MILIND COLLEGE OF SCIENCE

Nagsenvana, Aurangabad - 431002

Web:www.milindscience.in

NACC Accredited B + College

3.3: Research Publications and Awards

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People's Education Society's (Mumbai)

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Fax : (0240) 2372758

MILIND COLLEGE OF SCIENCE

Nagsenvana, Aurangabad - 431 002, (Maharashtra State)

FOUNDER : BODHISATVA BHARATRATNA DR. BABASAHEB AMBEDKAR

M.A., Ph.D., D.Sc. (London), LL.D. (Columbia), D.Litt. (Osmania), Barrister-at-Law

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CHAIRMAN
Dr. S.P. Gaikwad
G.C.A.M.

I/C PRINCIPAL
Dr. S.D. Rathod
M.Sc., Ph.D.

Ref. No. MCS/2022-2023/385 C

Date : 15/12/2022

Justification Letter 3.3.1

This is to be justified that as per suggested by DVV clarification, the college has uploaded the documents on the website landing to the paper/article and the link is enclosed in Data Template.The college uploaded the screenshots of research articles clearly showing the title of the article, affiliation, name of the journal, year and authors name if the links and DOI number are not available with Indication of data template against each paper about the presence of the paper in the UGC CARE list/Scopus/Web of Science/other clearly.

Kindly, consider it.

Thank you.

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Milind College of Science,
Aurangabad

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M.Sc., Ph.D.

CO-ORDINATOR
Dr. A.S. Munde
M.Sc., Ph.D., SET

INTERNAL QUALITY ASSURANCE CELL

Criterion – III Research, Innovations and Extension

3.3: Research Publications and Awards

3.3.1 : Number of research papers published per teacher in the Journals on UGC care list during the last five years

3.3.1.1 : Number of research papers in the Journals notified on UGC CARE year wise during the last five years

Sr. No.	Academic Year	Number of Papers	Web-link for Supporting Document
1	2021-2022	09	http://milindscience.in/wp-content/uploads/2022/11/3.3.1.MCS-SSR-Papers-2021-22-Suppo.Docu_.pdf
2	2020-2021	04	http://milindscience.in/wp-content/uploads/2022/11/3.3.1.-MCS-SSR-Papers-2020-21Suppo.Docu_.-pagenumber.pdf
3	2019-2020	10	http://milindscience.in/wp-content/uploads/2022/11/3.3.1.MCS-SSR-Papers-2019-20-Suppo.Docu_pagenumber.pdf
4	2018-2019	21	http://milindscience.in/wp-content/uploads/2022/11/3.3.1.-MCS-SSR-Paper-2018-19-Suppo.Docu_.-Final.pdf
5	2017-2018	25	http://milindscience.in/wp-content/uploads/2022/11/MCS-SSR-3.3.1.Papers-2017-18-Supo.Docu_pagenumber.pdf

3.3.1 Number of research papers published per teacher in the Journals notified on UGC website

Title of paper	Name of the author/s	Department of the teacher
2021-2022		
Ionic liquid [Et3NH][HSO4] Pramoted one	**Dr.S.D.Rathod**	**Chemistry**
Ulta sound assistanted One -Pot Green syn	**Dr.S.D.Rathod**	**Chemistry**
Synthesis and antimicrobial study of metal	**Dr.S.D.Rathod**	**Chemistry**
Synthesis,charecterization and QSAR study	Dr.A.S.Munde	**Chemistry**
Electrical Properties and Hydrogen absorp	Dr.A.S.Munde	**Chemistry**
An Outlook for sample prepation in XRD a	Dr.A.S.Munde	**Chemistry**
Green and efficient one Pot synthesis of P	Dr.K.N.Vidhate	**Chemistry**
Synthesi, charecterization,themal,X-ray an	Dr.S.R.Annapur	**Chemistry**
Ulta sound assistanted One -Pot Green syn	Dr.R.A.Waghmare	**Chemistry**
2020-2021		
Spectral,thermal,XRD study of new LA(III)	**Dr.S.D.Rathod**	**Chemistry**
Multivalled Carbon Nanotubes based Solid	Dr.A.S.Munde	**Chemistry**
Spectral,thermal,XRD study of new LA(III)	Dr.S.R.Annapur	**Chemistry**
Liquid-Liquid Extraction and separation of	Dr.K.N.Vidhate	**Chemistry**
2019-2020		
Spectrophotometric and kinetic study of H	**Dr.S.D.Rathod**	**Chemistry**
Determination of composition and stability	**Dr.S.D.Rathod**	**Chemistry**
Functionalization of Multiwalled carbo	Dr.A.S.Munde	**Chemistry**
MgO Supported AI_2O_3oxide:synthesis a	Dr.K.N.Vidhate	**Chemistry**
Extraction and separation studies Iridiu	Dr.K.N.Vidhate	**Chemistry**
Synthesis of Benzimidazole derivatives	Dr.K.N.Vidhate	**Chemistry**
Synthesis and characterization of MgO	Dr.K.N.Vidhate	**Chemistry**
Use of Spectral reflectance for sensetive	Dr.D.V.Kurmude	**Physics**
Dhage Iteration method for IVPs of non	Dr.S.D.Sarkate	**Mathematics**
Effect of EMS and SA all Pollen sterlity	Dr.M.P.Kulthe	**Botany**
2018-2019		
Plant Based Reducing Agent for Nickel	Dr.A.S.Munde	**Chemistry**
NANO MATERIAL FOR AGRICULT	Dr.A.S.Munde	**Chemistry**
ALPO4-stalibity catalysed one pot synt	Dr.K.N.Vidhate	**Chemistry**
NANO MATERIAL FOR AGRICULT	Dr.R.A.Waghmare	**Chemistry**
One pot Three component Synthesis of	Dr.A.S.Munde	**Chemistry**
NANO MATERIAL FOR AGRICULT	Dr.R. S. Yannawar	**Electronics**
Charged-Coupled device (CCDs) in As	Dr.R. S. Yannawar	**Electronics**
NANO MATERIAL FOR AGRICULT	Dr.D.V.Kurmude	**Physics**
Aspect,Domains and tools of heritage c	Dr.D.V.Kurmude	**Physics**

Role of Big data in Agriculture	Dr.D.V.Kurmude	**Physics**
Artificial Intengency: Simply Human li	Dr.D.V.Kurmude	**Physics**
Nonotechnology driven past,present an	Dr.D.V.Kurmude	**Physics**
Nano'making a big difference.	Dr.D.V.Kurmude	**Physics**
Role of ICT in Education	Dr.D.V.Kurmude	**Physics**
Dhage Iteration method for IVPs of nonlin	Dr.S.D.Sarkate	**Mathematics**
On the Homogenius Cone 3x2-8Y2=25	Dr.S.D.Sarkate	**Mathematics**
Factoribility in the Ring Z Ipi5I	Dr.S.D.Sarkate	**Mathematics**
Veriability in fatty acid composition an	Dr.M.P.Kulthe	**Botany**
Effect of Cooking methods on protease	Dr.M.P.Kulthe	**Botany**
Some medicinal plant in milind college	Dr.M.P.Kulthe	**Botany**
Post -Harvest diSsease of fruits and veg	Dr.M.P.Kulthe	**Botany**

2017-2018

Synthesis, Characterization and Antimi	**Dr.S.D.Rathod**	**Chemistry**
Synthesis of Novel Isoxazoline derivati	**Dr.S.D.Rathod**	**Chemistry**
Synthesis of novel Cyanopyridine deriv	**Dr.S.D.Rathod**	**Chemistry**
Design, Synthesis and *In-Vitro* Anti-in	Dr.A.S.Munde	**Chemistry**
DESIGN, SYNTHESIS, AND PHARM	Dr.A.S.Munde	**Chemistry**
Surface area measurement of Carbon N	Dr.A.S.Munde	**Chemistry**
Study of Variables stars using small opt	Dr.R. S. Yannawar	**Electronics**
Teaching Astronomy in Higher Educati	Dr.R. S. Yannawar	**Electronics**
Variable Star Astronomy	Dr.R. S. Yannawar	**Electronics**
Synthesis and In Vitro Anti-Inflammato	Dr.R.A.Waghmare	**Chemistry**
Synthesis and in Vitro Anti-Inflammato	Dr.R.A.Waghmare	**Chemistry**
Synthesis and in vitro Anti-inflammator	Dr.R.A.Waghmare	**Chemistry**
Synthesis and In Vitro Anti-inflammatory A	Dr.R.A.Waghmare	**Chemistry**
Synthesis and *in vitro* Anti-inflammatory A	Dr.R.A.Waghmare	**Chemistry**
Synthesis and characterization of dehyc	Dr.S.R.Annapur	**Chemistry**
Antioxidant ,Antimicrobial study of synthe	Dr.S.R.Annapur	**Chemistry**
Synthesis and characterization of dehyc	Dr.S.R.Annapur	**Chemistry**
ONE POT SYNTHESIS OF NITRILES FR	Dr.A.S.Munde	**Chemistry**
Synthesis, Characterization and Antimi	Dr.A.S.Munde	**Chemistry**
Educational Diamensions for Value based I	Dr.D.V.Kurmude	**Education**
Differtial Inqualities and comparison princi	Dr.S.D.Sarkate	**Mathematics**
Mathematics Education	Dr.S.D.Sarkate	**Mathematics**
Kamal Decomposition Methods for Solving	Dr.S.D.Sarkate	**Mathematics**
To increase Digestibility of winged bean us	Dr.M.P.Kulthe	**Botany**

e during the last five years

Name of journal	Year of publication	ISSN number
Bulletin of Environment ,Pharm	**2022**	**2277-1808**
Bulletin of Environment ,Pharm	**2022**	**2277-1808**
IJPSR	**2022**	**23220-5148**
Wesleyan Journal of Research	2021	0975-1386
IJBPSA	2021	2277-4998
IJBPSA	2021	2277-4998
VIIRJ	2021	2319-4979
JASR	2022	0976-9595
Bulletin of Environment ,Pharm	**2022**	**2277-1808**
Heterocyclic Letters	2020	2230-9632
A Journal of Physical Science and	2021	2454-5767
Heterocyclic Letters	2020	2230-9632
journal of Applicable chemistry	2021	2278-1862
Bioinfolet	2020	
Bioinfolet	2020	
Materials Today :Proceeding	2020	***3860-3862***
Chemistry and Chemical Technol	2020	
JBCC	2019	2454-7476
JBCC	2019	2454-7476
JBCC	2019	2454-7476
IJSTR	2019	2277-8616
Internation Journal of Mathemat	2019	
Plantia Scientia	2019	
JBCC	2019	2454-7476
International Journal of Advance	2019	2394-7780
Journal of Global Researcher		2395-3160
International Journal of Advance	2019	2394-7780
AJOMC	2018	
International Journal of Advance	2019	2394-7780
VRJFPS	2018	2348-7976
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CSI	2018	

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Internation Journal of Mathemat	2018	
	2018	2277-5730
	2018	2277-5730
Bioinfolet	2019	
Bioinfolet	2019	
Bioinfolet	2019	
Journal of Global Resources	2019	2395-3160
IJCRGG	2017	0974-4290
Der Pharma Chemica	2017	0975-413X
IJCRGG	2017	0974-4290
Journal of Ultra Chemistry	2018	0973-3450
AJPCR	2017	2455-3891
IJSRSET	2018	2395-1990
Power of Knowledge	2018	2320-4494
Power of Knowledge	2018	2320-4494
IWR	2018	2349-1027
IJCRGG	2017	2455-9555
AJRC	2017	0974-4150
IJHC	2017	2456-4311
AJRC	2017	0974-4150
AJOMC	2018	
IJCRGG	2017	2455-9555
AJRC	2017	0974-4150
IJCTR	2017	2455-9555
Heterocyclic Letters	2017	2230-9632
IJCTR	2017	2455-9555
The Magnificance of Humbles	2017	
Internation Journal of Mathemat	2018	2347-1557
Royal	2017	2278-8158
GALAXY-LINK	2017	2319-8508
Recent Trends In Life Sciences fo	2017	978-80876-11-5

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3.3.1 : Number of research papers published per teacher in the Journals on UGC care list during the last five years

3.3.1.1 : Number of research papers in the Journals notified on UGC CARE year wise during 2021-22 -09

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2021-2022

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3.3: Research Publications and Award

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2019-2020

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3.3.1 : Number of research papers published per teacher in the Journals on UGC care list during the last five years

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ORIGINAL ARTICLE **OPEN ACCESS**

Ionic liquid $[Et_3NH][HSO_4]$ promoted One-pot Synthesis of 1, 3-Benzoxazoles with Substituted Thiazolidinone Moiety

Anil R. Baswat[1], Sanket R. Rathod[1,2]*, Shantilal D. Rathod[2]
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ABSTRACT

A significant, One-pot Synthesis of 1, 3-benzoxazoles with substituted thiazolidinone moiety using 2-(4-amino phenyl) benzoxazole, substituted aromatic aldehyde, and thiaglycolic acid under $[Et_3NH]$ $[HSO_4]$ ionic liquid. Ionic liquid has been used as a rapid, greener, and reusesionic liquid for the synthesis of 1, 3-benzoxazoles with substituted thiazolidinoneunder solvent-free conditions.This methodology's numerous advantages are non-corrosiveness, safety, little waste, generality, simplicity, ease of isolation, short reaction times, better yields, and environmental friendliness.
Keywords: *$[Et_3NH]$ $[HSO_4]$, Ionic liquid, 1, 3-benzoxazoles,thiazolidinone,multicomponent reactions.*

Received 11.02.2022 Revised 19.03.2022 Accepted 24.04.2022

INTRODUCTION

Multi-component reactions have proven to an extremely effective at producing compounds in a single step and development of new MCRs, as well as the improvement of existing multi-component reactions, is a hot topic right now [1-4].MCRs contribute significantly to the convergence synthesis of organic compounds' simple, commonly available starting components [5-7].

Sulfur heterocycles, such as the thiazole, have been labeled "privileged structures" because of their presence in biologically active natural compounds, medicines, and a variety of synthetic intermediates[8]. During the process of probing structural activity relationships (SAR) for lead optimization, thiazole can also be employed as an amide isostere or in a scaffold hopping strategy. As a result, thiazoles are commonly used as the main structure in the synthesis of chemical library resources or in drug design. Many thiazole compounds have been produced in recent decades and tested for a variety of biological activities[9]. Among these numerous classes, thiazolidine-4-ones are of special interest to researchers due to their efficacy in several biologically active compounds such as anti-bacterial[10-14], anti-tumor[15], anti-tubercular[16],anti-fungal[17],anti-viral[18], anti-inflammatory [19], and etc. Several of these procedures, however, limitations are extended reaction durations, dangerous organic solvent, high acidic conditions, time-consuming workups, and the use of significant amounts of catalyst.

ILshaveenvironmentally acceptable solvents, catalysts, and reagents for chemical transformations due to their exceptional properties such as superior chemical stability, lack of flammability, and low volatility [21-27].They have notable qualities such as low vapour pressure, nonflammability, recyclable capabilities, and organic substances. Because of their fascinating physical and chemical features, ionic liquids have been used in a variety of applications. ILs have been successfully employed in cyclo condensation reactions, Prins reactions, and Oxa-Michael additions, among other chemical reactions [28-30]. As a result, we developed a moderate generalized to synthesis 1, 3-benzoxazoles with substituted thiazolidinone moiety using ionic liquid $[Et_3NH]$ $[HSO_4]$ under solvent-free environments.

MATERIAL AND METHODS

The chemicals were bought in a store and used without purification. The melting points were measured in an open capillary tube with no corrections. $CDCl_3$ was used as the solvent for ^1H and ^{13}C-NMR on a Bruker Avance II 400 spectrometer. The IR spectra were captured in KBr using a Perkin-Elmer RXI spectrometer.

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ORIGINAL ARTICLE **OPEN ACCESS**

Ultrasound Assisted One-Pot Green Synthesis of Highly Substituted Pyrazoles Catalyzed by [DBUH][OAc] Ionic Liquid

Sanket R. Rathod[1,2], Rahul A. Waghmare[2], Shantilal D. Rathod[2]*
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ABSTRACT

A significant, one-pot synthesis of highly substituted pyrazoles derivativevia three-component condensations of Aromatic aldehyde, Malononitrile, along with Phenylhydrazine in the presence of ionic liquid [DBUH][OAc]. The present technique provides significant advantages, including reduced environmental impact, simple procedure, shorter reaction time, mild condition, and ease of product recovery. The ionic liquid reusability and recovery make the protocol eco-friendly. Also, a series for 5-amino-1,3-diphenylpyrazole-4-carbonitrile analogues were synchesised. For the comparison between conventional and ultrasound techniques. It was observed that the ultrasound irradiation technique gave excellent yield and shorter reaction time than the conventional technique.

Keywords: *pyrazole, multicomponent reaction, ionic liquid, [DBUH][OAc], ultrasound irradiation.*

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INTRODUCTION

In pharmaceutical research, five-membered N-linked heterocyclic molecules have attracted much interest. For synthesizing five-membered heterocyclic compounds, the condensation reaction suitable sequential compound is the most popular alternative approach [1-4]. Pyrazole ring is a prominent motif which among the provide reported as having outstanding pharmacological and biological activity such as antimicrobial [5], antiviral [6], anti-inflammatory [7], anticonvulsant [8], anti-depressant [9], antitumor [10], as well as fungicidal properties [11,12]. Several pyrazole derivatives exhibit significant pharmacological properties and are valuable materials in pharmaceutical research. Some of the pyrazole-containing drugs like Antipyrine, Celecoxib, Mepirizole, Rimonabant, Lonazolac, and Tepoxalin, etc. The structure of drugs has been shown in Figure 1[13-18].

Multicomponent reactions (MCRs) is the preferable approach because it allows for high throughput chemical synthesis at a low cost and in a shorter reaction time. Because it generates significant compounds in a single step by forming multiple new bonds in a one-opt, the approach has prompted a lot of interest in organic chemistry. In both drug discovery and green chemistry [19,20]. in the last decade, the growth of three and four-component reaction has been considerable and there is still a lot of effort being put into developing new MCRs [21,22].In currentcenturies, ionic liquids (ILs) have obtained a noteworthy attention in the context of eco-friendly green synthesis since they can also be used as effective media for organic synthesis [23-25]. Non-volatility, non-explosive, low vapour pressure, reusable, easily operated, as well as thermally stable over a wide temperature range are only several of the physicochemical features of ILs. Due to their specific ionic character and structural organization, ionic liquids can be regarded as alternative greener solvents [26,27]. In organic synthesis, there are numerous reports about the application of ILs such as Biginelli reaction [28], Friedel-Crafts reaction [29], Beckmann rearrangement [30], Diels-Alder reaction [31], Heck reaction [32], Pechmann condensation [33], and more reactions [34-38].Recently, the technique of synthesizing organic molecules using ultrasound irradiation is very effective and attractive. Ultrasound irradiation is used to increase the rate of a chemical reaction by ultrasonic cavitation mechanism, mass transfer in the microenvironment can be accelerated, which is the formation of microbubbles, growth, and impulsive collapse. High temperature and pressure are generated by collapsing bubbles, resulting in hot spots with enough energy to promote chemical reactions [39-43]. This method is considered in terms of conserving energy, reducing reaction time, improving yield and waste minimization [44,45]. In the current work, effective implementation of

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SYNTHESIS AND ANTIMICROBIAL STUDY OF METAL COMPLEXES OF SM (III), EU (III) AND ASYMMETRICAL LIGAND DERIVED FROM DEHYDROACETIC ACID

Narayan P. Adlinge [1], Satish B. Jadhav [3] and Shantilal D. Rathod [*2]

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Department of Chemistry [2], Milind College of Science, Aurangabad - 431002, Maharashtra, India.
R. B. Attal Art's, Science and Commerce College [3], Georai - 431127, Beed, Maharashtra, India.

Keywords:

Tetradentate schiff base, Salicylaldehyde, Powder X-ray diffraction, TGA/DSC spectral analysis and antimicrobial activity

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ABSTRACT: Tetradentate Schiff bases are synthesized from o-phenylenediamine, 5-bromo Salicylaldehyde, and 3-Acetyl-6-methyl-pyran-2, 4-dione, and then its colored complexes of Sm (III) and Eu (III) are formed. The structure of ligand and complexes are characterized by elemental analysis, magnetic susceptibility, thermal analysis, X-ray diffraction, 1H-NMR, mass, IR, UV-visible spectra, and conductometry. TGA/DSC spectral and kinetic parameter of the complexes was studied eagerly. The x-ray diffraction data proposes Tetragonal crystal system for Sm (III) complexes and orthorhombic for Eu (III) complexes. The ligand and their metal complexes were subjected for antibacterial activity against Escherichia coli, *Staphylococcus aureus*, Pseudomonas Aeruginosa using the agar cup-plate method, and antifungal activity was observed by poison plate method against *Aspergillus niger*, *Aspergillus flavus*, *Penicillium chrysogenum*. The results obtained above are in good agreement with previous findings with respect to the comparative activity of the free ligand and its complexes. The result of an investigation of antimicrobial activity indicates that all the ligands show an inhibitory effect against all the pathogens.

