacetoyldihydrazone& BF4-Bis tetrafluoro borate. The complexes were analyzed initially for their physical properties viz. they are colored, solid, stable, and soluble in strong solvents like Dimethyl sulfoxide and are having high conductivities. The complexes were then analyzed by elemental analysis, metal estimation, TLC, melting point determination and IR spectra, Electronic spectra and antibacterial & antifungal studies. The complexes had high melting points. The spectroscopic techniques proved the structures to be Octahedral for the complexes. The ligand & their complexes were screened for their biological studies. The complexes showed high antibacterial and moderately high antifungal activities.

Keywords : Analytical, Biological, Ce(III), Hydrazone.

Introduction :

Hydrocyanation of carbonyl derivatives gives direct access to chiral difunctional compounds with synthetic importance. Research has been focused over last few years towards effective calalyst development with successes particularly in addition to alhedydes, ketones and imines (1). Hydrazones are used as substrates for asymmetric hydrocyanation reactions due to their ease of preparation and high percentage of crystallinity (2). Hydrazino acids have acted as inhibitors of certain amino acid metabolizing enzymes (3), conformation ally unique helices (4). Hydrazino acids which are enation enriched are dependent on elaboration of amino acid derivatives (5, 6) and on trapping of enolate derivatives with azodicarboxylates (7).

Materials and methods :

All the Chemicals used in the synthesis of compounds were of A.R. Grade Solids used: 1. Oxydiacetic acid. 2. 2,6-diacetyl pyridine. 3. 2, 6-pyridine dicarbonyl dichloride. 4. Cerium (III) chloride, Liquids used: 1. Ethanol. 2. Dimethylsulfoxide.

Synthesis of ligand :

0.01M of oxydiacetic ester was taken in standard flask and 0.02M of hydrazine hydrate were mixed into it. The contents were then refluxed over water bath for four hours. Then a light yellow solid separated out which was filtered, washed with ether and dried over anhydrous $CaCl_2$ in a desiccator. The contents were then weighed and its melting point taken.

Molecular weight : 156.

Melting point : 165^0C.

Yield : 1.54 gm.

Synthesis of Complexes :

1) Ce(DPODH)(BF4)2 :

Equimolar quantities 1:1:1 ratios of Ligand (0.01M), diacetyl pyridine (0.01) & Cerium chloride (0.0M) mixed and refluxed over a water-bath for three hours. The colour of the contents was changed into dark green. The contents were cooled, filtered & dried over anhydrous $CaCl_2$.

Melting : 235^0C.

Colour : Dark green.

Yield : 1.25gm.

2) Ce(DCODH)(BF4)2 :

Equimolar quantities 1:1:1 ratios of oxydiacetic acid dihydrazide (0.01M), 2,6-diacetyl pyridine (0.01M) and

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SYNTHESIS AND ANTIMICROBIAL STUDIES OF NOVEL HETEROCYCLIC COMPOUNDS

[1]REKHA KHAIRWAR, [2]DIWA MISHRA AND [3]ARUN SINGH

[1]Department of Chemistrty,Govt Geetanjali Girls' PG College Bhopal - 462 001 (India)

[2]Department of Chemistrty,Govt Geetanjali Girls PG Collge Bhopal - 462 001 (India)

[3]Department of Chemistrty,Govt Maharani Laxmibai Girls' PG College Bhopal - 462 001 (India)

E-mail : dr.arunsingh68@gmail.com

Abstract : The imidazole derivate say 2-(1-methyl-1H-benzo[d]imidazol-2-ylthio)acetohydrazide (1) was synthesised. Various Schiff bases (3a-e) of 1 were prepared by reacting with various benzaldehyde derivates (2a-e). All the 3a-e compounds react with Succinic Anhydride to afford 1-(2-(1-methyl-1H-benzo[d]imidazol-2-ylthio) acetamido)-5-oxo-2-arylpyrrolidine-3-carboxylic acid derivatives (4a-e). These (4a-e) compounds react with o-phenylene diamine yields N-(3-(1H-benzo[d]imidazol-2-yl)-5-oxo-2-arylpyrrolidin-1-yl)-2-(1-methyl-1H-benzo[d]imidazol-2-ylthio) acetamide (5a-e). The Compounds (5a-e) react with benzyldehyde affords 4-benzylidene derivates(6a-e),they further react with hydroxylamine gives N-(4-(1H-benzo[d]imidazol-2-yl)-3-phenyl-5-aryl-4H-pyrrolo[2,3-c]isoxazol-6(5H)-yl)-2-(1-methyl-1H-benzo[d]imidazol-2-ylthio) acetamide (7a-e).All the synthesized compounds characterized spectroscopically and tested for antimicrobial activity.

Keywords : benzimidazole, pyrrolidine, isoxazole,characterization,antibacterial activity and antifungal activities.