INTRODUCTION: In the present investigation, study of various colored complexes of Sm(III), Eu(III) with tetradentate ligands (Schiff Base)were synthesized and characterized. The novel series of lanthanides of tetradentate Schiff bases formed by the reaction of o-phenylenediamine, dehydroacetic Acid (DHA) and 5-bromo salicylaldehyde.

QUICK RESPONSE CODE

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This article can be accessed online on www.ijpsr.com

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MATERIALS AND METHODS:

Experiments: The reagents, solvents, DHA, o-phenylenediamine and 5-bromo salicylaldehyde of AR grade supplied by Merck were used for the synthesis of ligand. All metal chlorides used for synthesis of complexes are also AR grade.

Instrumentation: ^{1}H-NMR was recorded on FT NMR spectrometer (400 MH_z) model Advance-II (Bruker) in $CDCl_3$ as a solvent and tetramethylsilane as the internal standard. C, H, N was carried out on Thermo Scientific (FLASH 2000) CHN elemental analyzer. IR study has been carried out on Perkin Elmer-Spectrum RX-I FTIR spectrometer using KBr pellets.

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Research article: (Chemistry)

SYNTHESIS, CHARACTERIZATION AND QSAR STUDY OF 2-(5-METHYL-4-PHENYLTHIAZOL-2-YL)-4-OXOTHIAZOLIDINE-5-CARBOXYLIC ACID DERIVATIVES

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ABSTRACT

In this present work, we report a green and eco-friendly procedure for the synthesis of various different derivatives of Schiff bases N-((5-methyl-4-phenylthiazol-2-yl) methylene) aniline. These derivatives were synthesised by 5-methyl-4-phenylthiazole-2-carbaldehyde, substituted anilines, and reaction mixture was irradiated with microwave at 20% power to furnish Schiff bases N-((5-methyl-4-phenylthiazol-2-yl) methylene) aniline derivatives. The products react with 2-Mercapto-malonic acid, dry dioxane in scientific microwave oven (20%, 140 watts), on cyclocondensation gave different 2-(5-methyl-4-phenylthiazol-2-yl)-4-oxothiazolidine-5-carboxylic acid derivatives with good yield. Library of such 2-(5-methyl-4-phenylthiazol-2-yl)-4-oxothiazolidine-5-carboxylic acid derivatives has been generated and the structures were exposed to PASS to check probabilities of biological activity. QSAR study of the library was carried out to find the most active molecules.

Key words: cyclocondensation; 2-Mercapto-malonic acid; microwave; Schiff bases

Article History

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Corresponding author: Santosh R. Kshirsagar

1. Introduction:

The 4-oxo-thiazolidine is an important class of heterocyclic compounds had wide spectrum of biological activities. The 4-oxo -thiazolidines occupies significant place in medicinal field.[1] Initially 4-oxothiazolidine are

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ELECTRICAL PROPERTIES AND HYDROGEN ADSORPTION OF MULTIWALLED CARBON NANOTUBES OBTAINED FROM *AZADIRACHTA INDICA OIL*

ACHUT SADASHIV MUNDE[1*], VINOD ANNASAHEB LOHAKANE[1], RATNAKAR JAGDISH HOLE[1], SANDESH VINAYAKRAO JAYBHAYE[2]

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ABSTRACT

Neem oil *(Azadirachta indica)* is a vegetable low cost nonedible oil obtained from its fruits and seeds. Due to easily available in nature with plenty of abundance, and being a rich source of carbon, it can be used as organic precursor for the synthesis of Multiwalled carbon nanotubes (MWCNTs). In this study, we experimented the synthesis MWCNTs by using spray pyrolysis of neem oil over cobalt catalyst under the influence of argon atmosphere at 850°C. As synthesized MWCNTs were purified using acid treatment and characterized for structural confirmation. The electronic properties of as synthesized and purified MWCNTs was studied using four probe method. We studied the influence of acid treatment to MWCNTs on Surface area, Electrical properties and Hydrogen gas adsorption.

Keywords: Adsorption, spray pyrolysis, BET, Semiconductor

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AN OUTLOOK FOR SAMPLE PREPARATION IN XRD ANALYSIS OF PHARMACEUTICAL SOLIDS

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ABSTRACT

Evaluation of polymorphic forms of sample specimens has secured an inevitable importance across the pharmaceutical industry as it is scientifically proven that, the alteration of small change in polymorphic form of drug substance and/or drug product may end up with significant changes in physico-chemical properties of solids. The aforesaid polymorphic evaluation can be achieved by powder XRD technique which is primary analytical tool globally used by crystallographers for the determination of polymorphic forms. However sample preparation is key attribute while using powder XRD tool for said evaluation. The illegitimate sample preparation may lead to ambiguous data and falsification of conclusion. As sample specimens meant for polymorphic assessment may have different physical nature, a practical and enriched skill-set is required to reach to the desired goal. In this paper, we focused on various sample types, their physical nature, polymorphic targets and road map for sample preparations. Also we covered expectations of regulatory agencies from pharmaceutical industries as far polymorphic data is concerned.

Keywords: Powder XRD, Regulatory agency, Ointments, DPIs, Suspensions

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(2021-22)

A GREEN AND EFFICIENT ONE-POT SYNTHESIS OF POLYHYDROQUINOLINE DERIVATIVES CATALYZED BY AMMONIUM CHLORIDE UNDER AQUEOUS MEDIA

B.D. Aghav[1], S.A. Shaikh[2], N. Roy[3] and K.N. Vidhate[4]

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ABSTRACT

An efficient and eco-friendly one-pot four component synthesis of polyhydroquinoline derivatives from dimedone, aromatic aldehydes, ethylacetoacetate and ammonium acetate in the presence of catalytic amount of ammonium chloride under aqueous media is reported.The present approach of this protocol offersuse of green solvent, short reaction time, high yields, operational simplicity and simple workup.

Keywords: *Polyhydroquinoline, one-pot synthesis, eco-friendly, aqueous media*

Introduction

Heterocyclic compounds particularly containing nitrogen have attracted considerable attention in modern synthetic chemistry as these compounds play a key role in the fields of natural products, medicinal chemistry and materials chemistry. Among the important heterocyclic compounds, Quinolines having 1,4-dihydropyridine nucleus has attracted the enormous attention of organic and pharmaceutical chemists because of their significant biological activity and pharmacological properties[1-2].1,4-Dihydropyridines possess a range of biological activities, some of the biological activities exhibited by them are anti-atherosclerotic, bronchodilator, vasdilator, hepatoprotective, anti-hypertensive, anti-diabetic, geroprotective and antitumor agents[3-6]. 1,4- DHPs exhibit variety of pharmacological and medicinal properties and have been found to be effective as calcium channel blockers [7] and thus used in the therapeutic treatment of cardiovascular diseases [8]such as hypertension, angina pectoris, supraventricular tachycardia [9]. Literature have disclosed that these compounds also exhibits certain medicinal applications such as chemo sensitizer in tumor therapy, memory enhancing power, platelet anti-aggregatory activity, neuroprotectant, anti-inflammatory activity, antithrombotic activity [10-12].

In recent years, from the environmental and economic view point it is advisable to develop environmentally benign processes and avoid the use of solvents which are hazardous, responsible for environmental pollution and suspected human carcinogens. The use of water as an eco-friendly and easily available solvent in chemical reaction is the new trend in organic synthesis and important area of research. The use of water as a solvent shows valuable gains as it is most abundant and non-toxic. Water is polar solventhence immiscible with majority of organic compounds, therefore the water soluble by-products stays and isolation of organic compound is easy. Multicomponent reaction (MCR) is one of the most powerful and efficient tools in organic synthesis for the fabrication of biologically important compounds in the perspective of green chemistry. Multicomponent reactions offer advantages of atom economy, high yields and one-pot operation and aregreatly influenced by selection of suitable solvent and efficient catalyst [13-15].

Commonly used method reported for the synthesispolyhydroquinoline derivatives involves the one-pot, four component reaction of dimedone, aromatic aldehydes, ethyl acetoacetate and ammonium acetate in the presence of a variety of catalyst. The synthesis of these heterocyclic molecules is therefore extensively studied in the presence of organic solvents and catalysts [16-21].Recently the synthesis of polyhydroquinoline derivatives have been carried out using microwaves [22], ionic liquids [16], TMSCl-NaI [23], metal triflates [24], molecular iodine [25], $SiO_2/NaHSO_4$[26], $SiO_2/HClO_4$[27], ceric ammonium nitrate [28], tetrabutylammonium hydrogen sulfate [29], fermenting baker's yeast [30], organocatalyst [31]. Many of these methods are unsatisfactory as they suffer from

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Research Article

SYNTHESIS, CHARACTERIZATION, THERMAL, X-RAY AND ANTIMICROBIAL STUDY OF ZN (II) METAL COMPLEXES OF DEHYDROACETIC ACID BASED NEW SCHIFF BASES

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ABSTRACT

Tetradentate complexes of Zn (II) of Schiff bases derived from DHA, o-phenylenediamine, 4- N, N, Diethyl amino Salicylaldehyde (L1) and Dehydroacetic Acid (DHA), 4-methyl-o-phenylenediamine, 5-bromo Salicylaldehyde (L2) have been synthesized and characterized by elemental analysis, magnetic susceptibility, thermal analysis, X-ray diffraction, ^{1}H-NMR, Mass, IR,UV visible spectra and conductometry. The ligand field parameters have been characterized and found to have octahedral geometry. Thermal behavior (TG/DSC) of the complexes was studied. X-Ray diffraction study reveals monoclinic crystal system. The ligand and its complexes were subjected for antibacterial activity against *Escherichia coli* and *Staphylococcus aureus* and fungicidal activity against *Trichoderma and Aspergillus Niger*.

Keywords: Tetradentate ligand, Dehydroacetic acid, TGA/DSC, X-Ray diffraction.

1. INTRODUCTION

Dehydroacetic Acid (DHA) has antimicrobial effect against bacteria, yeast and molds and used as preservative in food factories & as fungicide with virtuous co-ordination properties [1]. So researchers are infatuated to synthesize metal complexes of Schiff bases choosing it as nucleus. Indicated metal complexes are used in Catalysis [2], DNA cleavage [3], antifungal [4], antitumor [5], antibacterial agents [6]. Zinc has decent co-ordination with N,O, donor Schiff bases. In the present study, tetradentate Zn (II) complexes derived from, DHA, o-phenylenediamine, 4-N, N Diethyl amino Salicylaldehyde (L1) and DHA, 4-methyl-o-phenylenediamine, 5-bromo Salicylaldehyde (L$_2$) have been synthesized and characterized.

2. MATERIAL AND METHODS

2.1. Reagents and solvents

Dehydroacetic Acid (DHA), o-phenylenediamine, 4-N,N-Diethylamino Salicylaldehyde, 4-methyl-o-phenylene diamine, 5-bromo Salicylaldehyde from Merck of AR grade were used as supplied for synthesis of ligand. AR grade Zinc chlorides used for the synthesis of complexes.

2.2. Synthesis of ligand

In the first step, mono-Schiff base compound was prepared by refluxing 50 ml solution of 10mmol of DHA and 10mmol o-phenylenediamine, 4-methyl-o-phenylenediamine in super dry ethanol for about 3h. The progress of reaction was monitored by thin layer chromatography. Mono-Schiff base thus formed was then refluxed with 10mmol 4-N, N Diethyl amino Salicylaldehyde/5-bromo Salicylaldehyde to prepare asymmetric ligand. Product was then cooled at room temperature and collected by filtration, and recrystallized by ethanol (Yield: L1-87, L2-85 %).

2.3. Synthesis of metal complexes

To a hot methanolic solution (25ml) of the ligand (0.01 mol), methanolic solution (25ml) of zinc chloride (0.01 mol) was added with constant stirring and refluxed for about 3 h. The pH of reaction mixture was adjusted to 7.5-8.5 by adding 10 % alcoholic ammonia. The precipitated solid colored metal complexes was filtered off in hot condition and washed with hot methanol, petroleum ether (40°-60°) and dried over calcium chloride in vacuum desiccators (yield: 65 %).

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ORIGINAL ARTICLE **OPEN ACCESS**

Ultrasound Assisted One-Pot Green Synthesis of Highly Substituted Pyrazoles Catalyzed by [DBUH][OAc] Ionic Liquid

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ABSTRACT

A significant, one-pot synthesis of highly substituted pyrazoles derivativeVia three-component condensations of Aromatic aldehyde, Malononitrile, along with Phenylhydrazine in the presence of ionic liquid [DBUH][OAc]. The present technique provides significant advantages including reduced environmental impact, simple procedure, shorter reaction time, mild condition, and ease of product recovery. The ionic liquid reusability and recovery make the protocol eco-friendly. Also, a series for 5-amino-1,3-diphenylpyrazole-4-carbonitrile analogues were synthesised. For the comparison between conventional and ultrasound techniques. It was observed that the ultrasound irradiation technique gave excellent yield and shorter reaction time than the conventional technique.

Keywords: *pyrazole, multicomponent reaction, ionic liquid, [DBUH][OAc], ultrasound irradiation.*

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INTRODUCTION

In pharmaceutical research, five-membered N-linked heterocyclic molecules have attracted much interest. For synthesizing five-membered heterocyclic compounds, the condensation reaction suitable sequential compound is the most popular alternative approach [1-4]. Pyrazole ring is a prominent motif which among the provide reported as having outstanding pharmacological and biological activity such as antimicrobial [5], antiviral [6], anti-inflammatory [7], anticonvulsant [8], anti-depressant [9], antitumor [10], as well as fungicidal properties [11,12]. Several pyrazole derivatives exhibit significant pharmacological properties and are valuable materials in pharmaceutical research. Some of the pyrazole-containing drugs like Antipyrine, Celecoxib, Mepirizole, Rimonabant, Lonazolac, and Teposalin, etc. The structure of drugs has been shown in Figure 1[13-18].

Multicomponent reactions (MCRs) is the preferable approach because it allows for high throughput chemical synthesis at a low cost and in a shorter reaction time. Because it generates significant compounds in a single step by forming multiple new bonds in a one-opt, the approach has prompted a lot of interest in organic chemistry. In both drug discovery and green chemistry [19,20], in the last decade, the growth of three and four-component reaction has been considerable and there is still a lot of effort being put into developing new MCRs [21,22].In currentcenturies, ionic liquids (ILs) have obtained a noteworthy attention in the context of eco-friendly green synthesis since they can also be used as effective media for organic synthesis [23-25]. Non-volatility, non-explosive, low vapour pressure, reusable, easily operated, as well as thermally stable over a wide temperature range are only several of the physicochemical features of ILs. Due to their specific ionic character and structural organization, ionic liquids can be regarded as alternative greener solvents [26,27]. In organic synthesis, there are numerous reports about the application of ILs such as Biginelli reaction [28], Friedel-Crafts reaction [29], Beckmann rearrangement [30], Diels-Alder reaction [31], Heck reaction [32], Pechmann condensation [33], and more reactions [34-38].Recently, the technique of synthesizing organic molecules using ultrasound irradiation is very effective and attractive. Ultrasound irradiation is used to increase the rate of a chemical reaction by ultrasonic cavitation mechanism, mass transfer in the microenvironment can be accelerated, which is the formation of microbubbles, growth, and impulsive collapse. High temperature and pressure are generated by collapsing bubbles, resulting in hot spots with enough energy to promote chemical reactions [39-43]. This method is considered in terms of conserving energy, reducing reaction time, improving yield and waste minimization [44,45]. In the current work, effective implementation of

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SPECTRAL, THERMAL, XRD STUDY OF NEW LA(III), CE(III), ND(III), METAL COMPLEXES OF ASYMMETRICAL LIGAND DERIVED FROM DEHYDROACETIC ACID

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Abstract: Solid numerous colored complexes of La(III), Ce(III), Nd(III) from tetradentate Schiff bases are synthesized from o-phenylenediamine,3-Acetyl-6-methyl-pyran-2,4-dione and 5-bromo Salicylaldehyde.The structures of ligand and complexes are characterized by elemental analysis, magnetic susceptibility, thermal analysis, X-ray diffraction, ^{1}H-NMR, mass, IR,UV-visible spectra, and conductometry. TGA/DSC spectral and kinetic parameter of the complexes was observed keenly. The x-ray diffraction data proposes Monoclinic crystal system for La (III)complexes and orthorhombic for Ce (III) and Nd (III) complexes. The ligand and their metal complexes were subjected for antibacterial activity against *Escherichia coli* and *Staphylococcus aureus, Pseudomonas Aeruginosa*and antifungal activity is observed by poison plate method against *Aspergillus Niger, Aspergillus flavus, Penicilliumchrysogenum.*

Keywords: Tetradentate Schiff Base, Dehydroacticacid, Powder X-raydiffraction, Thermal analysis Antimicrobial activity.

Introduction

In this paper we are pronouncing our earlier work in the series of lanthanides of tetradentate Schiff bases formed by the reaction of o-phenylenediamine, DHA, and 5-bromo Salicylaldehyde (Fig.1). The complexes of various color, of La (III), Ce(III), and Nd(III) with this tetradentate ligands were synthesized and characterized.

Experimental

Materials

Merck was the supplier for all reagents and solvents. DHA, *o*-phenylenediamine, and 5-bromo Salicylaldehyde of AR grade were used for synthesis of ligand. AR grade metal chlorides were also used for the formation of the complexes.

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RESEARCH ARTICLE

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Multiwalled Carbon Nanotube Based Solid- Phase Extraction Cartridges and its Application in Waste Water Analysis

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ABSTRACT

Isolation of different organic impurity from industrial waste water was carried out using solid phase extraction (SPE) cartridges and analyzed by reverse phase high performance liquid chromatography.

Kalonji oil-a rich source of carbon, easily available in nature and cheap is used as a naturally occurring precursor for the synthesis of Multiwalled Carbon Nanotubes (MWCNTs) in laboratory by chemical oil vapor deposition technique (COVD) by direct pyrolysis at 800°C in an inert gas (Hydrogen) atmosphere. The obtained MWCNTs were purified by acid treatment and characterized by different analytical tools such as XRD (X-ray diffraction), SEM (Scanning Electron Microscope) and FTIR (Fourier Transform Infra-Red Spectroscopy), BET surface area analyser. These MWCNTs used directly to prepare solid phase extraction cartridges in laboratory and studied its application in isolation of organic impurities (Aniline and Phenol) from industrial waste water followed its identification by RP - HPLC (Reverse phase High performance liquid chromatography analysis).

Keywords: Solid-Phase Extraction, Multiwalled Carbon Nanotubes, Water Analysis, Organic Impurities

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INTRODUCTION

Industrial waste water quality determination before directly pouring it to natural resources is very important now days which is directly or indirectly affecting health of human being and aquatic environment [1]. Different organic and inorganic impurities are the outputs of different chemical and pharmaceutical industries. Industrial effluent quality is determined by physical, chemical and biological parameters [2]. Use of naturally occurring precursor for the manufacturing carbon nanotubes by in-house, simple and efficient method is utmost important to get multiwalled carbon nanotubes in laboratory [3]. Aniline is aromatic amine widely used in many chemicals, pharmaceutical, rubber and dye industries as chemical feedstock [4]. Aniline and phenols are carcinogens and are highly toxic to aquatic life even in trace amount [5]. Presence of Aniline in concentration of Synthesizing metallic ppm range will kill 50 % of exposed organisms within 96Hrs [6].

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Traditional methods of water purification such as liquid extraction, distillation, adsorption can be used for removal of many organic and inorganic impurities [7]. Now a day many chemical, dye making and pharmaceuticals industries are looking for alternative and reusable cheap material technologies for the purpose which can be used to overcome the disadvantages. As multiwalled carbon nanotubes

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SPECTRAL, THERMAL, XRD STUDY OF NEW LA(III), CE(III), ND(III), METAL COMPLEXES OF ASYMMETRICAL LIGAND DERIVED FROM DEHYDROACETIC ACID

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Abstract: Solid numerous colored complexes of La(III), Ce(III), Nd(III) from tetradentate Schiff bases are synthesized from o-phenylenediamine,3-Acetyl-6-methyl-pyran-2,4-dione and 5-bromo Salicylaldehyde.The structures of ligand and complexes are characterized by elemental analysis, magnetic susceptibility, thermal analysis, X-ray diffraction, ^{1}H-NMR, mass, IR,UV-visible spectra, and conductometry. TGA/DSC spectral and kinetic parameter of the complexes was observed keenly. The x-ray diffraction data proposes Monoclinic crystal system for La (III)complexes and orthorhombic for Ce (III) and Nd (III) complexes. The ligand and their metal complexes were subjected for antibacterial activity against *Escherichia coli* and *Staphylococcus aureus, Pseudomonas Aeruginosa*and antifungal activity is observed by poison plate method against *Aspergillus Niger, Aspergillus flavus, Penicilliumchrysogenum.*

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Experimental

Materials

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Liquid-Liquid Extraction and Separation of Osmium(VIII) with 4-(4-Methoxybenzylideneimino)-5-methyl-4*H*-1,2,4-triazole-3-thiol in Organic Acid Medium

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ABSTRACT

A novel method is proposed for the extraction of microgram level concentration of osmium (VIII) from malonate medium with 4-(4-Methoxybenzylideneimino)-5-methyl-4H-1,2,4-triazole-3-thiol(MBIMTT) dissolved in chloroform as an extractant. The osmium (VIII) from the organic phase is stripped with mixture of thiourea and 2M hydrochloric acid and determined by spectrophotometric method. The method affords the binary separation and determination of osmium (VIII) from synthetic mixture. The method is successfully applied for the separation and determination of osmium from the alloys. The method is highly selective, simple and reproducible. The corrosive acids are not used in extraction of Os(VIII) in this method due to this it has green approach.

Keywords: Osmium (VIII), Solvent extraction, Alloys.

INTRODUCTION

0.001mg L^{-1} is the abundance of osmium in the earth crust. Osmium has wide range of applications as catalyst, hardening agent in alloys, polymer staining, buckminster fullerene adducts. Osmium has electronic, industrial and environmental importance. Hence it has paramount importance in the development of separation method to recover osmium to meet the future demands. Solvent extraction has become an effective technique in the recovery and separation of osmium [1-4]. The important tendency of osmium is to form chloro complex in chloride medium. Liquid- liquid extraction technique of separation uses the difference in kinetic behavior for the formation of extractable species as well as the strength of electrostatic interactions of their chlorocomplexes with liquid anion exchanger. The inertness of the chlorocomplex of osmium in aqueous medium plays an important role in the extraction from acidic solution by an anion exchange mechanism. Other extractants reported for osmium (VIII) are trioctyl phosphine oxide [5], trioctylamine [6], bis- 2-ethylhexyl phosphoric acid [7], cynex 925 [8], n-octylaniline [9-10]. The methods reported are not so reliable for routine application because these methods suffer from the drawbacks such as operating condition (emulsion formation leading to problem for the separation, slow equilibrium) and ionic exchanger, nature of diluents, critical pH range etc.

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SPECTROPHOTOMETRIC AND KINETIC STUDY OF HISTIDINE IN AQUO-ORGANIC MEDIUM

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ABSTRACT

The effect of ionic strength and H^+ ion concentration on rate of reaction was confirmed. The varying concentrations of substrate and oxidant showed significant effect on rate of reaction. The observed values E_a, ΔG and ΔH were determined as KJmol^{-1} and ΔS as JK^{-1} mol^{-1} respectively. There was good agreement between the observed and calculated rate constants with respect to various effects. The catalytic effect of bromide and ferrous ion were examined in detail and a suitable mechanism has been proposed with the experimental results.

Keywords: Kinetics of oxidation, Aquo -organic medium, Activation parameters.

Introduction

Chemical kinetics is receiving considerable attention in biological processes as it leads to find out optimum conditions required to get desired product. It helps to understand the qualitative and quantitative relationship between concentration of reactants, intermediates and the products in chemical reactions, particularly in the presence of catalysts, anions, cations, micelles etc. in aqueous and aquo-organic media. Kinetic measurement predicts the rate of reaction (Laidler, 1987; Zuman and Patel, 1984 and Benford and Tipper, 1969)[1].

Potassium permanganate is widely used as an oxidising agent (Ramlingam et. al)[2], particularly while studying oxidation of Amino acids. Although, a great deal of work has been done on kinetics and mechanism of oxidation of various amino acids using permanganate ion. The kinetic study of Histidine by MnO_4^- ion, in the presence of anion and cation catalysed oxidation, has received little attention.

Kinetic investigations on oxidation of amino acids is important, because of their biological significance (Kulkarni et. al 2003)[3]. Present study deals with the kinetic study of Histidine.

Material and Method

Potassium permanganate was prepared and standardized as described by Vogel, (1962)[4]. The reaction was initiated at 298K, by adding it to an equilibrated mixture of Histidine and potassium bromide. The progress in the reaction was studied by measuring optical density at 545nm. While performing the kinetic studies, the concentration of substrate was in excess and the pseudo first order rate constants were evaluated from plots of log (a-x) versus time. The initial rates were determined by varying concentrations of permanganate ions, by fixing substrate and varying concentration of substrate by fixing permanganate ion.

Results and Discussion

The kinetic investigation was carried out by using an oxidizing agent at various concentration of Histidine (0.024 to 0.05M) keeping MnO_4^- as constant (1.610^{-4}M) and subsequently keeping the concentration of substrate constant ([Hist] = 0.05M) and varying the concentration of MnO_4^- ($0.8\ 10^{-4}$ M to 3.210^{-4} M). Carbon dioxide, ammonia and respective aldehydes were identified as the reaction products using spot test (Fegl, 1966)[5].

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DETERMINATION OF COMPOSITION AND STABILITY CONSTANT OF Cu (II)-PROLINE AND Cu (II)-HISTIDINE IN AQUO-ORGANIC MEDIUM.

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ABSTRACT

Exhaustive work was carried out on the comlexometric study of amino acids in aquo-organic medium. The equilibrium behavior of the amino acids has been studied spectrophotometrically in the presence of Cu (II) ion in aquo-organic and at isodielectric constant medium. The molar extinction coefficient was determined from the slope of absorbance vs concentration of complex solution. It was also predicted from ratio of absorbance to the concentration of complex used. In order to evaluate formation constant again different composition (M:L) were prepared and measurements were made spectrophotometrically.

Keywords: Stability constants, Aquo-organic medium, Solvents and isodielectric constants.

Introduction

Present investigation was undertaken to understand the complexing behaviour and effect of H^+ ion, ionic strength, concentration of metal ion or amino acids and dielectric constant of the medium on formation constant (Naciye and Sahin, 2009). In both systems the formation constant was predicted by using jobs method, and 1:1 molar composition was confirmed by using slope ratio method. The existence of more than one complex species was also confirmed by adopting Vareilies method.

Kinetic study of both amino acids was carried out in acidic, alkaline and at neutral medium at various experimental conditions (Alev et. al., 2001). It was further extended for comlexometric investigation. Since amino acids exist predominantly as protonated species in the lower P^H range, they have negligible chelating behavior below 2.0 P^H However at higher P^H, the amino acids may behave either in anionic, cationic or even in zwitter ionic form because of their dipolar character in solution (Koseoglu et. al, 2000).

Material and Methods

The reactions were initiated at 298K by adding to an equilibrated mixture of Proline, Cupric Nitrate and requisite quantity of Sodium Sulphate. The optical density of mixture is measured at 704 nm by using Shimadzu UV-VIS 1700 spectrophotometer in aquo-organic medium. Similar procedure was repeated at various P^H values and at different concentration of ionic strength by adding an electrolyte. The percentage of solvent also varied with the change in optical density due to the change in wavelength. The same procedure is repeated to carry out reaction between Histidine and Cupric Nitrate metal complex.

Proposed reaction

The ionization of the imidazole group of Histidine starts in the region of P^H 5.0 to 7.0, the chelation was found to occur through group nitrogen and nitrogen of amino groups. In the present work the complex species was found

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Functionalization of multiwalled carbon nanotubes with active pharmaceutical ingredient via carboxylation

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ABSTRACT

We experimented the functionalization of multiwalled carbon nanotubes by simple and laboratory friendly reaction path. The exercise performed by hypothesizing the enhancement in the activation of Multiwalled Carbon nanotubes (MWCNTs) walls which subsequently were used for the functionalization of active pharmaceutical ingredient (API). The tailoring of MWCNTs was achieved by suspending the MWCNTs in acidic mixture of nitric acid and sulphuric acid (HNO_3/H_2SO_4) in volume proportionate. The reaction mixture was stirred manually followed by ultra-sonication and magnetic stirring for specific time interval to achieve the desired end product. After achieving promising analytical data, the functionalised MWCNTs (f-MWCNTs) were doped with API in alkaline medium. The obtained solids were further charaterised by key analytical techniques like FTIR and Powder XRD (p-XRD).

Selection and Peer-review under responsibility of the scientific committee of the 2nd International Conference on Nanoscience and Nanotechnology.

1. Introduction

To modify the sidewalls and tube ends of MWCNTs, the carboxylation was generally carried out by refluxing MWCNTs in HNO_3 and H_2SO_4 mixture [1–4]. The engineered areas of MWCNTs can serve as active sites for secondary functionalization vis-à-vis coordination chemistry [5–7]. The basic purpose of this experiment was to develop the road-map for the functionalization of MWCNTs with carboxyl group [8]. The functionalization was necessary to activate the surface and tips of MWCNTs in order to achieve the desired end product. A lot of methods are available in literature for the decoration of MWCNTs [9–10]; however, the path designed in this research work is more efficient and economical as compared to reported methods. The functionalization of MWCNTs was required to dope the anti-inflammatory class Etoricoxib active pharmaceutical ingredient onto its surface, making it feasible for drug delivery.

2. Material and methods

To carry out the presented research work, the pristine MWCNTs were collected from the Nanotech Research Laboratory, B.K. Birla College, Kalyan, Mumbai. The MWCNTs were treated with acidic mixture of HNO_3 and H_2SO_4 in volume proportion of 1:3% v/v. The 250 mL of acid mixture was added in a volumetric flask containing optimum quantity of MWCNTs. The flask was manually shaked for 5–10 min and the mixture was subjected to ultra-sonication for about 2 h at room temperature. The mixture was then stirred using magnetic stirrer for 8 h at room temperature. The mixture was diluted using de-ionised water (DI) centrifuged at 5000 rpm for about 30 min. The washing was carried out with DI water and ethanol till neutral pH. The resultant solid was collected and dried at 100 °C in oven for 3 h. The resultant solid was characterized by FTIR and XRD techniques.

The f-MWCNTs were dispersed in 0.005 M aqueous NaOH. The solution was stirred on magnetic stirrer for about 20 min. The Etoricoxib API was then added into the solution and stirred for another 8 h. The solution was centrifuged and collected solid was washed with echanol and dried at 100 °C for about 1 h. The analytical evaluation of blend sample (MWCNTs functionalized with anti-inflammatory API) was performed to study the structural identity of API after doping with f-MWCNT.

3. Results and discussions

The pristine MWCNTs, neat API, f-MWCNTs and blend were characterized by FTIR (Perkin Elmer) and p-XRD (Panalytical X'pert Pro) techniques.

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MGO SUPPORTED AL_2O_3 OXIDE: A NEW, EFFICIENT, AND REUSABLE CATALYST FOR SYNTHESIS OF CHALCONES

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Abstract. We have studied a series of mixed metal oxides of Mg-Al by a simple co-precipitation technique. Various characterization techniques, including XRD, SEM, EDS, TEM, BET and CO_2-TPD were carried out to investigate their physicochemical properties. An efficient and facile protocol has been documented for the synthesis of chalcones using different aldehydes and acetophenone using Mg-Al oxide under reflux conditions in ethanol affording good to excellent yields. Recyclability of a catalyst is a significant feature of this protocol. Moreover, it was proposed that MgO can disperse and increase the basicity, pore size and catalytic activity.

Keywords: Mg-Al oxide, environmental catalysis, recyclability, multicomponent reaction.

1. Introduction

As a typical solid base, magnesium oxide (MgO) has been widely used as the active catalyst or the catalyst support in a variety of organic reactions, such as transesterification [1], dehydrogenation of alcohol [2], aldol condensation [3-6], isomerization of alkenes [7, 8] and cycloaddition of CO_2 to epoxides [9]. Conventionally, MgO catalysts could be easily obtained by the thermal decomposition of magnesium hydroxide or carbonate [10]. However, the resultant MgO catalysts usually exhibit some disadvantages, like small specific surface areas, inhomogeneous morphologies, and varied grain size, which considerably limit their application [11]. Hence, much effort has been devoted to synthesize novel MgO-based materials with desirable characteristics (*e.g.*, high specific surface area, nanostructure and/or mesoporous porosity). For instance, nanoscale MgO materials with high specific surface area have been synthesized by sol-gel methods combining a hypercritical drying procedure [12-15]. MgO cubes with controllable particle size could be obtained by a chemical vapor deposition method [16]. However, these approaches appear to be rather expensive and complex for conventional catalytic applications. Furthermore, a mechanical strength of MgO itself is rather low, and shaping these materials to strong catalyst particles is cumbersome. Taking these aspects into account, it is still interesting to develop a simple and efficient method for synthesizing MgO-based materials with advantageous features.

Mg-Al mixed oxides are usually prepared by a thermal pretreatment of Mg-Al hydroxalcites and possess a strong surface basicity, high surface area and high quantity of defects resulting from the incorporation of Al^{3+} in the MgO lattice [17]. Mainly due to these properties Mg-Al mixed oxides are attractive catalysts for many reactions such as transesterification [18, 19], Michael additions [20] and alkylation of phenol [21]. However, the major part of works deals with Mg-Al mixed oxides as the catalysts for the condensation reactions [22-24].

Chalcones are a group of compounds with various substitution patterns on two aromatic rings of 1,3-diphenyl-2-propen-1-one. Chalcones constitute an important class of natural products belonging to the flavonoid family, which have been reported to possess a wide spectrum of biological activities, including antibacterial, antifungal, anti-inflammatory, antitumor, antifeedam and antimutagenic properties [15-27]. Additionally, some of chalcone derivatives have been found to inhibit several important enzymes in cellular systems, such as xanthine oxidase [28] and protein tyrosine kinase [29, 30]. Chalcones are also key precursors in the synthesis of many biologically important heterocycles such as benzothiazepine [31], pyrazolines [32], 1,4-diketones [33] and flavones [34]. Hence, the synthesis of chalcones has generated a vast interest among organic, as well as medicinal chemists.

Several methods have been reported for the chalcones synthesis. The most commonly used method is the base catalyzed Claisen-Schmidt reaction of a methyl ketone and aldehyde using sodium hydroxide (NaOH) [35], potassium hydroxide (KOH) [36], barium hydroxide

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Extraction and Separation Studies of Iridium(III) with 4-(4-Methoxybenzylideneimino)-5-methyl-4*H*-1,2,4-triazole-3-thiol in Malonate Medium

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ABSTRACT: A novel method is proposed for the extraction of microgram level concentration of iridium(III) from malonate medium with 4-(4-methoxybenzylideneimino)-5-methyl-4*H*-1,2,4-triazole-3-thiol(MBIMTT) dissolved in chloroform as an extractant. The iridium(III) from the organic phase is stripped with 2 M hydrochloric acid and determined spectrophotometrically with stannous chloride method. The method affords the binary separation and determination of iridium(III) from the alloys and synthetic mixture. The method is highly selective, simple and reproducible

Keywords: Iridium(III); Solvent extraction, Alloys.

INTRODUCTION: Iridium is a good catalyst organic transformation reaction. Owing to its corrosion resistance properties and easy alloying, iridium and its alloys are also used in chemical industry, medical devices and jewelry manufacture. The platinum group metals are scarce and have wide range of industrial applications; therefore it is of paramount importance in the development of separation method to recover these metals to meet the future demand. The determination of iridium has always been difficult. Solvent extraction has become an effective technique in the recovery and separation of iridium [1-4]. The aqueous chemistry of iridium is extremely complex. The important tendency of iridium is to form chlorocomplex in chloride medium. Solvent extraction technique of separation uses the difference in kinetic behavior for the formation of extractable species as well as the strength of electrostatic interactions of their chlorocomplexes with liquid anion exchanger. The inertness of the chlorocomplex of iridium in aqueous medium plays an important role in the extraction from acidic solution by an anion exchange mechanism. Other extractants reported for iridium(III) are alamine-336[5], N-n-octyaniline[6-8], tri-octylamine (TOA)[9], 4-(non-5-yl)pyridine (NP)[10]. The methods reported are not so reliable for routine application because these methods suffer due to the drawbacks such as operating condition (emulsion formation leading to problem for the separation, slow equilibrium) and ionic exchanger, nature of diluents, critical pH range etc.

In present investigations, extraction behavior of iridium(III) using 4-(4-methoxybenzylideneimino)-5-methyl-4*H*-1,2,4-triazole-3-thiol(MBIMTT) dissolved in chloroform as an extractant presence of malonate media. MBIMTT has been employed successfully in this laboratory for the extraction of Rh(III), Ru (III) and Au(III), Pd(II), Pt(IV) and Os(VIII) [11-16].

MATERIALS AND METHODS: A Shimadzu UV-Visible spectrophotometer (UV-1601) with 1cm quartz cells was used for measurement. pH measurements were carried out with an Elico digital pH meter model LI-120(0.01)

A stock solution of iridium(III) was prepared by dissolving 1g of iridium chloride hydrate (S. D. Fine, India) in dilute AnalaR hydrochloric acid (1mol/dm^3) and diluting to 100 ml with distilled water and further standardizing it[17]. A working solution 100 g ml^{-1} was prepared from it by diluting the stock solution with distilled water. The reagent MBIMTT synthesized by known literature method [11]. MBIMTT (0.1 mol/dm^3) solution was prepared in chloroform.

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Synthesis of Benzimidazole Derivatives using Ni nps /stilbite Zeolite

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ABSTRACT: In this research article we prepared Ni nanoparticle, then it was deposited on stilbite zeolite and application of this composite was checked in the synthesis of benzimidazole derivatives. The process of Ni nanoparticle synthesis and its deposition on stilbite zeolite is very simple. The catalyst is too much effective for the synthesis of benzimidazole derivatives giving high yields in short reaction time.

Keywords: Benzimidazole, Microwave, Ni nps/ stilbite, Reusable.

INTRODUCTION: Thin layer chromatography widely used for Heteronuclear molecule such as benzimidazole and its derivatives exhibit significant activity against several viruses, such as HIV[1], herpes (HSV-1)[2], RNA[3], influenza[4] and human cytomegalovirus (HCMV). Substituted benzimidazoles have commercial applications in veterinarian medicine as anithelmintic agents and in diverse human therapeutic areas such as treatment of ulcers and as antihistaminic[5]. Recently, it has been found that two groups of benzimidazoles, namely the 5,6-dinitro and 2-trifluoromethyl derivatives to be promising candidates for antimicrobial drugs[6]. Benzimidazoles have crucial structures, which are contained in agrochemicals, dyestuffs, and high temperature polymer products[7], and also have interesting biological and pharmacological activities[8], including inhibition of phosphodiesterase IV[9], neuropeptide Y binding and anti-arrythmic and antiviral indications[10,11].

Few recent protocols reported for the synthesis of benzimidazole derivatives include solvent free synthesis of benzimidazoles under microwave irradiation using $Yb(OTf)_3$[12], KSF clay[13], PPA[14], Na_2SO_4[15], metal halide supported alumina[16] and solid support[17]. As many of these processes have limitations, such as use of toxic acids as a catalyst, drastic reaction condition, low yields, high temperature, and tedious work-up procedure. There is need to develop new route for the synthesis of benzimidazole.

Stilbite is a natural zeolite mainly contain Silica and alumina, it has been investigated in different countries by several workers. Investigationn on stilbite from India has been carried out by Sukeshwala et al[18].

In recent years, nanoparticle attracts much more attention because higher surface areas available with the nanomaterial counterparts, nanocatalyst tend to have exceptional surface activity[19]. In present study we prepared Nickel nanoparticle as reported method[20], it was deposited on stilbite zeolite and named as Ni nps / stilbite catalyst. This catalyst was used for the synthesis of benzimidazole derivatives. We found that the reaction procedure is simple, highly efficient and environmentally benign method for the synthesis of benzimidazole derivatives in the presence of catalytic amount of Ni nps/ stilbite under microwave condition. This method gives significant advantages such as short reaction times, simple work-up procedure and excellent yields. The Ni nps/ stilbite was successfully reused for four cycles without significant loss of activity.

Scheme 1: Synthesis of benzimidazole derivatives catalyzed by Ni nps/stilbite zeolite.

EXPERIMENTAL: Melting points were determined in open capillary in paraffin bath apparatus and are uncorrected. The reactions were monitored by TLC

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Synthesis and Characterization of MgO Supported Al_2O_3 Oxide

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ABSTRACT: Synthesis of mixed metal oxide i.e. MgO/Al_2O_3 using Co-precipitation method and their characterization using various Techquies.

Keywords: Mg-Al mixed metal oxide; Co-precipitation.

INTRODUCTION: Mgo used as a catalyst, such as transesterification [1], dehydrogenation of alcohol [2], aldol condensation [3-6], isomerization of alkenes [7,8] and cycloaddition of CO_2 to epoxides [9]. Conventionally, MgO catalysts could be easily obtained by the thermal decomposition of magnesium hydroxide or carbonate [10]. However, the resultant MgO catalysts usually exhibit some disadvantageous, like small specific surface areas, inhomogeneous morphologies, and varied grain size, which are considerably limited their application [11]. Hence, much effort has been devoted to synthesize novel MgO-based materials with desirable characteristics (e.g.,high specific surface area, nanostructure and/or mesoporous porosity).

MgO cubes with controllable particle size could be obtained by chemical vapor deposition method [12]. However, these approaches appear to be rather expensive and complex for conventional catalytic applications. Furthermore, mechanical strength of MgO itself is rather low, and shaping these materials to strong catalyst particles is cumbersome. Taking these aspects into account, it is still an interesting subject to develop simple and efficient method for synthesizing MgO-based materials with advantage features Mg–Al mixed oxides are advantageously prepared by thermal pretreatment of Mg–Al hydrotalcites and possess strong surface basicity, high surface area and high quantity of defects resulting from the incorporation of Al^{3+} in the MgO lattice [13].