Introduction :

Benzimidazole derivaties have been found to possess various biological as well as pharmacological activities, such as, antiinflammatory, analgesics, antipyretic and antifungal, anticonvulsant, antitumor, antiviral and analgesic activities. (1-5) Another heterocyclic compound says, isoxazole moiety can also exposes biological activity (6-8). The benzlidine derivaties of N-(3-(1H-benzo[d]imidazol-2-yl)-5-oxo-2-arylpyrrolidin-1-yl)-2-(1-methyl-1H-benzo[d]imidazol-2-ylthio) acetamide (5a-e) were reacted with hydroxyl amine affords novel isoxazole containing heterocyclic compounds.. The present research paper comprises the novel heterocyclic compounds which contains benzimidazole and isoxazole. The synthetic route is as follow.

Materials and methods :

All chemicals used were of laboratory grade. 2-(1-methyl-1H-benzo[d]imidazol-2-ylthio)acetohydrazide (1) prepared by our reported research work (9).

Measurement :

Melting points were determined in open capillary tubes and were uncorrected. The IR spectra were recorded in KBr pellets on a Nicolet 400D spectrometer and 1H NMR spectra were recorded in DMSO with TMS as internal standard on a Bruker spectrometer at 400 MHz.

Preparation of 1-(2-(1-methyl-1H-benzo[d]imidazol-2-ylthio) acetamido)-5-oxo-2-aryl pyrrolidine-3-carboxylic acid derivatives (4a-e) :

An equimolecular mixture of 2-(1-methyl-1H-benzo[d]imidazol-2-ylthio)acetohydrazide (1), and the various aromatic aldehydes (2a-e) in ethanol was refluxed for 2.5 hrs. The solid separated was collected by filtration, dried and recrystallyzed, which on react with Succinic Anhydride in Xylene was refluxed for 7.5 hrs. The reaction mixture was allowed to stand for 2-3 days, the solid was filtered. The product thus formed was recrystallized from ethanol to give 1-(2-(1-methyl-1H-benzo[d]imidazol-2-

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ASSESSMENT OF WATER QUALITY BY PERFORMING PHYSICO-CHEMICAL AND METALLIC INVESTIGATIONS OF GROUND WATER SOURCES OF RAVER REGION OF MAHARASHTRA (INDIA)

[1]G. R. GUPTA, [2]G. R. CHAUDHARI AND [3]V. S. SHRIVASTAVA

[1,3]Nanochemistry Research Laboratory, G. T. Patil, Arts, Science and Commerce College, Nandurbar - 425 412 (India)

Arts and Science College, Bhalod - 425 304 (India)

Abstract : The purpose of this work is to assess the water quality of Raver region by analyzing twelve important physico-chemical parameters as well as six metals in the ground water samples. Thereafter a water quality index is determined.

Key Words : Physico-chemical parameters, metal analysis, correlation analysis.

Introduction :

In the modern world "Environmental Pollution" is a burning topic of interest, which, perhaps, affecting all of us directly or indirectly. During the last few decades rapid growth of human population and accelerated pace of urbanization and industrialization has led an adverse effect on the environment. Indeed, the discharge of organic and inorganic compounds from industry and agricultural sectors poses severe dimensions to the environmental pollutions in the twenty first century. Today, almost everything around us, e.g. the air we breathe, the water we drink, and even the soil we grow food, are very severely polluted. Water is highly complicated fluid present on this planet, and offers an essential role towards the development of life on this planet. Eventually, water very similar to light is an important raw material for the process of photosynthesis. From the latest reports, almost 70% of water in India has become polluted due to the discharges of domestic sewage and industrial effluents into natural water source, such as river, streams as well as lakes and pollute the underground water resources (1-4).

Raver is well-known region for supplying banana, not only in Maharashtra but also in India. However, the dark site of such huge production of the banana is the use of high amount of chemical fertilizers, which possibly have an adverse effect on the natural resources like soil and water up to certain extent. Taking this in consideration a systematic study has been planned to characterize soil and water courses throughout Raver region, both the pre-monsoon and post-monsoon analysis of selected water samples was performed very aptly. The results of physic-chemical and metallic studies have been discussed in the following sections for 30 water sampling stations.

Materials and methods :

Water Sampling :

The samples were collected from a water source of the Raver region. The samples were collected in well sterilized and pro cleaned glass bottles with tight lid for physico-chemical measurements and for D.O. measurements were done at the time of sampling.

Methodology :

Standard procedures (APHA 1995) have been followed for the Determination of various physico-chemical and metallic parameters (5). In order to calculate correlation among 30 different pairs of following water quality parameters has also been carried out and the results are discussed in the following section (6).

Results and discussion :

The effect of bombardment of fertilizers and pesticides on the physico-chemical and metallic properties of ground water courses of the Raver region are examined and tabulated in Tables 1 and 2 for pre-monsoon and post-monsoon study. In the study region pre-monsoon time is the preparation time i.e. preparation of land for seeding in monsoon, and

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CHEMICAL ESTIMATION OF AIR POLLUTANTS AND ITS IMPACT ON THE TOTAL CHLOROPHYLL CONTENTS A & B OF OCIMUM SANCTUM AND BOERHAAVIA DIFFUSA PLANTS

MANJU LATA SHARMA AND NITESH GOSWAMI
Government P.G. College, Morena - 476 111 (India)
E-mail: sharmamanju151983@gmail.com

Abstract : The present investigation was carried out to establish a correlation environmental pollution especially the SO_2 ,NO_X ,RSPM, SPM & ozone pollution at SLP Govt P.G. College, Maharaj Bada and DeenDayal Nagar . Samples of two medicinal plants Ocimum sanctum and Boerhaavia diffusa were analyzed for their phytochemical composition total chlorophyll contents a & b. The result of this study show that the total chlorophyll content in all the two plants varies inversely with pollutant. Chlorophyll a found maximum than chlorophyll b for all the two medicinal plants.

Key Words : ozone (03), Sulphur dioxide (SO_2), oxide of nitrogen (NOX), Respirable suspended particulate matter (RSPM), suspended particulate matter (SPM), chlorophyll contents a & b, Ocimum sanctum and Boerhaavia diffusa Plants.

Introduction :

Environmental pollution and its impact on plant have well recognized. The role of air pollutants causing injury to plants either by direct toxic effect or modifying the host physiology (1). The environment defined as to include water, air and land, the interrelationship which exists among and between water, air and land, and human being, plant, other living creatures, micro-organisms (2). Environment is continuously polluted due to increasing the concentration of NOx, SO_2, SPM, & O_3. Pollution means the presence of undesirable substances in any segment of environment, primary due to human activity discharging by products, waste product or harmful secondary products, which are harmful to man, vegetation or other organism. Ozone in the lower atmosphere is a highly reactive secondary pollutant photo chemically formed in the presence of primary pollutants like NOx, SO_2, Suspended particulate matter (SPM&PM), HC and CO etc, which are (NOx, SO_2, O_3 and SPM) the major constituents of automobile exhaust.

Atmosphere plays a significant role in global processes supporting life on earth. It serves as an efficient heat reservoir. Troposphere is a zone closest to earth. It is an important zone for living world. Stratosphere is next zone to the troposphere. SO_2, NOx, SPM, and Ozone are present in the troposphere and stratosphere (3). While ozone in the presence of stratosphere protects the entire biosphere from the lethal ultraviolet radiation by absorption it (4) in the troposphere it acts as a toxic green house gas by an absorbing terrestrial radiation (5) and contribute to the global warming. Highly reactive Ozone binds to plasma membrane, alters metabolism and inhibited stomatal photosynthesis. Ozone reacts with O_2 and produces reactive oxygen species, including hydrogen peroxide (H_2O_2), Super oxide ($O^2 \not\in$), Singlet oxygen, and the hydroxyl radical. These denature proteins and nuclic acid, and cause lipid per oxidation, which break down lipids in membrane.

Materials and methods :

Plant material : Samples of Ocimum sanctum and Boerhaavia diffusa Plants were collected from SLP PG college morar, Deen Dayal Nagar and Maharaj bada Sampling sites

Extraction of total chlorophyll : Total chlorophyll content in all two plants were extracted by using acetone as solvent.

Estimation of Pollutants : In this study Sulphur dioxide, nitrogen dioxide, suspended particulate matter, respirable

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BIOLOGICAL AND ANALYTICAL STUDIES OF SOME NEWLY FORMED FE(III) HYDRAZONE COMPLEXES

JITENDRA AMBWANI AND RAJANI KUMARI
Department of Chemistry, S.M.S. Govt. Model Science College,
Gwalior - 474 001 (India)

Abstract : Certain new hydrazone complexes of Iron III were synthesized by condensing the ligand dithiodi acetic acid dihydrazide with the iron acetate and 2,6-diacetyl pyridine and 2,6-pyridine dicarbonyl dichloride. The complexes were coloured, stable having high decomposition points. These complexes were physico chemically analysed by melting points, conductivity, TLC, recrystallization, etc. These were also subjected to further analyses viz. CHN, IR Spectral analysis, Electronic spectral analysis. The results of analysis showed that both the complexes were of octahedral structures. Also, the complexes were analysed antimicrobially against bacteria E. coli and S. alternaria and fungi C. albicans and A. Flavus. The results showed that both the complexes were five times more active than the ligand.

Key Words : Biological, analytical studies, Hydrazone complexes.

Introduction :

There has been unprecedented progress in biological applications of inorganic pharmaceuticals because of their key role in clinical therapy. Examples include cisplatin and corresponding second generation alternatives such as oxaliplatin and carboplatin. These serve as chemotherapeutic agents for solid malignancies and as diagnostic contrast agents such as magnetic resonance imaging. (MRI) (1-3). Transition metals are particularly suitable for this purpose because they adopt a wide variety of coordination numbers, geometries and oxidation states in comparison with carbon and other main group elements (4). Transition metal complexes of aroyl hydrazones function as antibacterial, antiviral and antifungal agents (5-9).