MATERIALS AND METHODS: All chemicals are purchased from Aldrich and Rankem chemical suppliers and used as received. The X-ray diffraction patterns were recorded by Bruker 8D advance X-ray diffractometer using monochromator Cu-Kα radiation (40 kV and 30 mV) of wavelength (l)= 1.5405Å. The Scanning Electron microscopy (SEM) and EDS was recorded on JEOL; JSM-6330 LA operated at 20.0 kV and 1.0000 nA. Transmission electron microscopy (TEM) is a microscopy technique recorded on CM-200 PHILIPS transmission electron microscopy (TEM) operated at 200 kV, resolution at 0.23 nm. Temperature programmed desorption (CO_2-TPD) measurements were carried out on a MICROMERITICS CHEMISORB 2750 TPD/TPR. Temperature programmed desorption (TPD) studies were done using 100 mg of the $MgO-Al_2O_3$ loaded on a quartz reactor. BET surface area was measured by means of N_2 adsorption at 77.74 K preformed on a Micromeritics, ASAP 2010.

Catalyst preparation: In a typical synthesis of mixed metal oxides, an aqueous solution of $MgNO_3$ was added to aqueous solution of $AlNO_3$ under vigorous stirring at room temperature and addition of 20 ml 5% polyethylene glycol (PEG-400) as structure directing agent. This solution was hydrolyzed with 1:1 aqueous ammonia with vigorous stirring until the solution reached to (pH = 9) and the mixture was stirred for 4h at room temperature. The reaction mixture was digest at 60°C in an electric oven for 12 h. The resulting precipitate was filtered, washed with deionized water and dried at 120°C for 12 h. Finally, the dried powders were calcined at 450°C for 2h in air atmosphere named as M1. Similarly, M2, M3, M4, M5, M6 and M7 were prepared.

RESULTS AND DISCUSSION:

Use Of Spectral Reflectance For Sensitive Waveband Determination For Soil Organic Matter

Mrs. Chitra. M. Gaikwad, Prof. Dr. S. N. Kakarwal, Mrs. A. N. Ghule, Prof. Dr. R. R. Deshmukh, Dr. D. V. Kurmude

Abstract: Soil plays an important role in producing healthy crops. The chemical analysis method for recognising the soil contents for good yield s time consuming and complex. An alternative method using VNIR spectral reflectance of soil can make the task easier. In the present study samples of soil were taken from the state of Maharashtra, India. The ASD field spec 4 spectroradiometer is used to record the spectra of soils. Nine different transformations were performed on spectral reflectance for noise removal. The predictions carried out using correlation show that the first derivative of reflectance, logarithm of reflectance and reciprocal of logarithm of reflectance predicts sensitive wavelengths for SOM. The multiple linear regression models reached the coefficient of determination to 0.92. The optimal wavelengths for SOM were found using analysis of variance technique (ANOVA).

Index Terms: ASD Field spec4 spectroradiometer, Reflectance, Correlation, ANOVA, Multiple Linear Regression.

1. INTRODUCTION

Along with minerals, organic matter is the important resource from soil for plant growth. Fertile soil consists of organic matter which in turn helps in good yield [1]. To predict the yield farmers can test soil in laboratories using the chemical assessment methods. These methods are complex time consuming and expensive [2]. To extract this information in an easy, non-destructive and economical way is to use the soil spectral signatures. Remote sensing using reflectance spectroscopy does not harm the nutrients in the soil [3]. Also, we can measure the various soil contents present in the soil sample [4-5]. The spectral signatures obtained using spectroscopy is spread over a wide range of wavelengths from visible region 350 nm – 700 nm and infra-red region 700 nm – 2500 nm. The reflectance values obtained from the laboratory spectrometer is used for predicting the correlation between spectral reflectance and actual values of contents present in soil obtained from chemical analysis [6-8]. Soil organic matter (SOM) is an essential nutrient amongst other nutrients for suitable vegetation growth. The soil which consists of organic matter is dark in colour. Due to which the correlation between SOM content and reflectance is strong [9]. Different soil nutrients are spread in the VIS region, IR region and SWIR region of electromagnetic spectrum. Studies show that the electromagnetic spectrum the visible (VIS (400-700 nm)) range gives the information about colour of soil, bands near 500-700 nm represent iron oxides, oxy hydroxides, hydroxides, narrow bands near 1400-1900 nm are for hydroxyl and water molecules. Clay minerals, organic constituents, carbonates, salt minerals are found beyond 2000 nm wavelength [10]. Soil organic matter in soil is the main source of nutrients to plants and vegetation. In the global C cycle soil has a huge amount of carbon [11]. The objective of this work is to determine relation between soil reflectance values with organic matter (SOM) and to predict the sensitive wavebands in VIS and NIR region for soil organic matter. The work is carried out on soil samples from different locations of Maharashtra, India.

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2 DATA PREPARATION

The samples of soil were obtained from various locations in the Maharashtra state of India. 8 topsoil samples were collected. The soil types are yellow-brown, brown-red, and paddy. The soil samples were dried in air and sieved with the mesh having size 2mm. The reflectance was measured in the dark laboratory using ASD Field Spec 4 spectroradiometer. The wavelength covered by ASD Field Spec Pro Analytical Spectral device ranges from 350 nm-2500 nm. Before obtaining the spectral reflectance of soil the spectroradiometer was calibrated and optimized using the white Spectralon panel to get absolute reflectance values. The fiber optic probe was kept at a 10 degree angle in a dark laboratory. A Petri dish having a thickness of 2cm and diameter of 20cm was utilized as a container to hold soil in the laboratory. Each soil sample was rescanned 20 times. Then the mean of the 20 scans was calculated. Using the RS3 software soil spectra in ASD format was read. The values of reflectance were obtained and then they were exported to spreadsheet software using Viewspec pro software.

3 SOIL ORGANIC MATTER CONTENT

The biological decomposition of residues, roots and litter in soil is the soil organic matter. Soil chemical properties were determined using the standard laboratory methods. The SOM values of soil organic matter were used to find the correlation with the spectral reflectance. The water absorption wavelength bands from 1350 nm -1416 nm, 1796 nm – 1970 nm, and 2470 nm – 2500 nm were removed by studying various conclusions from literature. To find the wavelength sensitive to organic matter the following steps are performed:

1. Nine various transforms were performed on reflectance values.
2. The correlation of actual values of SOM with reflectance and its transforms were measured.
3. The wavelengths with highest coefficients correlation were selected.
4. Multiple linear regression is used to find the prominent wavelengths for soil organic matter.
5. On these set of wavelengths analysis of variance was performed to find the amount of SOM predicted by these wavelengths.

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Dhage Iteration Method for IVPs of Nonlinear First Order Hybrid Functional Integrodifferential Equations of Neutral Type

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1. Statement of the Problem

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RESEARCH ARTICLE

Effect of EMS and SA on Pollen sterility in *Vigna radiata* (L.) Wilczek (Mung bean).

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ABSTRACT

The seeds of *Vigna radiata* (L.) Wilczek (Mung bean) variety was treated with the chemical mutagens viz. EMS and SA to study pollen sterility. EMS with 0.05%, 0.10%, 0.15% concentrations and Sodium azide with 0.01%, 0.02%, 0.03% concentrations. Pollen sterility is directly proportional to concentrations ie increase in concentrations increases pollen sterility.

Keywords: Effect of EMS & SA, Vigna radiata (L.) Wilczek, Pollen Sterility, Mung bean.

INTRODUCTION

Mutation breeding is one of the most useful technique to induce mutations in plant system. It used to introduce novel character in plant. Mutagen used are of two types these are physical and chemical mutagens. Mutagen before using LD 50 is determined to check the effect of mutagen on organism. Different criterion used to study the efficiency and effectiveness of it. Mutagenic efficiency is scored by observing genetic damage as mutagenic effectiveness is response of genotype to the different doses of mutagen (Mohd Rafiq Wani et al., 2011). efficiency is depend on doses of mutagens administered in seeds. Mung bean is one of the most consumed protein source in the world.

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Plant Based Reducing Agent for Nickel Nano Particles

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ABSTRACT: Nickel nano particles (NNPs) can be synthesized by physical, chemical, biological methods. The reduction of nickel nitrate salt to pure nickel nanoparticles using naturally occurring *Azadirachta Indica* (neem) leaves extract as a reducing agent. In this work qualitative and economical NNPs are synthesized by using Green method. In aqueous solution of Nickel nitrate (1M) *Azadirachta indica* leaves extract is slowly added and ultra sonicated for 1Hr at 80°C. The solution is then directly heated and dried to get Nickel oxide powder. As obtained nickel oxide was then reduced to NNPs at different range temperature (700- 900°C) in hydrogen atmosphere. The effect of varying temperature for getting different quality and quantity of NNPs were studied. These NNPs was then characterized by (XRD) X-ray diffraction, SEM (Scanning Electron Microscope) and FTIR (Fourier Transform Infra-Red Spectroscopy). It was found that the quality and quantity of NNPs varies with different experimental conditions.

Keywords: Nickel nano particles; Green method; Ultra sonicated; Azadirachta indica and X-ray diffraction.

INTRODUCTION: Nanotechnology is the science at nanoscale objects which are in nanometer size i.e.10^{-9}meter. The science which deals with the synthesis, characterization and development of various nanomaterials. In nanotechnology, a particle is defined as a small object that behaves as a whole unit with respect to its transport and properties [1]. Different types of nanomaterials are being produced using different types of approaches i.e. top to down and bottom up[2]. These types of different nanoparticles are synthesized using different methods i.e. chemical methods, physical methods and biological methods.

Preparing nickel nitrate from nickel oxide in presence of inert gas, reduces it to metallic nickel. Growing of nickel nanoparticles using different bio organisms have been also reported [3]

Nickel oxide can be synthesized by different methods. Upon heating above 400°C, nickel powder reacts with oxygen to give NiO. In some commercial processes, nickel oxide is made by heating a mixture of nickel powder and water at 1000°C[4].

Synthesizing metallic nanoparticles using naturally occurring plant based reducing agent i.e. Azadirachta indica (neem) leaves extract. This type of synthesis is an emerging field because plant part acts as reducing agent as well as capping agent and free from toxic chemicals [5].Some authors also reported the functionalization of nickel nano particles [6]. In the presented study, we applied green method for the synthesis of Nickel oxide nanoparticles. Green method is comparatively simpler, cost-effective synthesis method. Further the Nickel oxide nanoparticles were reduced to Nickel nanoparticles under the influence of hydrogen gas.The synthesized Nickel oxide nanoparticles and Nickel nanoparticles were characterized by key analytical techniques viz. Fourier Transform Infra-red Spectrometer (FTIR); X-ray diffraction technique (XRD); BET Surface area analyser (SAA) and Scanning Electron Microscopy (SEM).

MATERIALS AND METHODS:

Synthesis of Nickel Oxide Nanoparticles: Weighed and transferred about 20 g of nickel nitrate in glass beaker and added about 50 ml deionized water into it. To this aqueous solution of Nickel nitrate (1M) Azadirachta indica (neem) leaves extract is slowly added and ultra sonicated for 1Hr at 80°C. The solution is then directly heated and dried to get Nickel oxide powder.

Synthesis of Nickel Nanoparticles: Approximate quantity of powdered nickel oxide nanoparticles as obtained was taken into a quartz boat. The Lenton's Split Tube Furnace equipped with one meter long quartz tube was used for this synthesis. The hydrogen

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NANO MATERIALS FOR AGRICULTURE

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ABSTRACT
Nano materials are important class of materials mainly characterized by its size. Due to nano size large surface area, modified energy levels and quantum effects play crucial roles in modifying materials' properties. Nano materials exhibits novel and enhanced physical, chemical, electrical, magnetic and optical property. Nano materials are useful in various applications such as storage media, sensing devices, communication means, health care systems, medical diagnostic - treatment tools, defence systems, forensic investigation, crime control and even food security and agriculture. This paper briefly reviews the agriculture industry related applications of nano materials having power to revolutionize the entire agricultural industry.

Keywords: Nano materials, synthesis, properties, characterization, agricultural applications

1. INTRODUCTION

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Characterization of nano structures usually calls for sophisticated characterization tools. Different methods of characterization are employed to determine phase, structure and properties of the nano materials using equipments such as X-ray diffractometer, Scanning electron microscope, transmission electron microscope, scanning tunneling microscope, atomic force microscope etc. Device fabrication technique mainly involves top down (lithographic processes, etching techniques) and bottom up (growth, assembly and chemical vapor deposition) approaches. Fabrication of flexible electronics is fast progressing field today.

Apart from efficient and successful use of nanotechnology in storage media [**Masud Mansuripur**], healthcare [**Shavi**], medical diagnosis [**K. Rajasundari**], medical treatment [**Mohammad Abu**] etc. the nanotechnology has its role to play in the field of agricultural industry at various stages right from crop production, processing, storing, packaging and transport of agricultural products. Nanotechnology has potential to revolutionize agriculture and food industry with its emerging techniques namely, precision farming, increasing of plants' nutrients absorption ability, effective and targeted inputs, early detection and control of diseases. After years of green revolution and turn down in the agricultural products ratio to world population growth, it is obvious the necessity of employing new technologies in the agriculture industry more than ever. Food security has always been the major issue of the mankind. Nano materials that offer safe and efficient administration of pesticides, herbicides, and fertilizers are being developed. Smart sensors and smart delivery systems help to combat viruses and other crop pathogens. [**Sayed Rohella Mousavi**].

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$ALPO_4$-STILBITE CATALYZED ONE POT SYNTHESIS OF 3,4,6-TRIPHENYLPYRIDIZINE DERIVATIVES

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ABSTRACT
A rapid and an efficient route for the synthesis of substituted pyridizine derivatives catalyzed by $AlPO_4$-stilbite zeolite in sonication. This ecofriendly benign method contributes several advantages over methods that are currently used such as a simple work-up, mild reaction conditions and good to excellent yields.
Keyword: $AlPO_4$-stilbite zeolite, Catalyst, Sonication.

Introduction

Chemistry is the science of molecule and their transformation. Chemistry deals with the composition, structure and properties of matter. These aspects can be best described and understood the basic components of our materials. Generally the organic synthetic route generates an intolerably high amount of toxic wastes and violates the green chemistry principles. Our research interest, in the application of green benign approaches in organic synthesis to understand the role of heterogeneous catalysis in the investigation of ecofriendly synthetic route.

Nowadays the tremendous amount of heterocyclic aromatic compounds aromatic compounds demands increases due to their novel properties and widely applicable compounds [1]. The considerable interest of substituted pyridizines in pharmaceutical and biological applications due to their antifungal [2], antimicrobial [3], and antiviral activities [4] and N-N bond in their ring structure of pyridizine allows them to interact with suitable substrates with acidic functional groups to generate supramolecular complexes [5]. Pyridizine derivatives is just like pyridine consist of the π-electron deficient heterocyclic compounds [6] and it also used in solar cell modules to convert solar energy into the electricity [7]. The pyridizine structure is fount within a number of herbicides such as pyridafol, credazine, and pyridate [8]. It is also found within the structure of several pharmaceutical drugs such as cadralazine, cefozopran, pipofezine, minaprine, hydralazine and cilazapril [9]. By observing above methods, it seems that these methods consist some drawbacks in case of explosive solvent, consumption of catalyst, and also operational method is not simple and costly also. To overcome these we found new method for the synthesis of 3,4,6-triphenylpyridizine derivatives by using natural catalyst doped with $AlPO_4$.

Zeolite catalyst has a Bronsted and Lewis acidic sites, which are responsible for their activity. Amorphous phosphates have found increasing interest as catalyst supports in the last three decades [10]. Among these phosphates, aluminum phosphate has been studied extensively due to its large surface area, thermal stability and surface acid base properties [11-15]. Also phosphate based molecular sieves can be suitably designed for the catalytic applications [16]. Phosphorus doping is nowadays commonly used to improve the activity of catalyst. In present work, natural stilbite zeolite used as support for $AlPO_4$ and used as a catalyst for the synthesis of 3,4,6-triphenylpyridizine derivatives. This catalyst is also effective in the synthesis of ylidemalononirile [17]. This catalyst shows promising results in present methodology.

Materials and methods

The chemical used are purchased from Aldrich and s.d. fine chemical and used without purification. The Fourier transform infrared (FT-IR) spectra were recorded on a FT-IR spectrophotometer (Jasco, Japan). 1H-NMR spectra were recorded on an 400 MHz FT-NMR spectrometer in $CDCl_3$ as a solvent and chemical shift values are recorded in ppm relative to TMS

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NANO MATERIALS FOR AGRICULTURE

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ABSTRACT
Nano materials are important class of materials mainly characterized by its size. Due to nano size large surface area, modified energy levels and quantum effects play crucial roles in modifying materials' properties. Nano materials exhibits novel and enhanced physical, chemical, electrical, magnetic and optical property. Nano materials are useful in various applications such as storage media, sensing devices, communication means, health care systems, medical diagnostic - treatment tools, defence systems, forensic investigation, crime control and even food security and agriculture. This paper briefly reviews the agriculture industry related applications of nano materials having power to revolutionize the entire agricultural industry.

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One Pot Three-Component Synthesis of Thiazolidinone Derivatives of 4-Methylthiazole-5-carbaldehyde and its Biological Evaluation

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ABSTRACT

Thiazolidin-4-one is synthesized by highly efficient three-component reaction system. Three component involved are 2-(4-phenyl substituted) -4-methylthiazole-5-carbaldehyde (1) with *p*-substituted aniline (2), in presence of *p*-toluene sulfonic acid (*p*-TsOH) as an acid catalyst in toluene as an solvent with separation of azeotropic water, followed by cyclo-condensation with mercaptoacetic acid in a single pot. A series of compounds 2-(4-methyl-2-phenylthiazol-5-yl)-3-phenylthiazolidin -4-one (4a-h) were synthesized and structures of these compounds were elucidated by IR, ^{1}H NMR, GC-MS. Synthesized compounds were screened for antibacterial activity against Gram-negative (*E. coli* and *P. aeruginosa*) and Gram-positive (*S. aureus* and *B. subtilis*) bacteria, antifungal activity against pathogenic fungal strains and *in vivo* anti-inflammatory activities. Some of the compounds exhibited promising antibacterial, antifungal and anti-inflammatory activities.

KEYWORDS

p-Substituted aniline, *p*-Toluene sulfonic acid, Mercaptoacetic acid, Thiazolidinone, Antimicrobial activity, Anti-inflammatory activities.

INTRODUCTION

Thiazolidin-4-one is the derivative of thiazolidine which belong to an important group of heterocyclic compounds containing S and N in a five member ring. It has been considered as a magic moiety which possesses almost all types of medicine and pharmaceutical activities. The synthesis of compounds belonging to thiazolidinone series constitutes an important research area due to their interesting diverse pharmacological activities.

Thiazoles and their derivatives have found applications in the drug development for the treatment of allergies [1], hypertension [2], inflammation [3], schizophrenia [4], bacterial infections [5], HIV infections [6], hypnotics [7] and more recently for the treatment of pain [8], as fibrinogen receptor antagonists with antithrombotic activity [9] and as new inhibitors of bacterial DNA gyrase B [10]. Thiazole nucleus is also an integral part of all the available penicillin which have revolutionized the therapy of bacterial diseases [11]. There are several thiazole containing drugs available in market such as, nizatidine a histamine H$_2$-receptor antagonist that inhibits stomach

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Charge-Coupled Devices (CCDs) in Astronomy Research

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Research Paper - Astronomy

ABSTRACT

A charge-coupled device (CCD) is a device for the movement of electrical charge, usually from within the device to an area where the charge can be manipulated, for example conversion into a digital value. This device was invented in October 19, 1969 in the United States at AT&T Bell Labs by Willard Boyle and George E. Smith. CCDs work by converting light into a pattern of electronic charge in a silicon chip. This pattern of charge is converted into a video waveform, digitized and stored as an image file on a computer In recent years CCD has become a major technology for digital imaging. In a CCD image sensor, pixels are represented by p-doped metal-oxide-semiconductors (MOS) capacitors. These capacitors are biased above the threshold for inversion when image acquisition begins, allowing the conversion of incoming photons into electron charges at the semiconductor-oxide interface; the CCD is then used to read out these charges. Although CCDs are not the only technology to allow for light detection, CCD image sensors are widely used in professional, medical, and scientific applications where high-quality image data are required. In applications with less exacting quality

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ARTICLE

Aspects, Domains and Tools of Heritage Computing

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1. Introduction:

Heritage means events or processes that have a special meaning in group memory. In 2002, UNESCO listed various heritages as cultural heritage sites, momentous cities, enriching landscapes such as parks, gardens, natural holy sites, undersea cultural legacy such as shipwrecks, museums, variable cultural heritage such as paintings, stone kit, handicrafts etc., textual and digital legacy, cinematographic heritage, verbal traditions, languages, celebratory events, rites and values, composition and song, the recreational dramatics arts, conventional medicine, novel story, cooking conduct, traditional sports event.