Materials and methods :

All the Chemicals used were of A.R. grade. The chemicals used were as follows : Solvents : Ethyl alcohol, Dimethyl formamide, Inorganic : Iron (II) acetate, Organic : 2, 6-diacetyl pyridine, 2, 6-pyridine dicarbonyl dichloride. Synthesis of the ligand: 0.02 M of the acid ester, Dithio diacetic ester were taken in a R. B. flask and dissolved in about 20 ml. of ethyl alcohol. After this, 0.04 M of hydrazine hydrate was added to this solution. The mixture was refluxed for around 5 hours. Then, the contents were cooled, filtered and dried in a desiccator over anhydrous $CaCl_2$. Then, it was weighed to constant weight. Yield : 2.68 gm, melting point: 170^0C.

Synthesis of the complexes :

1) Fe (III) (2, 6-pyridine dicarbonyl dichloride- N, N'-dithiodiacetic acid dihydrazone). $(BF_4)_2$, 0.02 M of the ligand were mixed with 0.02 M of iron acetate and 0.02 M of 2, 6-pyridine dicarbonyl dichloride in solvent DMF in a R.B. flask and contents were refluxed on a water-bath for about three hours. Afterwards, the mixture was cooled and filtered. Then, it was dried over anhydrous $CaCl_2$ in a desiccator and weighed to a constant weight. Yield : 1.90 gm. Melting point : 288^0C.

2) Fe (III) (2, 6-diacetyl pyridine- N, N'-dithiodiacetic acid dihydrazone) $(BF_4)_2$ 0.02 M of the ligand were taken in a R. B. flask and mixed with 0.02 M of the metal acetate and 2, 6-diacetyl pyridine. The mixture was then refluxed for around three hours. Afterwards, the mixture was cooled, filtered and dried in a desiccator over anhydrous $CaCl_2$. Then, it was weighed to constant weight. Yield : 1.70 gm. Melting point : 275^0C.

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SYNTHESIS, SPECTRAL AND ANTI-MICROBIAL STUDIES OF OXO-VANADIUM COMPLEXES WITH NEW SCHIFF- BASE LIGANDS

R.B.S.RAIPURIA[1], SADHNA SHRIVASTAVA[1], LAXMI SHARMA[1], P. D. SHAKYA[1] AND V.K.SHRIVASTAVA[2]

[1]Govt. S.L.P.(P.G.) College Morar, Gwalior - 474 001 (India)

[2]Govt. V.R.G.(P.G.) College Morar, Gwalior - 474 001 (India)

E-mail id : rbraipuriya2004@gmail.com

Abstract : The Schiff base ligands have been synthesized by condensation reaction of sulphonamides with substituted and unsubstituted benzaldehyde. The Oxo-vanadium complexes of these Schiff base ligands have been synthesized by taking 1:2 metal ligand ratio in ethanol. The newly synthesized complexes were characterized by elemental analysis and IR, 1HNMR, and UV spectral studies. These studies reveled that all complexes were coordinated to bidentate ligands through nitrogen donor system. All newly synthesized complexes were screened for their antimicrobial activity against selected bacteria.

Key Words :

Introduction :

Catalytic and material properties of vanadium compounds and their effect in biological system have been long provided the impetus and fuel to study of Vanadium and Oxo-vanadium complexes. Oxo-vanadium complexes with Schiff base ligands have attracted interest due its chelating properties and change in biological characteristics. Many of these complexes found applications in biological, clinical and analytical field (1-5). Oxo vanadium complexes can activate many signaling pathways and transcription factors which help in therapeutic applications (6,7). These complexes were widely used as antibacterial (8), antifungal (9) antimicrobial (10-12) insulin mimetic (13) anti diabetic (14) anti cancer (15-18) and anti-neoplastic (19-25) agents. The tremendous importance of these Oxo-vanadium complexes have prompted us to synthesis some new complexes with Schiff base ligands derived from sulphonamides (26-28).

Materials and methods :

Chemicals :

All the chemicals used for the present work such as Ammonium vanadate, Benzaldehyde, Salicyldehyde, 4-Chloro benzaldehyde and 4-Methoxy benzaldehyde. were purchased from sigma Aldrich and use without purification.

Instrumentation :

Elemental analysis (C, H, N, O) were performed using Leeo VTF- 900 CHN S-O Verizon 1.3X (Thermo fisher scientific - USA) instrument. Electronic spectra of solution of the complexes in DMF were recorded on 300 UV-VIS spectrophotometer. IR spectra were recorded as KBR discs using Perkin Elmer 880 spectrophotometer NMR spectra were obtained in DMSO with various 400 MHZ spectrometer using TMS as standard.

Synthesis of Schiff base ligands (Ia-Id) :

Schiff base ligand Ia was synthesised by the condensation of sulphanilamide (0.01M, 1.72gm) with benzaldehyde (0.01 M, 1.06gm) in 1:1 molar ratio in an ethanol solution. Lemon juice 2 ml is added to this mixture as acidic catalyst. The mixture is refluxed for 1-2 hours. The product so obtained was filtered ,washed and recrystallised with ethanol. Colour Yellow; M.P. 187^{0}C.

The other Schiff- Base ligands of the series were synthesized in the similar manner using various substituted aromatic aldehydes (Scheme-I).

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SYNTHESIS, CHARACTERISATION AND THERMAL STUDIES OF MOLYBDENUM(III) COMPLEXES WITH SOME SUBSTITUTED THIOHYDRAZIDES

A.KUMAR[1], D.P.ROY[2], P.K.SINHA[3], V.S.OJHA[4] AND V.KUMARI[5]

P.G. Department of Chemistry, L.S.College, B.R.A.Bihar University, Muzaffarpur - 842 001 (India)

[2]Deptt. of Chemistry, R.B.B.M.College, B.R.A.Bihar University, Muzaffarpur - 842 001 (India)

[3]Deptt. of Chemistry, Motihari Engineering College, Motihari - 845 401 (India)

[4]D.A.V.Public School, Punaichak, Patna - 800 023 (India)

[5]Deptt. of Chemistry, Uma Pandey College, Pusa, Samastipur - 848 125 (India)

E-mail : karbindus@gmail.com

Abstract : The complexes of Molybdenum(III) with some thiohydrazides of composition MoL_3[LH = 4-methyl piperidine-N-thiohydrazide (mpipthH); 4-hydroxy piperidine-N-thiohydrazide (hpipthH); 3-methyl pyrrolidine-N-thiohydrazide (mpyrthH); aniline-N-thiohydrazide (athH); p-hydroxyphenylthiohydrazide (p-hpthH) p-anisidylthiohydrazide (p-anthH); p-tolyl thiohydrazide (p-tthH); Thiophene-2-thiohydrazide (tthH)] have been prepared by refluxing Mo $(CO)_6$ with requisite proportion of bidentate ligands in dry ethanol and air, where Mo(O) was oxidised in oxidation state (III) and stable 1:3 chelates were obtained. The complexes have been characterised by elemental analysis, spectral (UV-VIS; IR, 1HNMR) - studies electrical conductance value, thermogravimetric analysis and magnetic susceptibility measurements. All the complexes were found paramagnetic and displayed magnetic moment value in the range of 3.68 to 3.73 BM, suggesting oxidation state "3 + " for Molybdenum.

Keywords : Thiohydrazides, spectral studies, Thermogravimetric analysis, Magnetic susceptibility measurements.

Introduction :

The Transition metal complexes of thiohydrazides and substituted thiohydrarides are significant antibacterial, antifungal and antitumor agents (1- 4). Molybdenum is the only second transition series metal which is essential for all forms of life-microbial, plants and animals. Homo and Hetero complexes of Mo(III) with bidentate Nitrogen and Sulphur donors are limited (5-6). Dilworth et. al. (7) have prepared some Mo(III) complexes with thiohydrazides. In the present investigation Mo(III) complexes with some substituted thiohydrazides (mpipthH, hpipthH, mpyrthH, athH, p-hpthH, p-anthH, p-tthH, tthH) have been prepared by replacement of CO from Mo $(CO)_6$ in dry ethanol and characterised.

Materilas and methods :

$Mo(CO)_6$, 4-methyl Piperidine, 4-hydroxypiperidine, 3-methyl pyrrolidine were supplied from sigma Aldrich and other reagents were of E-Merek (AR-Grade). The solvents were purified by standard methods & dried before use. The magnetic susceptibility was determined at room temp. by Gouy method, IR-spectra were recorded as KBr pellets or nujol mull in the range 200-400 cm^{-1} region on Perkin-Elmer FTIR spectrometer from RSIC-Chandigarh & partly from P.G.Department of Chemistry, B.R.A.Bihar University, Muz. 1HNMR spectra were recorded from CDRI-Lucknow. The metal ion was estimated by standard methods (8).

All the ligands were synthesised in lab by reported (9-11) methods with some modifications.

Analytical data of Prepared Ligands :

4-Methylpiperidine-N-thiohydrazide (mpipthH), $C_7H_{15}N_3S$; Flaky white; M.P.-100^{0}C; Found (calc.)% C, 48.46 (48.55); H, 8.56 (8.67), N, 24.13 (24.27); S, 18.38

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DETERMINATION OF HEAVY METAL POLLUTANT OF ROADSIDE SOILS IN MORENA, INDIA

LAXMI KANT SHARMA
Department of chemistry, Govt. Adarsh Girls College, Sheopur- 476 337 (India)
E- mail : laxmikantsharma1984@gmail.com

Abstract : The survey was conducted in the high traffic density in Morena (M.P.). Detection of contaminated soil from changes in soil pH, electrical conductivity, moisture content, bulk density and water strength. The wall floor is a clear indicator of vehicle pollution, from which a high level of pollution is expected. Different physico-chemical properties of the soil compared to the other two sites (agricultural and non-agricultural products). The presence of heavy metals such as Cu, Cr, Fe, Pb, Zn and Mn on the roadside was also significant. This study gives residents awareness of avoiding activities such as agriculture, commerce, etc. in the immediate vicinity of the highway due to exposure to these toxic metals.