Heritage is a crucial element of day today's life and of the prospect we put forward to put together. Heritage perpetuation and elucidation plays a productive role in the social development of nations, states, and local regions. In almost all field computers and related software/hardware technology plays vital role in preservation, promotion and understanding of heritage.

2. Aspects of Heritage Computing:

'History and Computing', 'Humanities and Computing' are in a vital part of development. The literary heritage zone is turning digital and always added archival. There is a necessity for novel methods and techniques to route the inundation of digital assets. Computer researchers are performing on information problems of artistic heritage. Advanced techniques the Semantic Web and in grid computing and are invigorating a new variety of e-Culture, e-Science, e-history, and e-Humanities. Virtual libraries, digital archives, Data enrichment, electronic textbook expurgation, digital source editions, analyzing the Text and reclamation, text analytical and ontological problems, Literary and linguistic computing, Images and multimedia, Visual object detection, Content based artist identification, Geographical information Systems for historical studies, Quantitative data analysis, digitization strategies, methods of database design, XML in the structuring of heritage information are some of the aspects of heritage computing [1]. Visual computing is one more significant room in built heritage learning. It prefers non-linear spatial narratives of the 3D models helpful to analyze and illustrate the buildings. Such models offer an aggregative hub for the diverse size of information associated to momentous buildings allied to text, drawings, data, images, etc. there in. Visual architectural modelling and database modelling associate together in wide-ranging and the entire system gives rise to multifaceted informatics models – navigative and interactive, helpful for the accepting, knowledge, protection, communication and augmentation of architectural heritage [2].

3. Domains of Heritage Computing:

Using a prototype DESIKA, and ancient Indian language Sanskrit has been processed where input sentence is taken into Sanskrit and its paraphrased meaning is presented as output in Sanskrit itself. The same processing can be extended to other Indian languages such as Pali and Prakrit. C-DAC, Pune works on Computational Rendering of Panini and Natural Language Processing (NLP) using ancient Indian Scientific Approach using Graphics and Intelligence based Script Technology (GIST). In GIST, sanskrit words are represented in Devanagari characters including accent marks [3].

C-DAC, Kolkata has digitized over 40 Million pages rare and copyright free books, over 3 Million pages of rare collections of Nobel Laureate Gurudeva Rabindranath Tagore in microfilmed, 1500 old Gramophone Records digitized, web portal for North Eastern state libraries is developed, Developed a Digital Content Repository for Books, Manuscript and Audio-Visual Performance of Baul Songs using Open Source Software "Fedora" with over 1,00,000 Books / Journals and 250 Baul Songs with Metadata-based search & retrieval, Bengali OCR with above 90% character level accuracy on trained singular size font has been developed and unattended batch mode conversion is also possible.

Three dimensional objects and virtual presentation is a work of narrative and efficient way to conserve and develop prehistoric buildings and traditions. As an effort, a loom to document Chinese Hakka culture and Tulou was depicted and practiced, with a new policy for internet-based cloud-enabled virtual experience of cultural visit in three dimensional ways. The resources and facts of Hakka culture was surveyed and composed on site including past fruition, Tulou or its residue or remains and folk traditions. Data sets related with Tulou probed by terrestrial laser scanner, unmanned aerial vehicle and digital camera are integrated and modelled in realistic 3D manner [4].

Cultural heritage studies involve activities such as digital data visualization, information analysis and sharing results. CHER-Ob a software system provides effective tools for analysis of cultural heritage research [5].

In addition to modernized technologies for data collection and processing in cultural heritage, an preliminary video generator based on the open source software CHER-Ob for shared analysis is helpful tool

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ARTICLE

Role of Big Data in Agriculture

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1. Introduction

Information is important part of today's world. Due to availability of high speed internet connectivity, user can access the information on their laptops, desktops and on smart phones at any time and at any location. Large volume of data is created and pass on from one location to other location using internet.

Businesses are also working on such large volume of data to process it, analyse it for their product efficiency. The data on which businesses are working is also available in structured and unstructured format. It is hard to process such data using traditional data processing technique. The success of any product of business is totally dependent on market analysis of that product. This analysis totally depends on large amount of data. To work on such large volume and variety of data, Businesses need to work on big data concept. This big data concept is essential for overcome the problem of traditional approaches.

2. Big data analytics in various industry

The businesses which uses the big data analytics to grow their business are like education field, banking sectors, Health care sectors and retail sectors.

The few thrust area where Big data can be beneficial for finding the answer to the questions which are not solved using traditional techniques such as food chain market, agricultural sectors, traffic controlling, driverless car projects and many mores.

This big data can be beneficial for food chain market. It is beneficial for agricultural sector.

This sector is unstructured one where farmers are deciding to grow their farming independently.

Big data can be helpful to such farmers to decide which farming is useful for which period.

Based on market analysis and environmental analysis, farmer can decide to select the crop.

Using Big data, government can take the decision based on analysis of big data.

Government can go for the agricultural survey which is beneficial for finding the drought affected regions as well as flood affected regions. Using crop growing area and affected area, government agencies can able to find out the total loss and package given to that affected farmer. This will beneficial to improve the process of giving packages to really affected people.

For insurance companies in agricultural field, they can also use big data tool to find the land area which is insured by farmer and actual affected land area and level of affected area.

Big data can be useful for traffic control system by taking online feedbacks.

In automobile sector, Big data is useful for automated driverless car project where driverless car producing the signal from their sensors and these signal data can be captured for analysis purpose using big data tools. Information which can be analysis are road side view, climate condition for visibility purpose, accidental prone zones.

For analysis of heavy traffic area, Big Data can play important role to divert the traffic through another route during that timing.

In above all condition, Big data tools can give the better solution in minimum amount of time for scattered data as compare to traditional software's.

The need of accurate and faster result for the large number of populations can be satisfied using big data analytics tools[1][2].

3. Big data in Agriculture Field

Agriculture sector growth depends upon the weather, productivity of soil, seeds quality, pesticides, temperature require for crops, prices of farming product decided by government, transportation facilities availability, cold storage capacity availability for crops.

All above parameters are highly volatile and unpredictable in nature by common man. Due to lack of knowledge of use of technology to understand the need of market, many farmers take the wrong decision during all development stages of crops. When crop is ready to go for market that time also farmers are not getting accurate information about current market price of their product which leads -to- sales their product in moderate rate decided by agents.

The complete cyclic process from seed sowing to crop marketing is highly dependent on above mention parameters. This situation can be overcome by use of big data technology.

Satsure Pvt. Ltd is using big data analytics along with Machine learning tools for soil related issues and crop process. With the help of satellite imaging they are also helping the insurance companies to understand the loss affected areas.

Using latest technologies tools with big data, SatSure Limited is an IT firm provide accurate result to bank, insurance companies and farmers to increase their productivity, reduce their risk factor of crop loss. They are working on farmers issues to resolve their problem by using big data analytics with the help of satellite imaging. They also provided the prediction about next year's harvesting. They coin the new term as smart farming by using data analytics tools along with machine learning and Internet of Things.

This concept is fruitful for farmers to be part of new era of farming by using cutting age technology. These technologies bypass the all traditional techniques through which it is impossible to process on huge dataset.

In agricultural sector, to reduce the risk factors, it is needed to gather the data from last few years related to crop

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Artificial Intelligence: Simplifying Human Life

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1. Introduction:

Human like behaviour/decision making by a machine is artificial intelligence (AI). AI enabled computer systems can execute several tasks just similar or more often in efficient way than human saving time and energy. AI systems are capable of giving an error less response to certain complex situations. AI is proposed by John McCarthy in 1956 the possibility of AI was verified by Turing test. In near future activities such as, visual understanding, words identification, taking decisions, and paraphrase will be carried out by AI.

2. Scope of Artificial Intelligence:

AI is being used in almost every sector, such as agriculture, medical, health care services, education, legal, public, energy, insurance, banking, financial, water, big companies and social media platforms. AI incorporated along with Machine Learning simplifies the task. AI powered digital assistants has the potential to free people from everyday chores. It helps in planning routine tasks such as making restaurant booking. Self Driving Cars, Boston Dynamics, Navigation Systems, Human verses Computer Games are some of the applications of AI. Following sections briefs few areas where AI is being used.

2.1 AI in Agricultural Industry

Climate variation, population expansion, marketing, demand and supply, food safety concern are some of the issues in front of agriculture industry. AI powered technology helps to have better work rate, to tackle issues regarding crop yield, soil fertility and herbicide opposition in the field of agriculture. Milking robots are generally used in dairy farming.

2.1.1. Agricultural Robots –

By means of computerization and robotics crops can be protected efficiently from weeds. *See & Spray robot* leverages machine vision to control and specially spray weeds on cotton plants. Specific spraying prevents herbicide resistance. Strawberry farmers select and bundle their crops using especially designed robots which can harvest up to eight acres per day alike to thirty human workers.

2.1.2 Crop and Soil Monitoring –

PLANTIX is a deep learning application for recognition of potential defects and nutrient deficiencies in soil. Analysis is carried out by software algorithms to associate particular plant life patterns with certain soil defects, plant pests and diseases. For defects recognition images taken by the user's smart phone camera are used. Soil reinstatement techniques, tips and other feasible solutions are also provided.

Images of vineyards recorded by drone using machine vision are used for study to get comprehensive report on the health of the vineyard, specially the condition of grapevine leaves to improve crop yield at less costs. Such drones can inspect fifty acres in twenty four minutes and gives data analysis with 95 % accuracy. Figure 1 gives use of AI in agriculture sectory [1].

2.1.3 Predictive Analytics –

Machine learning algorithms in association with satellites can analyze crop sustainability, detects farms for the existence of diseases and pests and predict weather. These tools are helpful to researchers, crop consultants and farmers[2].

2.1.4 AI in Indian Agriculture –

CROPIN, GOBASCO, FASAL, SATSURE, INTELLO LABS, AIBONO and are some of the foremost Indian Agri-Tech Start-ups that are changing agriculture in India. These start-ups make use of new technologies such as satellite imaging, machine learning and data analytics.

SATSURE help farmers what to sow, when to irrigate or add fertilizers, or prepare for harvest. SATSURE's solutions are widely used by the Andhra Pradesh Government, large banks and insurance companies in India are also leveraging SATSURE's solutions. FASAL one more start-up presents microclimate forecast custom-made to each farm location carried out at a point scale. AI-based microclimate forecasting algorithm incorporates real in-field information and relates it to explicitly reachable weather reports, so that farmers can take advantage from real-time, actionable information relevant to day-to-day operations at his farm. CROPIN is a collection of analytics solutions, supervision and farm administration. INTELLO LABS have provided machine vision based solutions with captured images for deriving insights and executable options. It leverages AI, deep learning, and IOT to help farmers for efficient growth of business.

2.2 AI in medical field

2.2.1 Clinical and Diagnostic

- Instead of depending on experience, Doctors are using AI powered and providing health care and clinical

Figure 1: Representation of AI in Agriculture Sector

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Nanotechnology Driven Past, Present and Future

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Introduction:

Nano means one billionth of a unit. A nanometer is about a few 10's of 1000 times thinner than human hair but still significantly bigger than size of atom (0.2 - 0.4 nm in diameter). Materials when reduced to nano size found to exhibit different or/and enhanced properties mainly due to larger surface area, and significant quantum effects. Increased surface area per unit mass enhances materials' chemical reactivity and dominating quantum effects significantly change materials' optical, magnetic and/or electrical properties.

First visionary of nanotechnology, Richard P. Feynman on 29th September 1959 while delivering lecture on, *"There is plenty of room at the bottom"*, at the annual meeting of the American physical society opened up a completely new field, of nano technologies. His suggestion to start from bottom or nano level is in fact the key of the advancement of nanotechnology. In turn, Norio Taniguchi in 1974 while describing thin film deposition and ion beam milling, first coined the term "nanotechnology". NASA describes "nanotechnology" as, *"The creation of functional materials, devices and systems through control of matter on nanometer length scale (1-100 nm) and exploitation of novel phenomena and properties at that length scale."*

Nano material synthesis involves 'bottom up' and 'top down' approach. In bottom up approach synthesis is carried out at molecular level using techniques such as inverse micelles, sol gel processing and chemical vapour deposition. Top down approach of nano material synthesis involves cutting, carving and moulding etc. using techniques such as laser ablation, ball milling, nano-lithography, hydrothermal, electroplating. Synthesis of uniform sized nanoparticles of identical properties is in fact the great challenge till today.

In the field of computer science, nanotechnology is playing a crucial role in producing electronic components, devices, functional matter and systems at atomic level incorporating concepts from in almost all disciplines. S1 MP3 chipset from The Flying Electron Inc. is the so called first is nano computer or a quantum computer and is being used in audio players.

Nature's - The Nanotechnologist:

Nanotechnology has the ability to work at the atomic and molecular level and surprisingly, it has been used by nature since the beginning of the progression of biological species [1]. And so, the nature is the leading motivation for nanotechnologists. Over the millions of years, many nanoparticles and devices have been perfected by nature through the process of evolution. Mere observation of the natural phenomena around us can reveal new directions and insights in nearly all domains of research.

The webs of web-spinning spiders are made up of nano fibres that are light, insoluble in water, stronger than steel, can withstand environmental effects such as rain, wind and sunlight. With enough supply of raw resources of own a spider is able to spin the web over great distances compared to its body size and that too at amazing speed, in an organized manner is fascinating. Just to quote another example, nano spikes available on the surface of lotus leaf makes them self cleaning, rolling off with ease, the water droplets and dust particles and providing protection. Aquaporins in plants, as well as some animals regulate the movement of water into and out of cells and survive them. Plants extract water from the soil into the roots using aquaporins. Gecko lizards can walk across a ceiling upside - down because of billions of nano hairs (spatulae) well organized in groups (setae) each about 200 nm wide on the soles of their feet. Setae are in turn arranged in rows, which are visible to the naked eye (image 1). These hairs when wedged between surface atoms form molecular bonds with the wall or ceiling, putting the gecko in direct contact with its environment. Further, enormous amount of surface area of these nano hairs outweighs the animal's body weight and dismiss the laws of gravity. Gecko nano hairs have encouraged scientists in trying to produce a stickier, stronger, reusable self-adhesive tape.

Image 1: Setae on the soles of gecko feet Credit: Max Planck Institute for Metals Research

Nano scale structures are involved even in milk - a nano scale colloid. Nano sized structures in the sophisticated proteins control a various biological actions, such as flexing muscles, releasing energy and repairing cells. Looking to the sensory mechanism of nature, electronic nose, electronic tongue etc. consisting of nano sensors each with a specific code have been developed. Data storage capacity of electronic devices is being continuously enhanced by looking at nature's wonder- DNA, a nano molecule that not only stores but also manifests the entire personality of a species.

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'NANO' making a big difference!

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Introduction

Nanotechnology deals with synthesis, characterization of variety of nano particles. Further it includes visualization, organization and manipulation of nano particles so as to build various devices for desired applications.

In general chemical routes of nano particles' synthesis are efficient and widely followed. These includes sol gel, auto combustion, hydrothermal, micro emulsion etc. Characterization of nano structures usually calls for sophisticated characterization tools. Different methods of characterization are employed to determine phase, structure and properties of the nano materials. Some of the equipments used in characterization of nano materials are, X-ray diffractometer, Scanning electron microscope, transmission electron microscope, scanning tunneling microscope, atomic force microscope, small angle X-ray scattering, wide angle X-ray diffraction, field iron microscope, 3 dimensional atom probe (3DAP) and many more can be listed here. Device fabrication technique mainly involves top down (lithographic processes, etching techniques) and bottom up (growth, assembly and chemical vaper deposition) approaches. Fabrication of flexible electronics is fast progressing field today. This article focuses on the modifications material properties due to size reductions to nano level.

Size Dependence of Properties

The modifications in the properties of a material due to reduction in the grain size to nano dimensions are not only very large but in most cases the resultant properties are superior to those of conventional materials. It is no wonder that nano materials are finding use in large number of applications. More and more potential applications of nano materials are being discovered.

For example, the change in properties of Nickel when it is made in nanocrystalline form is shown in Table 1. It should be recognized however that there are secondary effects on properties, since commercially pure Nickel contains impurity atoms that would prefer to segregate the boundaries between the grains. The higher concentration of the impurity atom at the grain boundaries will alter the bulk properties of solids.

Quantum chemistry and solid state physics converge at **nano** level. At nano sizes, the material exhibit properties from both phase regions. Quantum chemistry deals with chemical systems where the charge carriers are restricted in the electrostatic potential of nucleus. And, in solid state physics infinitely large systems where charged carriers travel as quasi free particles.

Nano structured materials are composed of grains and grain boundaries. Nanometer sized grains contains, few hundreds to approximately a million atoms on an average. And large number of atoms resides at the grain boundaries. For example, for a spherical nano particle of 3 nm diameter almost 50% of atoms or ions reside on the surface **[1]**. These surface atoms offer more coordination sites enhancing probability of manipulation to make them highly reactive. Hence, the surface and surface atoms plays a crucial role in assigning various properties to the material.

As the grain size decreases there is significant increase in the volume fraction of grain boundaries or interfaces and triple junctions. With increase in defect density, or in other words when the fraction of items residing at defect cores like dislocations, grain boundaries and triple junctions becomes comparable with that residing in the core, the properties of the material are bound to be govern to a large extent by defect configurations, dynamics and interactions. Nanoparticles have higher values of surface to volume ratio, as the surface area is varies with square of radius ($4\pi r^2$) while volume varies with cube of radius ($4/3\pi r^3$). Due to higher surface to volume ratio and large number surface atoms, the surface energy plays dominant role in assigning properties to a material. Enhancement in chemical activity of catalyst is familiar **[2]**. Besides the modifications in physical properties, quantum confinement of electron has influenced the electrical resistivity and magnetic susceptibility of the materials **[3]**.

Nanocrystalline ceramics are tougher and stronger than those with coarse grains. Nano sized metals exhibit significant increase in ill strength and toughness decreases. Electrical properties, chemical reactivity, melting point and optical absorption etc. depends on particle size when particles reach the nanometer scale. Magnetic nano particles behave differently than

Property	Change in property in comparison to bulk
Hardness	5times increased
Strength	3 to 10 times increased
Wear resistance	110 times increased
Frictional coefficient	Reduced to half
Corrosion resistance	Reduced or localized corrosion is stopped
Magnetic properties	Lower coercivity, decrease in saturation magnetization
Electrical properties	Resistivity increased by 3 times

Table 1: Change in the properties of Nickel as grain size is changed from 10μm to 10 nm

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ARTICLE

Role of ICT in Education

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What is ICT?

ICT (Information Communication Technologies) is the use of communication and computer based technologies that enables the user to store, retrieve, transmit, receive and manipulate digital information. From last two-three decades the use of Information Communication Technologies has greatly impacted in various sectors such as education, business, governance etc. And it has changed many aspects of the lives. Today's world is computer world and this world is rapidly moving towards digital information. So, the importance of ICT in education is increasing. This article gives highlights various impacts of ICT in education and future of ICT based education. The article also argues the role of ICT in transforming teacher-centered learning to Student centered learning.

Introduction

As education is need of society because the education plays the vital role in building the society. The quality of education determines standard of society. The educational quality helps to empower the society in all aspects by bringing new thoughts, new technologies and so many such things. There are number of effective teaching and learning methodologies that are in practice today. But these traditional methodologies are teacher centric. In traditional approach, we have particular course structure / syllabus, subject wise textbooks & reference books and we follow that for years. Here teachers teach in lectures either using board or presentation. Teachers used their lesson plans, tutorials etc and the assessment of student's performance is done using assignment, exams etc.

Traditional teaching-learning process

In conventional teacher-centric teaching-learning process students just study the contents of syllabus that is not sufficient for bringing and implementing new ideas and new technologies. In such system students only learns what their teacher teach in lecture. They cannot choose topic of their choice whenever they want. Students have to attend the lectures even though they are bored or not interested in particular topic. To survive in this dynamically changing technological world, student-centered learning process is necessary where student will have anytime access to required information by the use of web as a source. Students can learn anytime and at any place. Students can select the experts from whom they will learn etc. Here comes the role of ICT in the education sector. Learning Process will be problem based learning.

Need for Competency based learning

To compete with this rapidly growing world we need to improve quality and structure of the education system by enforcing competency and performance based approach by including advance technology and practical based approach in learning process. With such Student-centered learning process, student has access to any type of information. In Such system student will learn variety of things that are beyond the syllabus with Real life examples. In such system Teachers are not content experts but they acts as a mentor/guide to the students.