Key words : Roadside soil, heavy metal, Morena, India

Introduction :

Soil pollution from heavy metals from car sources is a serious environmental problem. The results show that road surfaces near highways are heavily contaminated by heavy metals from motor vehicles (1-2). The streets of the most developed and developing countries are crowded with a number of vehicles day by day due to the growing population and rapid invention and the development of new technology. As a result, our social life improves rapidly, but it has some negative effects on our ecology and environment. The most important road communication system, which plays an important role in our modern economy and in social life, is without doubt the motorways. Nowadays, an increasing number of vehicles on our roads, especially on motorways, are causing various types of environmental problems that will be a major challenge for our civilization in the near future. Contamination of soil and groundwater by heavy metals is one of these serious problems caused by humans (3). Recently, research has focused on heavy metals in urban areas, including those that cars contributed along transport routes (4-5). Environmental management problems in transport-related introduction of heavy metals into the environment vary depending on time, location, intensity of human activity and traffic volume, mobility and bioavailability for the metals (6). Freeways play an important role in the transport of productions and live with the development of the economy. However, the wall floor and the residential area were heavily contaminated due to the rapidly increasing flow of motor vehicles along the highways (7).

Anthropogenic efforts of heavy metals are associated with natural sources, industrialization and agricultural methods. In general, the distribution of heavy metals in the soil is affected by the type of raw material, the climatic conditions and their relative mobility, depending on soil parameters such as mineralogy, texture and classification of the soil (8-9). The pattern of lead deposition, which is reflected in the Pb loads on the earth, showed that the concentration decreases with increasing distance from the road edge. In both places the lead concentration was 15 cm above the background concentration. Some plants contained a high concentration of Pb compared to their respective controls, where the underground parts of the plants gathered more. The cattle grazed near the pastures on the road, of course the milk sample contained lead in an increased concentration (10).

Soils and bushes near the road are immediate receptors for pollution that result from the application of various types

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SYNTHESIS, CHARACTERISATION AND BIOLOGICAL STUDIES OF Cr(III), Ni(II) AND Zinc(II) THIOHYDRAZIDE COMPLEXES

A. KUMAR[1], P. K. SINHA[2], D. P. ROY[3] AND V. S. OJHA[4]

[1]P.G.Department of Chemistry, L.S.College, B.R.A.Bihar University, Muzaffarpur - 842 001 (India)

[2]Department of Chemistry, Motihari Engineering College, Motihari - 845 401 (India)

[3]R. B. B. M. College, B. R. A. B. U. Muzaffarpur 842 001 (India)

[4]D.A.V. Inter College, New Punaichak, Patna - 800 023 (India)

E-mail : karbindus@gmail.com

Abstract : The complexes of Chromium(III), Nickel(II) and Zinc(II) with some new thiohydrazides as Nitrogen and Sulphur chelating ligands of compositions $[CrL(H_2O)_2Cl_2]$; $[CrL_2(H_2O)Cl]$; $[M(LH)_2]X_2$ ($X = Cl^-$, NO_3^- or ½ SO_4^{2-}, $M = Ni^{2+}$) and $[ML_2]$, ($M = Ni^{2+}$ or Zn^{2+}) and [LH = p-tolylthiohydrazide (ptthH), aniline-N-thiohydrazide (athH), 4-methyl piperidine-N-thiohydrazide (mpipthH), 4-hydroxypiperidine-N-thiohydrazide (hpipthH), 3-methyl pyrrolidine-N-thihydrazide (mpyrthH)] have been prepared and characterised by elemental analysis, spectral (UV-vis, IR, ^{1}HNMR) studies, electrical conductance values, thermo gravimetric analysis and magnetic susceptibility measurements at room temperature. Some of the ligands as well as their Ni(II) and Zn(II) complexes exhibit appreciable antifungal activity against Rhizopus & Aspergillus niger fungal stains.

Keywords : Thiohydrazides, Nitrogen and sulphur chelating ligands, spectral analysis, Thermo gravimetric analysis, fungal stains.

Introduction :

Among the nitrogen-sulphur Chelating ligands, thiohydrazides are notable due to wide spectrum of biological activity of thiochelates and their commercial uses like valcanization accelerators for nubber, fingerprint developers, chromatographic supports etc. as well (1-3). Cr(III) is stable, non-toxic essential trace element in mammals and participates in glucose and lipid metabolism (4). The stereochemistry of Ni(II) is quite interesting as it forms a large number of octahedral, trigoral bipyramidal, square pyramidal & four coordinated square planar or tetrahedral complexes. Ni(II) complexes are effective to stabilize photographic image dyes (5). Nickel is involved in a no. of biological processes (6) and several Nickel complexes have catalytic activity (7). Biologically Zinc is also one of the most important metals and a no. of Zinc-sulphur compounds are found commercially useful (8-9). The complexes of substituted thiohydrezides have not been investigated in detail. So in the present investigation we report the preparation & characterisation of complexes of Ni(II) and Zn(II) with some new thiohydrazides, p-tolythiohydrazide (ptthH), Aniline-N-thiohydrazide(athH),4-methypiperidine-N-thiohydrazide(mpipthH), 4-hydroxypiperidine-N-thiohydrazide (h-pipthH), 3-methylpyrrolidine-N-thiohydrazide (mpyrthH).

Material and methods :

4-Methyl Piperidine, 4-hydraxy Piperidine, 3-Methyl Pyrrolidine were supplied from sigma Aldrich and other reagens were of E. Merek (A.R.Grade). The solvents were purified by standard methods and dried before use. The magnetic susceptibility was determined at room temp. by Gouy method. IR spectra were recorded as KBr Pellets or nujol mull in the range 200-400 cm^{-1} on Perkin-Elmer FTIR - Spectrometer. The electronic absorption spectra of the complexes and ligand molecules were recorded in the range of 220-900 nm in ethanol or DMF at RSIC-chandigarh as well as in the P.G.Deptt. of Chemistry, B.R.A.Bihar

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FAST SYNTHESIS OF DIBENZOFURAN FROM XANTHONE

[1]SARBASRI NATH, [2]SHAILENDRA KUMAR SINHA AND [3]RISHIKESH KUMAR
Department of Chemistry
[1]Gurucharan College, Silchar - 788 004 (India)
[2]L.S.College, Muzaffarpur - 842 001 (India)
[3]S.P.College, Dumka - 814 101 (India)
E-mail : sinhals.chem@gmail.com

Abstract : When looking for dibenzofuran - synthesis, most of the papers describe for requirement of high temperature, hours of time of completion of reaction and low yield. Pyrolysis of xanthone at 860^{0}C yields dibenzofuran. However, the yield of dibenzofuran by this method is only 10%. Here dibenzofuran has been synthesised from xanthone by microwave irradiation in single step. This is an example of ring transformation reaction. The reaction is solvent free and instead of this a new solid surface, zinc oxide has been used. Organic transformations carried out under microwave irradiation require shorter reaction periods, involve a very small amount of solvent and the products obtained are in higher yield.

Keywords : Ring contraction, dibenzofuran, xanthone, microwave irradiation, green chemistry, zinc oxide as solid surface.

Introduction :

A novel series of dibenzofuran - piperazine derivatives have been synthesized (1) and found antiplatelet activity. Usnic acid, a dibenzofuran, have been originally isolated (2) from lichens producing secondary metabolites, and is well known as an antibiotic, but is also endowed with several other interesting properties. Benzofuran compounds are a class of compounds that are ubiquitous in nature. Numerous studies have shown that most benzofuran compounds have strong biological activities (3-6) such as anti-tumor, anti-bacterial, anti-oxidative and anti-viral activities. Owing to these biological activities and potential applications in many aspects, benzofuran compounds have attracted more and more attention of chemical and pharmaceutical researchers worldwide, making these substances potential natural drug lead compounds.

Inspired by the medicinal value, we invisaged to design a quick synthesis for dibenzofuran. Pyrolysis of xanthone at 860^{0}C yields dibenzofuran (7). However, the yield of dibenzofuran by this method (Scheme-1) is only 10%. We have been successful in converting xanthone into dibenzofuran by ring transformation reaction under microwave irradiation (Scheme-2). It is solid state reaction. For solid state reaction, the reaction is to perform on solid support (no solvent) which couples effectively with microwave. Silica and alumina are the common solid supports, but we have used a new solid support, zinc oxide and found improved yield.

Organic transformations carried out under microwave irradiation require shorter reaction periods, involve a very small amount of solvent (or no solvent), and the products obtained are in higher yield (8-10).

Materials and methods :

Reaction was carried out under atmospheric pressure in an open vessel adapted to a microwave oven. The compound was identified by ^{1}H NMR and gave satisfactory results in comparison with authentic sample. Melting point was in good agreement with literature data. Melting point was taken in open capillary and is uncorrected. Purity of the compound was checked by TLC. ^{1}H NMR spectrum was recorded in acetone on a Bruker WM 400 MHz spectrometer, using TMS as an internal reference.

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A REVIEW : GREEN SYNTHESIS PREFERRED OVER PHYSICAL AND CHEMICAL SYNTHESIS OF SILVER NANOPARTICLE

[1]GOPAL M. SHENDE, [2]VINOD. S. SHRIVASTAVA, [3]TEJASWINI A. DONGARE

[1]Dept. of Chemistry, RFNS Senior Science College Akkalkuwa - 425 415 (India)

[2]Nanochemistry Research Laboratory, GTP College, Nandurbar – 425 412 (India)

[3]Dept. of Botany, Brijlal Biyani Science College, Amravati – 444 601 (India)