ICT as change agent

ICT plays a vital role in standardizing the quality of education. Use of ICT helps to transform teacher centered learning to competency based learning. As ICT supports independent learning, Students get deeply involved in a particular activity. To bring this changes Educational board and universities should also choose ICTs as a learning technology. The following are the advantages of ICT based learning over conventional learning process.

a) **Students Centered Learning:** With the help of web as source students can learn anything without the need of teacher. Students can choose the mentors from whom they want to learn. In Such system teachers are not content expert of the particular subject but rather they are mentor for the student.

b) **Supporting Knowledge Construction:** In The conventional teaching-learning process teachers plan the things and than delivered those things through lecture. But this system does not take into account individual Student's interest, their understanding level etc. This interests and understanding level can be taken into account with the help of ICT based learning. Use of ICTs supports knowledge construction and also facilitate many opportunities through their provision and support for resource based, student centered learning.

c) **Any place learning:** The use of ICT allows students to learn at a distance. In conventional system students have to come and attend lectures in classroom. But now with the help of ICT Student can learn from a distance and according to their convenient time. This type of learning not only provides convenience but also saves the cost associated with travel and time away from work. With these modern technologies learner gets the opportunities to enroll the courses offered by external institutions rather than those

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DHAGE ITERATION METHOD FOR IVPS OF NONLINEAR SECOND ORDER HYBRID FUNCTIONAL INTEGRODIFFERENTIAL EQUATIONS OF NEUTRAL TYPE

By

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Abstract :

In this paper we prove an existence and approximation result for a second order initial value problems of nonlinear hybrid functional integrodifferential equations of neutral type via construction of an algorithm. The main results rely on the Dhage iteration method embodied in a recent hybrid fixed point principle of Dhage (2015) and includes the existence and approximation theorems for several functional differential equations considered earlier in the literature. An example is also furnished to illustrate the hypotheses and the abstract result of this paper.

2010 Mathematics Subject Classifications: 34A12, 34A45, 47H07, 47H10.

Keywords and phrases: Hybrid neutral functional differential equation, Hybrid fixed point principle, Dhage iteration method, Existence and Approximation theorem.

1 Statement of the Problem

Given the real numbers $r > 0$ and $T > 0$, consider the closed and bounded intervals $I_0 = [-r, 0]$ and $I = [0, T]$ in $\mathbb{R}$ and let $J = [-r, T]$. By $\mathcal{C} = \mathcal{C}(I_0, \mathbb{R})$ we denote the space of continuous real-valued functions defined on I_0. We equip the space $\mathcal{C}$ with the norm $\|\cdot\|_{\mathcal{C}}$ defined by

$$\|x\|_{\mathcal{C}} = \sup_{-r \leq \theta \leq 0} |x(\theta)|. \tag{1.1}$$

Clearly, $\mathcal{C}$ is a Banach space with this supremum norm, and it is called the **history space** of the functional differential equation in question.

For any continuous function $x : J \to \mathbb{R}$ and for any $t \in I$, we denote by x_t the element of the space $\mathcal{C}$ defined by

$$x_t(\theta) = x(t + \theta), \quad -r \leq \theta \leq 0. \tag{1.2}$$

The differential equations involving the history of the dynamic systems are called functional differential equations and the differential equations involving the derivative of history function are called neutral functional differential equations. It has been recognized in the past few decades the importance of such problems in the theory of differential equations. Since then, several classes of nonlinear functional differential equations of neutral type have

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10. On the Homogeneous Cone $3x^2 - 8y^2 = 25z^2$

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Abstract

This paper aims at determining non-zero distinct integer solutions satisfying the homogeneous cone represented by the ternary quadratic equations $3x^2 - 8y^2 = 25z^2$. A few interesting relations among the solutions are presented. A general formula for generating sequence of integer solutions to the given cone based on a given solution is illustrated.

Keywords: Ternary quadratic, homogeneous quadratic, homogeneous cone, integer solutions

Introduction

The quadratic Diophantine equations with three unknowns offer an unlimited field for research because of their variety [1,3]. For an extensive review of various problems on ternary quadratic Diophantine equations representing specific 3- dimensional surfaces, one may refer to [4-13]. In this communication, we search for nonzero distinct integer solutions satisfying the homogeneous cone represented by the ternary quadratic equation $3x^2 - 8y^2 = 25z^2$. A few interesting relations among the solutions are presented. A general formula for generating sequence of integer solutions to the given cone based on a given solution is illustrated.

Notations

1. GNOn = 2n-1 – Pentagonal pyramidal number of rank n.
2. PRn = n(n+1) – Pronic number of rank n.
3. $T_{m,n} = n\left[1+\frac{(n-1)(m-2)}{2}\right]$ – Polygonal number of ran n with size m.
4. Sn = $6n^2 - 6n+1$ – S tar number of rank n.
5. $T_{3,n} = \frac{n(n+1)}{2}$ – triangular number of rank n.

Method of Analysis

Consider the homogeneous cone represented by the ternary quadratic equation

$$3x^2-8y^2=25z^2$$

We present below different methods of solving (1) and thus, obtain different sets of integer solution to (1).

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25. Factorability in the Ring Z[p;5]

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Abstract

The fundamental theorem of arithmetic says that any integer greater than 2 can be written uniquely as a product of primes. For the ring Z[p;5], although unique factorization holds for ideals, unique factorization fails for elements. We investigate both elements and ideals of Z[p;5]. For elements, we examine irreducibility (the analog of primality) in Z[p;5] and look at how often and how badly unique fac-torization fails. For ideals, we examine irreducibility again and a proof for unique factorization.

Introduction

In describing the natural understanding we have of factoring, the famous mathe-matician Paul ErdÄos would have said, Every baby knows that any integer greater than one can be factored into a product of primes." While ErdÄos often exagger-ated what babies know, it is certainly true that most grade school children know it. Moreover, the Fundamental Theorem of Arithmetic states that such a factorization is unique, up to the ordering of the primes. Surprisingly, although factorizations are unique for the integers, factorizations are not unique in general. One setting in which unique factorization fails is the ring Z[p;5] = *fa + bp;5 j a; b 2 Zg*. For instance, the number 6 has two different factorizations in this ring:

6 = (2)(3) = (1 + p;5)(1 ; p;5):

To verify that the two factorizations are truly different, we would need to know that the factors 2, 3, 1 ; p;5, and 1 + p;5 are \prime" in Z[p;5]; we will see that later in Chapter 3.

The ring Z[p;5] is interesting for many reasons. It is, as we will see in Chapter 6, the ¯rst complex quadratic number ring where unique factorization fails for elements. So, in looking at this ring, we will be interested in when an element can be factored, what the factorizations are, how many factorizations exist, and how many elements have more than one factorization. As it turns out, although unique factorization fails for *elements* of Z[p;5], it holds for *ideals* in Z[p;5]. This result comes from the fact that Z[p;5] is what is called a Dedekind domain. we de¯ne an \irreducible" element in Z[p;5] as the analog to a \prime" number in Z. We also review some de¯nitions and results from ring theory and number theory.

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VARIABILITY IN FATTY ACID COMPOSITION AND QUALITY PARAMETERS IN VIABLE MUTANTS OF SUNFLOWER (*HELIANTHUS ANNUUS* L.)

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ABSTRACT

Mutagenic treatment succeeded in inducing genetic variability along with significant alteration in plant growth and metabolism which resulted into variability in fatty acids in sunflower.

Key words: fatty acid, viable mutants, Sunflower.

Introduction

Fatty acids, that cannot be synthesized in the human body, but required for human health, are designated as essential fatty acids (EFA), such as omega-3 (Linolenic acid) and omega-6 (Linoleic acid) (Singh *et.al*, 1984). The fatty acid composition of oil determines its suitability in human nutrition. Most of the fatty acids in sunflower oil are oleic and linoleic acids. In addition, it contains palmitic, stearic, myristic, myristoleic, palmitoleic, arachidic, behenic and other fatty acids. Attempts were made during present investigation to find out fatty acid variability in 16 M_3 mutants of sunflower.

Material and methods:

Sixteen M_3 mutants, along with control, of sunflower varieties Bhanu and SS-56 were selected and screened for fatty acid content. Seed samples of each mutant were analyzed for fatty acid profile, with the help of Gas chromatography Mass Spectrophotometry (GCMS) at Marathwada Institute of Technology (MIT), Aurangabad. Data were analysed statistically using the JMP 7.0 software package.

Results and Discussion

The fatty acid profile of sunflower varieties Bhanu and SS-56 were evaluated on the basis of nutritional quality index (NQI) and oxidative stability index (OSI). The ratio of unsaturated fatty acid to saturated fatty acid indicates nutritional quality index (NQI), while the ratio of monounsaturated fatty acid (MUFA) to polyunsaturated fatty acid (PUFA) acts as an indicator of oxidative stability index (OSI) of the oil, as per the recommendation of World Health Organization (WHO).

During present investigation Palmatic and oleic acids represented monounsaturated fatty acid (MUFA), Oleic acid as polyunsaturated fatty acids (PUFA) while Stearic acid as saturated fatty acid in both the varieties of sunflower.

In sunflower variety Bhanu the values of Palmatic acid ranged from 2.00 to 6.19 g, stearic acid from 3.83 to 5.74 g, Oleic acid from 3.04 to 19.08 g, and Linoleic acid from

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EFFECT OF COOKING METHODS ON PROTEASE INHIBITORS IN *PSOPHOCARPUS TETRAGONOLOBUS* (L.) DC SEEDS

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ABSTRACT

Winged bean (*Psophocarpus tetragonolobus* L.) is non-conventional rich source of protein. It is a novel crop producing protein rich seeds. However, some negative attributes are present in it, which are commonly known as anti-nutritional factors, which are in the form of trypsin and chymotrypsin inhibitors. These protease inhibitors reduces digestibility of proteins. Trypsin inhibitors strongly inhibit Trypsin activity and thus reduce digestion and absorption of dietary proteins. During present study raw and treated seeds of winged bean, with different cooking methods were tested for trypsin and chymotrypsin inhibitors.

Key words : Winged bean, seeds, *Psophocarpus tetragonolobus* (L.), Protein, Trypsin Inhibitor

Introduction

Though legume seeds contain higher amount of protein, its consumption remains limited due to the presence of protease inhibitors (Deshpande, 1992). Protease inhibitors are the chemicals of polypeptidic or proeinic forming strong and stable complexes with proteases (Gatel,1994). Protease inhibitors, even if inactivated, play an important role in nutrition as they are with higher Sulphur containing amino acids in relative higher amount as compared to majority of the seed proteins (Ryan,1990). Liener (1962) recognized that the nutritive value and the protein digestibility of legumes would be always poor unless subjected to cooking or heat treatment. Hence, present investigation was undertaken to find out suitable processing and cooking methods for their reduced effect in human nutrition.

Material and methods :

The seeds of winged bean, varieties EC38955 (A) and IIHp sel-21 were used during present investigation. Physical treatments given to the seeds included Soaking, Boiling, Roasting, Autoclaving and Microwave cooking (Khattab and Arntfield, 2009) The crude protein content in the seeds was estimated by Micro-Kjeldahl method (A.O.A.C., 1975), Biuret method (Layne, 1957) was followed to estimate true protein content, while, the activities of trypsin and chymotrypsin inhibitors were determined following Erlanger *et al.* (1961) and Mueller and Weder (1989).

Results and discussion :

As shown in Table 1, the protein content in seed meal was not affected by different cooking methods. In variety EC38955A , TIU considerably reduced due to boiling while in var. IIHpsel-21, autoclaving and soaking proved to be efficient in reducing the activity of TIU. Trypsin inhibitor content decreased due to boiling and autoclaving, while chymotrypsin inhibitor by autoclaving. Autoclaving method was thus found to be superior, which was followed by boiling.

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SOME MEDICINAL PLANTS IN MILIND COLLEGE OF SCIENCE CAMPUS, AURANGABAD.

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ABSTRACT

Six medicinal plant species belonging to four families and four genera are listed, which were found in the campus of Milind College of Science, Aurangabad.

Key words: Medicinal plants, Milind college campus.

Introduction

Milind college was established by Dr. Babasaheb Ambedkar in the year 1950 to cater the need of the education in Marathwada region of Maharashtra state. This college is located in *Nagsenvan* which is located near cantonment area, Aurangabad. Apart from establishment of the College, Dr. Babasaheb Ambedkar established a Botanic garden in this area, by planting giant Peeple Tree with his auspicious hands, which still exists around Botany Department of the college. Present investigation was undertaken to provide medicinal properties of some medicinal plants among them.

Material and methods

Six species of medicinal plants were observed, collected and morphologically studied. Those were identified following Naik (1979) and Hooker (1876-1879). Information on their medicinal uses was collected from literature.

A brief account of the medicinal plants has been given as follows.

(1) Adhatoda zeylanica Medic: is Shrub or small tree 2-4 m tall. Leaves lanceolate, 10 - 20 X 3 - 8 cm. Flowers white in axillary and terminal dense spikes shorter than leaves. Capsules 1.8 - 2.2 X 0.8 cm, club shaped, subulate, shorty pointed, pubescent

Medicinal uses In bronchitis, in removal of intestinal parasites for treating cold, cough, chronic, bronchitis and asthma. For scabies and other skin diseases. In treating diarrhea and dysentery. For fresh wounds, rheumatic joints and inflammatory swellings.

(2) Asparagus racemosus Willd. var. javanica Baker is Scandent shrub, glabrous. Leaves linear subulate with a stout conical spinous spur , 4-6 mm long, straight or slightly curved. Cladodes slender, 8-12 mm long, spinous pointed, 4-8 together. Flowers white fragrant in axillary racemes.2-5 cm long. Berries globose, 6-8mm in diam., red when ripe.

Medicinal uses Dysentery, diabetic retinopathy, inflammation, tumour, bronchitis, nervous disorders, hyperacidity, certain infectious diseases, neuropathy, conjunctivitis, spasm, chronic fever and rheumatism, in female infertility, to increases libido and cures inflammation of sexual organs. Enhances foliculogenesis and ovulation, prepares the womb for conception, prevents miscarriages, acts as post partum tonic by increasing lactation and normalizing

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POST-HARVEST DISEASES OF FRUITS AND VEGETABLES IN AURANGABAD MARKETS (MAHARASHTRA)

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ABSTRACT:

Fruits and vegetables are the major food requirement in different countries of the world. It is a daily need of people which play an important role in diet. it supplies essential nutrients to the people. Many postharvest pathogenic diseases cause severe losses. The survey of post harvest fungal diseases of some fruits and vegetables in different markets of Aurangabad was done in present study .These diseases develop during harvesting ,transport ,storage ,and consumption. The pathogenic fungal diseases were studied during (2017 -2018) and fungal diseases of 15 fruits and vegetables were selected for the study work. The fungal pathogens were isolated and observed among these pathogenic fungi *Aspergillus,Fusarium,Phytophthora,Rhizopus,Penicilliumand Mucor*species, were found to be Major disease causing fungi in different markets of Aurangabad. The present work of Investigation revealed that fungal pathogenic infection is mainly of injuries during harvesting, transport, storage and handling of fruits and vegetables.

KEYWORD: Postharvest fungi, injury, handling and transport.

INTRODUCTION:

Fruits and vegetables are the important component of our diet .The food scarcity is one of the most significant problem facing by large number of people in the world .This is because of inadequate agricultural facilities for storage and produce preservation [1].Spoilage of fruits and Vegetables after harvest often causes severe losses as great as 25 to 50% of the harvested crops is it estimated that most important losses in Agricultural Products which involve greatest cost on agricultural economy [2]. Post harvest diseases were estimated that 10% to 40% agricultural produce losses of nation occurs due to post harvest diseases worldwide [3-4]. The process is more in developing countries than developed countries of the world. The postharvest diseases caused severely destroy 10 to 30% of the total farm, field of crops and in some highly perishable crops specially in developing countries that destroyed more than 30% harvested crop yield. The postharvest fungal diseases responsible for economic losses .It reduces quality and marketability of damaged fruits. The fruits contain high level of bio-chemical substances and their low pH value makes them highly favorable to fungal disease [5] .

MATERIALS AND METHODS:

For investigation of diseases, the samples of infected fruits and vegetables were collected in different Seasons, from different markets of Aurangabad city, the temperature during these months of collection were ranges from 22to 24. The sample collection was done during morning 8:00 a.m. to 11:00 a.m. the samples were collected fresh, as well as, or previously rotten in pre- sterilized Polythene bags, the fruits and vegetables were collected from different Markets and examined postharvest fungi on these samples ,the sample were kept in isolated conditions for the proper development, growth of the fungal mycelium in favorable conditions. were maintained in moist chamber at room temperature for 9 days .after that the fruits and vegetable samples were separately taken to the laboratory. Post harvest causal fungi were identified from the book of DS

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Synthesis, Characterization and Antimicrobial Screening of Some Novel *N*-Substituted-2-Pyrazolines, Derived from Chalcones

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Abstract : A new series of(3-(2,4-dichlorophenyl)-5-methylisoxazol-4-yl)(3-(4-substituted phenyl)-5-(6-methoxynaphthalen-1-yl)-4,5-dihydro-1H-pyrazol-1-yl)methanone(**6a-g**) and (3-(4-fluorophenyl)-5-(6-methoxy naphthalen-1-yl)-4,5-dihydro-1H-pyrazol-1-yl)(pyridin-4-yl)methanone (**7a-g**)were synthesized by reacting 3-(6-methoxynaphthalen-1-yl)-1-(4-methoxyphenyl)prop-2-en-1-one (Chalcone)(**3a-g**) with hydrazine hydrate followed by 3-(2,4-dichlorophenyl)-5-methylisoxazole-4-carbonyl chloride (**5**) and isonicotinohydrazide respectively. Allthese compounds were characterized by means of their IR, ^{1}H NMR, mass and elemental analysis. All the synthesized products were evaluated for their antimicrobial activity. All the compounds exhibited significant to moderate antimicrobial activity.

Keywords : Chalcone, N-substituted-2-Pyrazoline, isonicotinohydrazide, Antibacterial, Antifungal activity.

Introduction

Medicinal chemistry is the science that deals with the discovery and design of new therapeutic chemicals. Many of these chemicals are used as medicine in treatment of infectious diseases. The high therapeutic properties of the related drugs have encouraged the medicinal chemists to synthesize a large number of novel chemotherapeutic agents[1]. Much attention has paid to synthesis of nitrogen containing heterocyclic compounds. Nitrogen and oxygen containing heterocycles are of special interest because they constitute an important class of natural and non-natural products, many of which exhibit broad spectrum of biological and pharmacological activities.

Much attention has paid to the synthesis of nitrogen and oxygen containing heterocyclic compounds like Pyrazoles and isoxazoles[2] mainly due to their broad spectrum of biological and pharmacological activities[3,4]. Pyrazoles signifies a key motif in heterocyclic chemistry and occupies a major position in medicinal and pesticide chemistry due to its wide range of bioactivities such as antibacterial[5], anticancer[6], analgesic and anti-inflammatory[7]. Whereas, isoxazoles possess a broad spectrum of pharmacological activities such as antibacterial[8], antiviral[9], antidepressant[10]and anti-TB activity[11]activity. As per literature review the pyridine, naphthalene derivatives also possess analgesic[12] and anti-inflammatory[12]activities. The synthesis of heterocyclic motifs containing multi-structure in one molecule has received much interest in recent years[14].

Literature survey revealed that when one biodynamic heterocyclic system was coupled with another, a molecule with enhanced biological activity[15]was produced. The chemistry of these linked biheterocycles have

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Synthesis of Novel Isoxazoline Derivatives Containing s-Triazine via Chalcones and their Anti-Microbial Studies

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ABSTRACT

In this series different Isoxazoline were prepared i.e., 4,6-diethoxy-N-(4-(4,5-dihydro-5-phenylisoxazol-3-yl)phenyl)-1,3,5-triazin-2-amine 7(a-h) via cyclisation of chalcone intermediate. The structures of prepared compounds were confirmed by spectral analysis. The antibacterial and antifungal activities of the final products against various bacteria and fungi have also been reported. Most of the compound showed good to moderate activity.

Keywords: Cyanuric chloride, 2-chloro-4,6-diethoxy-1,3,5-triazine, Chalcone, Isoxazoline, Anti-bacterial activity

INTRODUCTION

A heterocyclic compound is one which possesses a cyclic structure with hetero atoms such as nitrogen and oxygen atom in the ring in addition with carbon atom. Nitrogen and oxygen containing heterocyclic compounds have received considerable attention due to their wide range of pharmacological activities. Five membered heterocyclic compounds are much more important in organic chemistry [1] Isoxazoline is five membered heterocyclic compounds and it has more application in agro chemistry [2] and Pharmaceutical sciences.

A literature survey indicated that heterocyclic compounds containing Isoxazoline, Containing s-triazine were found to exhibit much more application as pharmaceutical and Agrochemical agents. The synthesis and study of Isoxazoline derivatives containing s-triazine have been of interest because of facile synthesis and broad spectrum of biological and Pharmacological activities [3]. Many s-triazine containing Isoxazoline derivatives have recently created great interest in chemotherapy. These derivatives have been reported to possess antifungal [4,5], antibacterial [6], Anticonvulsant [7] antioxidant, cytotoxicity [8] and anti-inflammatory [9] activity.

As our interest is to synthesize heterocyclic templates capable of bearing some potential pharmacophore which can enhance the inherent biological activity, therefore systematic propagation of heterocyclic rings in Chalcones with the installation of biological active heterocyclic units such as isoxazoline containing s-triazine ring.

In the present work, 4,6-diethoxy-N-(4-(5-(substituted-phenyl)-4,5-dihydroisoxazol-3-yl)phenyl)-1,3,5-triazin-2-amine(7a-7h) have been synthesized by the treatment of 1-(4-(4,6 diethoxy-1,3,5-triazin-2-ylamino)phenyl)-3-substitutedphenylprop-2-en-1-one (Chalcone) [10-16] (6 a-6h) with Hydroxylamine Hydrochloride and KOH in DMF (Scheme 1). The structure of all prepared isoxazoline derivatives were given on the basis of IR, Mass, 1 H NMR, elemental analysis and evaluated their antimicrobial activity and obtained good results.

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Synthesis of Novel cyanopyridine Derivatives Containing s-Triazine via Chalcones and Evaluation of their Antimicrobial Activity

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Abstract : 6-(4-(4,6-diethoxy-1,3,5-triazin-2-ylamino)phenyl)-4-(substituted phenyl)-2-methoxypyridine -3-carbonitrile(**7a-7h**) have been synthesized by treatment of (E)-1-(4-(4,6-diethoxy-1,3,5-triazin-2-ylamino)phenyl)-3-(substituted phenyl)prop-2-en-1-one.(**6a-6h**) chalcones. With malono nitrile and sodium methoxide in DMF.All the prepared compounds were evaluated for anti-fungal and anti-bacterial activity. Most of the compound showed potent activity.

Keywords :
Cyanuricchloride,MalonoNitrile,SodiumMethoxide,Chalcones,Triazine,cyanopyridine.

Introduction:

Pyridine moieties are very common in many Natural Products, pharmaceuticals, and functional materials [1-2].Polysubstituted pyridine having good Biological and Pharmacological activity. It could be used as a Agrochemical also for example Herbisides[4]Cyanopyridine derivatives attracted considerable attraction because of their wide Activity,anticonvulsant[5],antibacterial[6-7],antitumor[8] ,antihypertensive[9],cardiovascular[10] and antisoriasis[11]etc. due to such wide Activity of Cyanopyridine derivatives researchers are more interesting in synthesis of such compound.

A literature survey reveals that majority of Cyanopiridine derivatives were synthesized by treatment of chalcones with ammonium acetate and malono nitrile via condensation reaction.

In view of the above and in continuation of our work[12-13].we have synthesized new series of cyanopyrsidine derivatives. In present work,6-(4-(4,6-diethoxy-1,3,5-triazin-2-ylamino)phenyl)-4-(substituted phenyl)-2-methoxypyridine-3-carbonitrile have been synthesized (**7a-7h**)by treatment of (E)-1-(4-(4,6-diethoxy-1,3,5-triazin-2-ylamino)phenyl)-3-(substituted phenyl)prop-2-en-1-one.(**6a-6h**)chalcones with Malono Nitrile and Sodium Methoxide. In DMF (**Scheme I**).The structures of all synthesized compounds were assigned on the basis of IR, Mass, 1H NMR spectral data and elemental analysis and synthesized compounds were screened for their antimicrobial activity.

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Design, Synthesis And *In-Vitro* Anti-inflammatory, Antimicrobial Activities of Some Novel 2, 3-Disubstituted -1,3-Thiazolidin-4-One Derivatives Containing Thiazole Moiety

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Abstract

In Present work, the Reduction of ethyl 2-(4-phenyl substituted)-4-methylthiazole-5-carboxylate(1) by Lithium Aluminium hydride in diethyl ether Solvent yield (2-(4-phenyl substituted)-4-methylthiazol-5-yl) methanol (2) followed by Oxidation using IBX in the DMSO solvent, to yield 2-(4-phenyl substituted)-4-methylthiazole-5-carbaldehyde(3) which on further reaction with2-(4-phenyl substituted)-4-methylthiazole-5-carbohydrazide(4) in the presence of conc. sulphuric acid in ethanol solvent to yield N-((2-(4-phenyl substituted)-4-methylthiazol-5-yl)methylene)-4-methyl-2-(phenyl substituted)thiazole-5-carbohydrazide(5) which further cyclisation with mercaptoacetic acid in presence of zinc chloride catalyst in DMF Solvent afforded series of thiazolidin-4-one derivatives namely N-(2-(2-(4-phenyl substituted)-4-methylthiazol-5-yl)-4-oxothiazolidin-3-yl)-2-(4-phenyl substituted)-4-methyl thiazole-5-carboxamide(**6a-h**). The structure of all the synthesized compounds was characterized by FT-IR, ^{1}H NMR, DIP MS data. Furthermore, compounds (**6a-h**) were screened for their antibacterial activity against gram negative (*E. coli* and *P. aeruginosa*) and gram positive (*S. aureus* and *B. subtilis*) bacteria, antifungal activity against pathogenic fungal strains and anti-inflammatory activities. Some of the compounds exhibited promising antibacterial, antifungal and anti-inflammatory activities.

Key words: thiazole, hydrazide, acyl-hydrazone, 4-thiazolidinone, antiinflammatory (*in-vitro*), antibacterial, antifungal activity.

Introduction

There are numerous biologically active molecules which contain various heteroatoms such as nitrogen, sulphur and oxygen, always drawn the attention of chemist over the years mainly because of their biological importance. Similarly 1,3-thiazolidin-4-ones are heterocyclic nucleus that have an atom of

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Research Article

DESIGN, SYNTHESIS, AND PHARMACOLOGICAL EVALUATION OF SOME NOVEL BIS-THIAZOLE DERIVATIVES

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ABSTRACT

Objective: A series of substituted 5,2-bis-thiazoles derivatives were synthesized by Hantzsch reaction and evaluated *in vitro* for antimicrobial activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, and *Staphylococcus aureus*.

Methods: 2-(4-(benzyloxy)phenyl)-4-methylthiazole-5-carbothioamide were synthesized and allowed to react with various α-haloketones to give 5,2-bis-thiazoles, i.e., 2-(4-(benzyloxy)phenyl)-4-methyl-5-(4-substituted thiazol-2-yl)thiazole derivatives in excellent yield. The synthesized compounds were characterized by spectroscopic methods as well as elemental analyses. They were screened for their antimicrobial activity using the agar diffusion method.

Result: Literature survey reveals that the synthesis of 2-(4-(benzyloxy)phenyl)-4-methyl-5-(4-substituted thiazol-2-yl)thiazole, i.e., (5,2-Bis-thiazoles) derivatives (10a-e) was not reported. The entire compound exhibited mild to moderate antimicrobial activity.

Conclusion: The antimicrobial results revealed that the synthesized derivatives have significant antimicrobial properties, and further, structure-activity relationship studies may develop more potent and less toxic molecule.

Keywords: Bis-thiazoles, Thiazolyl-carbothioamide, α-Haloketones, Antimicrobial activity.

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INTRODUCTION

Heterocyclic chemistry is now fast-growing research field in chemistry. Thiazoles are five-membered heterocycles with N and S as a heteroatom. They are ubiquitous in natural product [1] and pharmaceuticals [2]. Substituted 1,3-thiazoles, especially tethered with aryl or heteroaryl groups (in the 2,4,5 positions or disubstituted such as 2,4-diaryl,2,5-diaryl or 4,5-diaryl) are considered privileged structural motifs and have application in various fields, such as materials science, for the preparation of liquid crystals [3], etc. In addition, they are also having numerous applications in medicinal chemistry for access of bioactive lead molecules and drugs candidates. Some di- and tri-substituted 1,3-thiazole derivatives with various pharmacological properties. Febuxostat is a urate-lowering drugs and inhibitor of xanthine oxidase used for the treatment of hyperuricaemia and chronic gout [4] and fatostatin is a SREBP inhibitor [5]. Similarly, nizatidine is a useful drug used for the treatment of peptic ulcers and gastroesophageal reflux disease [6]. The thiazole moiety is also found in Vitamin B_1 as well as various other bioactive molecules.

Thiazole ring system is possessing diversified types of pharmacological activities such as antifungal [7], anti-inflammatory [8], antidiabetic [9], antiepileptic [10], antimalarial [11], and antiparasitics [12]. In the recent reviews, many examples of enhanced bioactivity of multivalent drug molecules have been cited [13]. Compounds bearing more than one thiazole ring unit also exhibit good biological activities, the bleomycin containing 2,4'-bis-thiazole system acts as an anticancerous, antibiotic, and biological reports also existing on the 5,5'-bis thiazoles [14] and 2,2'-bis-thiazoles [15]; it is also present in many bioactive compounds including thrombotic [16], and bacterial DNA-gyrase [17] inhibitors that are potantifungal, anti-inflammatory and also useful in cardiac and cancer treatment [18], skin whitening properties [19] and have some interesting agricultural application [20].

The development of non-steroidal anti-inflammatory drugs (NSAIDs) is a current topic for medicinal chemistry research, due to the problems that this drugs present. An important number of molecules from this class have been withdrawn from market because of their potentially fatal side effects. Furthermore, most NSAIDs have a high risk of adverse reaction (especially gastrointestinal bleeding) and a low safety profile [21]. C_2 position of thiazole ring requires large hydrophilic, electronegative functional moieties like substituted phenyl ring for enhanced antibacterial activity of thiazole. In our compounds, methyl group is present still most of the compound show good antibacterial activity. C_4 position of the thiazole ring requires small hydrophobic, electronegative functional moieties, for enhanced antibacterial activity of thiazole. It is already known that the thiazole ring could provide a rich spectrum of biological activities [22], being also present in some well-known antibacterial molecules, such as ceftriaxone, ceftazidime, cefixime, and aztreonam. In this context, our aim was to test new derivatives with 5,2-bis-thiazoles scaffold for their antimicrobial activity.

In the present work, some new series of 5,2-bis-thiazole derivatives have been prepared by the Hantzsch. 2-(4-(benzyloxy)phenyl)-4-methylthiazole-5-carbothioamide were synthesized and allowed to react with various α-haloketones in the presence of isopropyl alcohol to give 5,2-bis-thiazoles, i.e. 2-(4-(benzyloxy)phenyl)-4-methyl-5-(4-substitutedthiazol-2-yl)thiazole derivatives in excellent yield. The structures of newly synthesized compounds were confirmed by ^{1}H NMR, ^{13}C NMR, and mass spectrometry. All the synthesized compounds were evaluated for antibacterial and antifungal activities.

METHODS

Chemistry

Melting points were determined in open capillary and are uncorrected. ^{1}H NMR spectra were recorded on Bruker Avance II 400 spectrometer

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Surface Area measurement of Carbon Nanomaterials obtained from Castor oil

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ABSTRACT

This document Carbon nanomaterials (CNM's) synthesized from castor oil by direct pyrolysis at 750°C in an inert atmosphere. CNMs was then characterized by (XRD) X-ray diffraction, SEM (Scanning Electron Microscope) and FTIR (Fourier Transform Infra-Red Spectroscopy)The specific surface area measurement of CNMs was done by using adsorption of methylene blue dye(MB). In this method a fixed concentration of aqueous methylene blue solution was allowed to adsorb on fixed quantity of carbon nanomaterial. The amount of adsorbed methylene blue dye was determined by UV spectrophotometer. It was found that the concentration of adsorbed methylene blue corresponds to the surface area of test sample. The surface area of CNM was found to be 32m2/g. The obtained data was correlated with that of BET surface area measurement and found to be comparable.

Keywords : Castor Oil, Surface Area, Carbon Nanomaterial.

I. INTRODUCTION

A carbon nanotubes discovery in 1991 [1] was a microscopic wonder, due to the porosity with nanometer size and large surface area. The synthesis of carbon nanomaterials from natural precursors receiving the interest because of its unique characteristics of utilization of waste material in different applications via synthesis of different CNM's. from it. Most of the researchers are using petroleum products for the preparation of carbon nano materials; sandesh Jaybhaye et al [2] at NTRC is able to produce these materials from plant derived precursors. There are various physical and chemical properties of CNM has been studied for different applications like hydrogen storage [3] super capacitor [4] solar cell applications [5] micro wave absorption for lithium ion battery [6] etc. has been carried out. Specific surface area is one of the important property of carbon nanomaterials that can be related to their physical or chemical behaviour. The most commonly used methods to evaluate the specific surface area of carbon nanomaterials are based on adsorption of nitrogen [7], water vapour [8], ethylene glycol mono ethyl ether [9] or colour dye [10]. A very simple adsorption of methylene blue hereafter will be called as MB is used in lab to determine the specific surface area of the carbon nanomaterials which is synthesized in laboratory using a castor seed oil. In this method MB is used to adsorb on CNM and is then evaluated by using a UV-Vis spectrophotometer.

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Study of Variable Stars using Small Optical Telescopes

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Abstract
The rapidly increasing sophistication in the optics and electronics has made small optical telescope very efficient and intelligent. With the state of art back end instruments like photoelectric photometers interfaced with computer and compact CCD camera, the conventional photometric monitoring has become a highly potential tool for the study of variable stars. When working on sufficiently bright stars, small optical telescopes are capable of the same photometric accuracy as large telescopes. There exist a large number of bright variable stars that need continuous, systematic observations over a long time span to determine their short-term and long-term light variation and unusual stellar activity. For this kind of work small optical telescope is a natural choice. The main objective of paper to focus uses of Small Optical Telescopes for Study of Variable Stars.

Keywords: Variable Stars, Small Optical Telescope

Introduction

Research on variable stars is important because it plays a crucial role in our understanding of the universe. In many cases the nature of the variability provides the clues to many astrophysical research problems enabling to understand the physics of the other stars. The study of variable stars plays a central role in understanding the process of evolution of the stars. With the availability of small robotic optical telescopes and quality photometers and CCDs at a very reasonable price, the photoelectric photometric study of variable stars is becoming very popular amongst the astronomers. Astronomers can determine the mass, radius, age, temperature, chemical composition and many other properties of a star by observing its spectrum, luminosity and motion through space. In this paper, we describe the research activities that we have been carrying out quite successfully using small optical telescope.

Variable Stars

The stars varying in their brightness (magnitude) are called as 'Variable Stars'. These changes are of deeper nature and dependent on the structure of the stellar interior. They are directly related to the characteristics of these objects. The 'Period of Variation' is very important parameter; which varies from fraction of a second to several hundred days, even to the extent of several years, for different stars. Over 100,000 variable stars are known and catalogued, and many thousands more are suspected to be variable.

There are a number of reasons why variable stars change their brightness. Variable stars need to be systematically observed over decades so that the changes in their variability can be studied as their long-time behavior. This data provides valuable information needed to analyze variable star behavior, which makes it possible to develop theoretical models of variable stars.

Small Optical Telescope

All the photometric data analyzed for our research were obtained using small optical telescope, 12" Meade LX200 Schmidt- Cassegrain reflector telescope mounted at J.E.S. Observatory, Jalna (Latitude 190 51' 19" N; Longitude 750 54' 22" E), India as shown in Fig.1. This telescope includes 12" Schmidt-Cassegrain optical tube assembly with EMC Super Multi-Coatings (D = 305mm, F = 3048mm-f/10), heavy-duty fork mount with 4"-diameter sealed polar ball bearing, quartz-microprocessor-controlled 5.75" worm gears on both axes, and multi-function power panel

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Teaching Astronomy in Higher Education

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Abstract
In India, Astronomy and Astrophysics study in higher education especially in universities and colleges is big problem. The main objective of this paper to focus why Astronomy should part of higher education curriculum. It suggest some action which universities, colleges, astronomers and teachers can take to improve the situation.

Keywords: Teaching Astronomy, Higher Educatior.

Introduction

Astronomy is the branch of physics that deals with the study of celestial bodies like planets, stars and galaxies. It refers to the study of objects outside the earth's atmosphere and their physical and chemical properties. With the development of science and technology, man began to use sophisticated technological gadgets like telescopes, binoculars, computers for the purpose. India has produced many best brains like Aryabhatta and Bhaskara in this field. Astronomy is divided into several branches such as Astrophysics, Astrometeoroiogy, Astrobiology, Astrochemistry, Astrogeology, Astrometry etc. These branches together help in study of the discipline and unravel the mysteries of the universe. Astronomy is an amazing & a promising career for the students, those are interested in the mysteries of the universe. A career in Astronomy is broadly divided as theoretical or observational though. So, Teaching Astronomy in Higher Education play important role.

Why teach astronomy?

The astronomy education takes in many ways like informal outside class room: books, magazines, radios, TVs, astronomy clubs, amateur groups/camps, on internet and formal in class room. For centuries, astronomy was a core subject in a good, classical education. Now, Astronomy is important subject for class room teaching because;

1) Astronomy has influenced our history and culture through its practical, its philosophical and religious implications. Our calendars have an astronomical basis.
2) People have misconceptions about astronomical events like solar eclipse, lunar eclipse, season change, sunrise/sunset, comets, asteroids, gravity etc. These misconceptions must be identified and overcome, as part of teaching astronomy.
3) Astronomy can increase public awareness, understanding and appreciation of science and technology for all reasons.
4) Astronomy deals with our cosmic roots, and our places in time and space.
5) Astronomy plays a central role in understanding the process of evolution of the stars, galaxies and Universe.
6) Astronomy can be enjoyed as hobby and make important contribution to astronomical education and research.
7) Astronomy provides a useful alternative to the experimental mode in the scientific method, observational mode. It also provide simulation and modeling in science.
8) Astronomy is ultimate interdisciplinary subject.
9) After completion of degree in Astronomy, students can work as a research scientist with various research institutions, leading observatories & big government organizations such as ISRO, IUCAA, ARIES etc. Interested students can also join teaching profession after the accomplishment of pre-requisite qualification.

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Research Paper 6 Physics

Variable Star Astronomy

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ABSTRACT

The astronomical study of variable stars plays a central role in understanding the process of evolution of the stars. Astronomers can determine the mass, radius, age, temperature, chemical composition and many other properties of a star by observing its spectrum, luminosity and motion through space. The main objective of this paper to focus Variable Star Astronomy.

Keywords: Variable Star, Astronomy

Introduction:

Astronomy is natural science that studies celestial objects and phenomena. It applies Physics, Mathematics and Chemistry to explain the origin of those objects, phenomena and their evolution. It splits into observational and theoretical branches. Research on variable stars is important because it plays a crucial role in our understanding of the universe. In many cases the nature of the variability provides the clues to many astrophysical research problems enabling to understand the physics of the other stars. The Mira variables help to understand the further evolution of Sun like stars. Distances to far-away galaxies can be determined through study of Cepheid variables. These stars have also helped in estimating the age of the Universe. Accretion disks in cataclysmic variables help to understand larger scale disk behavior, like the activity

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Synthesis and In-vitro Anti-inflammatory Activity of some 1- (4-methylsulphonyl amino methyl) phenyl -3, 5-diaryl-pyrazolines

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Abstract : New 1- (4-methylsulphonyl amino methyl) phenyl -3, 5-diaryl-pyrazolines (**3a-j**) bearing aryl and sulphanoamido pharmacophores were synthesized following convenient synthetic protocol as cyclocondensation of 1,3-diaryl 2-propene-1-ones (chalcones) (**2a-j**) and 4-(sulphonylamino methyl)-phenyl hydrazine hydrochloride (1) in ethanol and TEA . The 2-propene-1-ones (**1a-j**), required were freshly prepared by following Claisen-Schimidt condensation of substituted acetophenones and aryl aldehydes in alcoholic KOH. Synthesized intermediates and final compounds were characterized by FT I.R, ^{1}H NMR, MASS spectroscopic techniques and C, H, N & S analysis. Synthesized titled compounds were evaluated for in vitro anti-inflammatory activity by HRBC membrane stabilization method. Some of the synthesized compound showed good anti-inflammatory activity as compared to standard Diclofenac sodium.

Keywords: Chalcones, Trisubstitued pyrazolines, in vitro anti-inflammatory activity, HRBC membrane stabilization.

Introduction

Pyrazoline derivatives constitute an interesting class of organic heterocyclic compounds with diverse pharmacological applications as antibacterial[1, 2, 3] antifungal[4], antitumor [5] and anti-tubercular agents[6]. Literature survey revealed that many pyrazoline derivatives have been found to possess clinical applications as NSAIDS. Antipyrine (**1**), 2, 3-dimethyl-1-phenyl-3-pyrazolin-5-one, was the first pyrazoline derivative used in the treatment of pain and inflammation. Phenyl butazone (**2**) and its potent metabolite celocoxib (**3**), a prototype of pyrazoline-dione NSAIDs, are potent anti-inflammatory agents. However their use became restricted due to their GI side effects [7] besides these some pyrazoline derivatives, (**4**) and (**5**) are also reported in the literature as potent anti-inflammatory agents.[8,9]

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RESEARCH ARTICLE

Synthesis and *In Vitro* Anti-inflammatory Activity of Some 1- [(2-(Methylsulphonyl amino) thiazole-4-yl) methyl]-3- aryl thioureas.

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ABSTRACT:

New thioureas (4a-f) bearing 2-methylsulhonyl amino thiazol-4-methyl moiety have been synthesized by multistep synthesis depicted in Scheme.1. Intermediate 2-Amino-4-(isothiocynatomethyl) thiazole (2) has been synthesized from 2-amino-4-chloromethyl thiazole hydrochloride (1) by nucleophilic displacement of chlorine by isothiocynate. The compound (2) on subsequent condensation with methyl sulphonyl chloride carried in the presence of triethyl amine in DCM yielded 2-methylsulphonyl amino-4-(isothiocynatomethyl) thiazole (3) which on addition with aryl amines in refluxed pyridine gave the titled thioureas. Synthesized intermediates and final compounds were characterized by I.R, ^{1}H NMR, MASS spectroscopic techniques and C, H, N and S analysis. Synthesized final compounds were evaluated for in vitro anti-inflammatory activity by HRBC membrane stabilization method. Most of the synthesized compound exhibited good anti-inflammatory activity as compared to standard Diclofenac sodium.