E- mail : gopalmshende111087@gmail.com

Abstact : Nanotechnology emerges as a tool for application in every field as its properties changes at nano level. This review focuses on the distinct features of synthesis of silver nanoparticles by various methods. A detailed study of reduction of silver ion into silver nanoparticles mediated through chemical, physical and most efficient green synthesis method ware demonstrated with brief experimental procedures. These methods includes chemical reduction, microemulsion technique, UV-initiated photo reduction, irradiation, electrochemical reduction method along with green methods includes microwave assistant synthesis, using sunlight and using plants and animals parts including algae, fungi, angiosperm, gymnosperm extract, bacteria, tissue extract and saliva of animals. Some method requires external reducing and stabilizing agent for synthesis where as other uses radiation source. The synthesize nanoparticles with different size and shapes like cubes, triangular, wires etc. ware characterized through U-V visible spectroscopy, Fourier Transform Infra-Red spectroscopy, X- Ray Diffraction analysis, Scanning Electron Microscopy(SEM), and high resolution Transmission Electron spectroscopy (TEM). Nanoparticles ware comparatively analyzed for their absorbance, stabilization of bond, particle size in nanometer and particle shapes contributing configuration respectively. The Clinical significance of silver nanoparticles conferring the antimicrobial activity was studied with the zone of inhibition produced by some pathogenic gram positive and gram negative bacteria and fungus respectively. This review emphasis the ecofriendly, cost effective and nonhazardous, green method of synthesizing nanoparticles by using plants extracts which overcomes the other method with all the way.

Keywords : Green synthesis, UV visible spectroscopy, SEM analysis, FTIR analysis.

Introduction :

The term nanotechnology was define by professor Norio Taniguchi from Tokyo Science university in 1974 as "Nanotechnology mainly consist of the processing of separation, consolidation and deformation of material by one atom or by one molecule" (1). In recent year nanotechnology attracts many researchers as more than lac of research paper has been published in reputed journals. The nanoparticles refers to the particles of size less than 100 nanometer (nm) (2). Due to the large surface area properties of nanoparticle alters optical, magnetic, electrical, thermoelectric, optoelectronic, thermomechanical, antibacterial, catalytic properties at nano leval (3-10). It open the door for interest and wide application of nanoparticles in the field of pharmacy, medicine, industry, biomedical and biofuels as energy production (11-14).

Due to increase in demand by overpopulation causes rapid urbanization and industrialization our environment undergoes great damage by releasing large amount of unwanted and hazardous materials like chemicals and gases (15-16). Now it is our need to learn about the secrets which are present itself in natures and its products, which opens the door of ecofriendly nanoparticle synthesis (17). The methods used to synthesize silver nanoparticle are chemical,

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A REVIEW : SYNTHESIS METHODS AND APPLICATIONS OF NANOMATERIALS

DINESH KANADE
Dept. of Chemistry, Govt.P.G. College, Shendhwa - 451 666 (India)
E-mail : prof.dinesh.kanade@gmail.com

Abstract : Currently nanomaterials gaining attention of all research communities and researchers due to their unique properties such as low-cost, easy preparation, nano size and wide range of applications. Hence in the present study a review of nanomaterial, their synthesis methods and applications have been presented. The nanoparticle synthesis is most potential area of research. Day by day various scientist and researchers have made major advances in the synthesis methods of nanomaterials. In this review various methods for synthesis of nanomaterials such as physical methods and chemical methods have been described and discussed in detail. Furthermore some applications of nanomaterials for industrial wastewater treatment have been reviewed.

Keywords : Nanomaterials, Synthesis methods, Applications, Chemical methods, Physical methods.

Introduction :

Nanomaterials is an emerging field of science that includes synthesis methods and applications of various nanomaterials. Nanomaterials can be ranging in size from 1-100 nm. Presently, different metallic nanomaterials are being produced using zinc, titanium, magnesium, silver, etc. Nanomaterials are classified into three main groups such as, Zero-dimensional, one-dimensional, and two-dimensional. The zero-dimensional nanostructures, represented quantum dots or nanoparticles, have been widely used in biological applications [1,2]. Also, nanomaterials have been used for various purposes such as for industrial wastewater treatment, fuel batteries, cosmetics or clothes [3]. Researchers conducting investigation to develop novel materials with better properties, more functionality and lower cost than the present one. Number of physical and chemical methods have been developed to enhance the performance of nanomaterials [4]. Large number of nanomaterials such as ZnO, PbO, SiO_2, Al_2O_3, Fe_2O_3, etc. But in the present review, metal oxides such as ZnO nanomaterial has been briefly studied. This is due to their remarkable performance in various fields, ZnO nanomaterials are attractive material for many applications such as UV lasers [5], light-emitting diodes [6], solar cells [7], nanogenerators [8], gas sensors [9], photodetectors [10], and photocatalysts [11]. Out of these applications, ZnO nanomaterials are being increasingly used as photocatalysts to remove bacteria and viruses and for the degradation of environmental pollutants such as organics, dyes, and heavy metals under suitable light irradiation [12, 13]. This paper reviews recent research on nanomaterials with an emphasis on ZnO nanomaterials used in photocatalysis. Also studied different methods of synthesis of ZnO nanomaterials. Finally, various applications are highlighted in this paper.

Synthesis methods for nanoparticles :

There are two main approaches for nanoparticle synthesis such as Bottom-up approach and the Top-down approach as shown in Fig.1. Top-down approach involves breaking up of the bulk material in to smaller one, using various physical processes such as crushing, milling or grinding. Typically this method is not suitable for formulating uniform material. But there are certain drawbacks in top-down approach such as imperfection of the surface structure. Such a drawback effect on physical properties and surface chemistry of nanomaterials. It is well known that the conventional top-down technique can cause significant crystallographic damage to the processed patterns. Bottom-