KEYWORDS: Amino-4-(isothiocynatomethyl) thiazole, aryl amine, pyridine, in vitro anti-inflammatory activity.

INTRODUCTION:

Thiourea derivatives exhibit diverse biological and pharmacological activities. Derivatives of N-aryl- or N-heteroarylthioureas are known as potential inhibitors of HIV-1,[1] antihyperthyroid[2] acaricidal[3] wide spectrum of anthelmintic[4] anti-inflammatory and analgetic agents.[5] Various symmetrical and unsymmetrical thioureas, N, N'-disubstituted thioureas have shown remarkable anti-inflammatory activity. Derivatives of N-aroyl- or N-heteroaryl thioureas are known for their better anti-inflammatory activity and low toxicity.

Disubstituted thioureas possessing N-substituent like pyrimidine, quinazoline, acridinyl thiophene etc have displayed appreciable anti-inflammatory activity. Literature survey reveals N-substituted thioureas 1-(para-nitrobenzoyl)-3-(2, 3-dimethyl-oxo-1-phenylpyrazolin-4-yl)-thiourea,[6] N-(4-alkoxyphenyl)-N'-(2-alkylthio-6-methyl-4- pyrimidinyl) thiocarbamides,[7] 1- (2-phenyl quinazolin-3-yl-4(3H)-one)-3-substituted thioureas,[8] have displayed considerable anti-inflammatory activities. Literature survey revealed that 2-amino 4-substitued thiazoles[9] and their various derivatives such as 2-(2, 4-disubstituted-thiazole-5-yl)-3-aryl-3H-quinazoline- 4-ones,[10] 3-[4'(p-chlorophenyl) thiazol-2'-yl]-2-[(substituted azetidinone/thiazolidinone)-aminomethyl]-6-bromoquinazolin-4-ones,[11] 4-oxothiazolidine and its 5-arylidenes,[12] (Z)-4-((2,4-dioxothiazolidin-5-ylidene) methyl)-N-(4-substituted phenylthiazol-2-yl) benzene sulfonamides and 2-

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Synthesis and *in vitro* Anti-inflammatory Activity of 5-Arylidene -3-[(2-(methylsulfonylamino)thiazol-4-yl)methyl] thiazolidine-2, 4-diones

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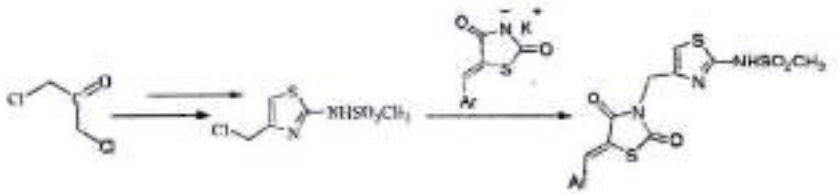
ABSTRACT: Eight new 5-arylidene -3-[(2-(methylsulfonylamino)thiazol-4-yl) methyl] thiazolidine-2, 4-diones (**7a-h**) were prepared by the condensation of 2-methylsulfonylamino-4-chloromethylthiazole (**4**) and 5-arylidene-2,4-thiazolidinediones (**5a-h**). Synthesized compounds were characterized by Fourier transform infrared, ^{1}H nuclear magnetic resonance, mass spectroscopic techniques, and elemental analysis. Final compounds (**7a-h**) were evaluated for *in vitro* anti-inflammatory activity by human red blood cell membrane stabilization method. The compounds **7b**, **7c**, **7f**, **7g**, and **7h** displayed very good anti-inflammatory activity as compared to standard diclofenac sodium.



KEY WORDS 2-Methylsulphonylamino-4-chloromethylthiazole, 5-Arylidene -2, 4-thiazolidinediones, *In vitro* anti-inflammatory activity, Human red blood cell.

INTRODUCTION

5-Arylidene-2,4-thiazolidinediones display significant pharmacological properties.[1,2] A library of 5-arylidenyl 2, 4-thiazolidinones are under clinical trials as potential phospholipase A2 inhibitors, dual cyclooxygenase (COX)-2/5-LOX inhibitors and anti-inflammatory agents.[3] N-methyl at 2, 4-thiazolidinediones has retained the anti-inflammatory activity as observed in meclofenamic acid and indomethacin derivatives.[4] 2, 4-Thiazolidinedione derivatives are better templates to design and synthesize novel and safe anti-inflammatory compounds.[5,6] 5-Benzylidene-thioxoimidazolidinones and thioxothiazolidinones with substitutions like benzyl/phenacyl group have displayed considerable anti-inflammatory activity.[7] Organic compounds bearing thiazoles with different pharmacodynamic nuclei have been found to possess potent anti-inflammatory activity.[8-10] Therien *et al.*[11] and Roy *et al.*[12] reported thiazole derivatives as selective COX-2 inhibitors. Literature survey revealed that 2-amino 4-substituted thiazoles[13] and their various derivatives have displayed considerable anti-inflammatory activity. When methanesulfonylamino moiety was incorporated in the heterocycles, the modified products are found to have appreciable anti-inflammatory activity

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Synthesis and *In Vitro* Anti-inflammatory Activity of 5-arylidene-1- [(2 (Methyl suphonyl amino) thiazol-4-yl) methyl]-2-thioxoimidazolidin-4-ones.

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ABSTRACT:
One-pot multicomponent condensation carried for obtaining 5- arylidene -1- [(2-(methylsuphonyl-amino)-thiazol-4-yl)-methyl]-2-thioimidazolidin-4-ones using 2-methyl suphonyl amino-4-isothiocynato methyl thiazole, glycine and aryl aldehydes in acetic acid (Schemel). Intermediate 2-Amino-4-(isothiocynatomethyl) thiazole (2) has been synthesized from 2-amino-4-chloromethyl thiazole hydrochloride (1) by nucleophilic displacement of chlorine with isothiocynate. Synthesized intermediates and final compounds were characterized by I.R, ^{1}HNMR, MASS spectroscopic techniques and C, H, N and S analysis. Synthesized final compounds were evaluated for in vitro anti-inflammatory activity by HRBC membrane stabilization method. Most of the synthesized compound exhibited good anti-inflammatory activity as compared to standard Diclofenac sodium.

KEYWORDS: 2-Amino-4-(isothiocynatomethyl) thiazole, aryl aldehyde, glycine, acetic acid, in vitro anti-inflammatory activity.

INTRODUCTION:

Thiohydantoins are sulfur analogs of hydantoins with one or both carbonyl groups replaced by thiocarbonyl groups.[1] Due to the presence of the nucleophilic carbon atom at position 5 of the thiohydantoin ring, various substituents can be introduced at this position.Among the known thiohydantoins, 2-thiohydantoins are the most notably known due to their wide applications as anticarcinogenic,[2] antimutagenic,[3]antithyroidal,[4] antiviral (e.g., against herpes simplex virus, HSV),[5]human immunodeficiency virus (HIV),[6] tuberculosis,[7] antimicrobial, (antifungal and antibacterial),[8] anti-ulcer and anti-inflammatory agents.[9]Gauthier et al. have reported new series of (±) 3, 5-diaryl-2-thioimidazolidin-4-ones) and evaluation for inhibitors of type-2 cyclooxygenase.[10] Park et al. have reported the synthesis of a novel series of 1, 5- diarylhydantoins which is the hybrid type compound by structural modification of celecoxib and rofecoxib.[11]

Literature survey revealed that 2-amino 4-substitued thiazoles12 and their various derivatives such as 2-(2, 4-disubstituted-thiazole-5-yl)-3-aryl-3Hquinazoline- 4-ones,[13] 3-[4'(p-chlorophenyl) thiazol-2'-yl]-2-[(substitutedazetidinone/thiazolidinone)-aminomethyl]-6-bromoquinazolin-4-ones,[14]4-oxothiazolidine and its 5-arylidenes,[15](Z)-4-((2,4-dioxothiazolidin-5-ylidene) methyl)-N-(4-substitated phenylthiazol-2-yl) benzene sulfonamides and 2-substituted-N-(4-Substituted-phenylthiazol-2yl) acetamides,[16]thiazolyl-N-Ph piperazines,[17] 2-(4-arylthiazol-2-yl-amino)-n-aryl acetamides[18] have displayed considerable anti-inflammatory activity. When methane sulphonamido moiety was incoeporated in the heterocycles the modified products are found to have appreciable anti-inflammatory activity with COX-2 selectivity.[19] Considering the pharmacological importance of thiohydantoins, sulphonamides and 2-4-disubstituted thiazoles, here it was thought to bring thiohydantoinyl, and 2-methyl sulphonylaminothiazolyl methyl moieties together in one molecular frame work to obtain the new lead molecules with intensified anti-inflammatory activity.

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ARTICLE

Synthesis and *in vitro* Anti-inflammatory Activity of Some 2-(Methylsulphonyl Amino)-4-(Arylthio)methyl Thiazoles

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ABSTRACT

New 2-methylsulphonyl amino-4-arythio methyl thiazoles (**6a-f**) have been synthesized by novel route starting from 1,3-dichloroacetone (**1**) and thiourea (**2**), by multistep synthesis which involves cyclocondensation, mesylation and thioetherification. Synthesized intermediates and final compounds were characterized by IR, ^{1}H NMR, mass spectroscopic techniques and elemental analysis. Synthesized titled compounds were evaluated for *in vitro* anti-inflammatory activity by the human red blood cell membrane stabilization method. The compounds **6c**, **6d**, **6e** and **6f** displayed good anti-inflammatory activity as compared with standard diclofenac sodium.

KEYWORDS

2-Amino-4-chloromethylthiazole hydrochloride, Mesylation, Arythiols, Anti-inflammatory activity.

INTRODUCTION

Among the different aromatic heterocycles, thiazoles occupy a prominent position in the drug discovery process, and this ring structure is found in several marketed drugs. Organic compounds bearing thiazoles with different pharmacodynamic nuclei have been found to possess potent anti-inflammatory activity [1-3]. Therien *et al.* [4] and Roy *et al.* [5] reported thiazole derivatives as selective COX-2 inhibitors.

Literature survey revealed that 2-amino-4-substituted thiazoles [2] and their various derivatives such as 2-(2,4-disubstituted thiazole-5-yl)-3-aryl-3*H*-quinazoline-4-ones [6], 3-[4'-(*p*-chlorophenyl)thiazol-2'-yl]-2-[(substituted azetidinone/thiazolidinone)aminomethyl]-6-bromoquinazolin-4-ones [7], 4-oxothiazolidine and its 5-arylidenes [8], (*Z*)-4-((2,4-dioxothiazolidin-5-ylidene)methyl)-N-(4-substituted phenylthiazol-2-yl)-benzene sulphonamides and 2-substituted-N-(4-substituted phenylthiazol-2-yl)acetamides [9], thiazolyl-N-Ph piperazines [10], 2-(4-arylthiazol-2-yl-amino)-*n*-aryl acetamides [11] and 2-(4-alkylthiophenoxy)-4-substituted-1,3-thiazoles have displayed considerable anti-inflammatory activity. A survey of the literature revealed that the introduction of 4-alkylthiophenyl group into different heterocycles has produced many compounds endowed with a broad spectrum pharmacological activity. It has been well established that the presence of 4-alkylthiophenoxy moieties is an important structural feature of many synthetic

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Synthesis and Characterization of Ni (II), Cu (II) metal Complexes of New Tetradentate Ligand derived from Dehydroacetic acid

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Abstract: Colored solid asymmetrical complexes ofNi(II),and Cu(II)of Schiff bases are synthesized from o-phenylenediamine,3-Acetyl-6-methyl-pyran-2,4-dione (DHA)and4-N, N Diethyl amino Salicylaldehyde. The structures of ligands and complexes are characterized by thermal analysis, X-ray diffraction, ^{1}H-NMR, mass, IR,UV-visible spectra, elemeatal analysis, magnetic susceptibility, and conductemetry. Thermal behavior (TG-DSC) of the complexes were studied and kinetic parameter were determined by Horowitz Metzger and Coats Red Fern method. The ligand field parameters have been characterized for Ni (II), Cu(II)complexes, which indorse squace planargeometry. The x-ray diffraction data proposes monoclinic crystal system for both complexes. The ligand and their metal complexes were subjected for fungicidal activity against Trichoderma and Aspergillus Niger and antibacterial activity against Escherichia coli and Staphylococcus aureus.

Keywords : Powder X-ray diffraction, Thermal analysis, Antimicrobial activity, Dehydroacetic acid.

Introduction

Huge number of publication has been devoted for Schiff bases and Co-ordination chemistry of transition metal complexes[1]. It reiterated the importance of ability of amines, to condense with carbonyl carbon. This fact had been pervade, so it is imperative for researcher to use it as antitumor, anti-oxidant, anti-cancer, antibacterial , antiviral , DNA-cleavage[2-7].

In continuation of our earlier work [8] in this unequivocal missive we synthesized complexes of Ni(II), and Cu (II) with tetradentate ligands formed by the condensation of o-phenylenediamine, DHA, and 4-N, N, Diethyl amino Salicylaldehyde[**Fig.1(a)**],and characterized by different spectral methods, also evaluated for microbial activity.

Experimental

Materials

Reagents and solvents Procured from sigma Aldrich are used without purification. DHA,o-phenylenediamine, and 4-N,N-Diethyl amino Salicylaldehyde of Analytical grade were used for synthesis of ligand. AR grade metal chlorides were used for the preparation of the complexes.

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RESEARCH ARTICLE

Antioxidant, Antimicrobial Study of Synthesized and Characterized metal Complexes of Mn(II),Fe(III),Co(II) and XRD, Thermal Study

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ABSTRACT:
Solid asymmetrical complexes of Mn(II), Fe(III), and Co(II)of Schiff bases are synthesized from 3, 4-diamino toluene,3-Acetyl-6-methyl-pyran-2,4-dione (DHA)and5-bromo Salicylaldehyde. The structures of ligands and complexes were characterized by thermal analysis, X-ray diffraction,^{1}H-NMR, mass, IR, UV-visible spectra, elemental analysis, magnetic susceptibility, and conductometry. Thermal study carried out to calculate kinetic parameter through TGA/DSC. The ligand field parameters have been characterized for Mn(II), Fe(III), Co(II)complexes, which recommend high spinoctahedral geometry. The x-ray diffraction data proposes monoclinic crystal system for all three complexes. Antioxidant property is investigated by DPPH, among three, Fe (III) complex is found more potent. The ligand and their metal complexes were subjected for fungicidal activity against Trichodemma and *Aspergillus niger* and antibacterial activity against *Escherichia coli* and *Staphylococcus aureus*.

KEYWORDS: Antioxidant, Antimicrobial activity. Dehydroactic acid, Thermal analysis, X-Ray.

INTRODUCTION:

Transition metal complexes play a key role in important chemical processes. Hemoglobin the Oxygen carrier of blood is an iron complex of a protein. Hemocyanin, which transports oxygen in invertebrate animal blood, is a copper chelate. Vitamin B_{12} is cobalt chelate. The importance and role of coordination compounds in living system is well established. So, chemists infatuated to use it as anti-bacterial, antitumor, anti-oxidant, oxidative cleavage, DNA-cleavage.[1-3] DHA appeared as striking ligand to synthesize tetradentate Schiff bases. In continuation of our earlier work [4]. In present study we synthesized solid complexes of various color, of Mn (II), Fe (III), and Co (II) with tetradentate ligands formed by the reaction of DHA, 3, 4-diamino toluene, and 5-bromo Salicylaldehyde [Fig.1(a)], and characterized by different spectral methods, evaluated for antioxidant and microbial activity.

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Synthesis and Charactrisation of Dehydroacetic acid based New Mn(II),Fe(III),Co(II), metal Complexes of Asymmetrical Ligand

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Abstract: Solid asymmetrical complexes of Mn(II),Fe(III), and Co(II)of Schiff bases are synthesized from o-phenylenediamine,3-Acetyl-6-methyl-pyran-2,4-dione (DHA)and4-N,N, Diethyl amino Salicylaldehyde. The structures of ligands and complexes are characterized by thermal analysis, X-ray diffraction,^{1}H-NMR, mass, IR,UV-visible spectra, elemental analysis, magnetic susceptibilty, and conductometry. Thermal study carried out to calculate kinetic parameter through TGA/DSC.The ligand field parameters have been characterized for Mn(II), Fe(III), Co(II)complexes, which recommend high spineoctahedral geometry. The x-ray diffraction data proposes monoclinic crystal system for all three complexes. The ligand and their metal complexes were subjected for fungicidal activity against Trichoderma and Aspergillus Niger and antibacterial activity against Escherichia coli and Staphylococcus aureus.

Keywords : Dehydroactic acid, Powder X-ray diffraction, Thermal analysis Antimicrobial activity.

Introduction

In search of novel chemical nuclease, the method designed by Hugo Schiff appeared in a paper entitled *"A New Series of Organic Bases"* is a milestone for researchers [1]. So chemists started to synthesize various imines from carbonyl carbon and amines and their metal complexes and used it as medicinal power house. These metal complexes have numerous potential to use it as anti-inflammatory, antiviral, antitumor, anti-oxidant, anti-cancer, DNA-cleavage[2-7].DHA appeared as an striking ligand to synthesize tetradentate Schiff bases. In present study we synthesized complexes of various color, of Mn(II), Fe(III),and Co (II) with tetradentate ligands formed by the reaction of o-phenylenediamine, DHA, and 4-N, N, Diethyl amino Salicylaldehyde[**Fig.1(a)**],and characterized by different spectral methods, evaluated for microbial activity.

Experimental

Materials

Reagents and solvents used as it is obtained from Merck. DHA,o-phenylenediamine, and 4-N,N, Diethyl amino Salicylaldehyde of AR grade were used for the ligand. AR grade metal chlorides were also used for the formation of the complexes.

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ONE POT SYNTHESIS OF NITRILES FROM ALDEHYDES AND HYDROXYLAMINE HYDROCHLORIDE USING CALCIUM CHLORIDE IN DMF SOLVENT UNDER REFLUX CONDITION

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Abstract: A rapid and facile one pot synthesis of nitrile has been carried out in high yields from the corresponding aldehydes and hydroxylamine hydrochloride in the presence of anhydrous calcium chloride and DMF Under reflux condition.

Key words: Nitriles, aldehyde, hydroxylamine hydrochloride, anhydrous calcium chloride.

Introduction

Nitriles(R-CN) are very useful starting materials for the synthesis of various bioactive molecules[I]. The versatile nitriles are used for the preparation of thiazole, 2-oxazolines, tetrazoles andtriazoles, imidazoles, benzamidines possessing a broad spectrum of biological activities[II]. Nitriles are widely used for transformation into amides, amines, ester and carboxylic acids[III]. Hence they have been used as intermediates for the synthesis of fine chemicals such as, agricultural chemicals, dyes and medicines[IV].One of the most general methods for the synthesis of nitriles is the nucleophilic substitution reaction of alkyl halides with metal cynaides. The method is, however inconvenient because of high toxicity of metal cyanides and troublesome handling. They are also usually prepared by regenerating CN group via oxidation[V], rearrangement[VI] or elimination. Consequently, other method such as, dehydration of primary amides[VII]or aldoximeshave attracted attention. It is known that dehydration of aldoximes into nitriles can be achieved by using a variety of reagents or new other reagents like, triethylamine/sulphur dioxide[VIII], zeolites[IX], sulfurylchloride[X], trichloroisocyanuricacid[XI],dicyclohexylcarbodiimide[XII],phosphonitrilicchloride[XIII],chlorosulfonylisocyanate,triphenylphosphine Burgess reagent[XIV],and also include the use of expensive (2,4-dinitrophenyl hydroxylamine)[XV], (hydroxylamine-*o*-sulphonic acid)[XVI],selenium dioxide[XVII], etc. but many of these suffer from limitations such as, high toxicity,vigorous reaction conditions, unsatisfactory yields, tedious work up and use of large excess of reagents. We have recently reported a rapid synthesis of nitriles in high yields from aldoximes using silica gel[XVIIIa] and one pot synthesis of nitriles from aldehyde and hydroxylamine hydrochloride using silica gel, Mont K-10 and KSF catalyst in dry media under microwave irradiation[XVIIIb]. Some rapid procedures for one pot synthesis of nitriles have been described using formic acid[XIX] and potassium peroxymonosulfate[XX]but whereas

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Synthesis, Characterization and Antimicrobial Screening of Some Novel N-Substituted-2-Pyrazolines, Derived from Chalcones

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Abstract : A new series of(3-(2,4-dichlorophenyl)-5-methylisoxazol-4-yl)(3-(4-substituted phenyl)-5-(6-methoxynaphthalen-1-yl)-4,5-dihydro-1H-pyrazol-1-yl)methanone(6a-g) and (3-(4-fluorophenyl)-5-(6-methoxy naphthalen-1-yl)-4,5-dihydro-1H-pyrazol-1-yl)(pyridin-4-yl)methanone (7a-g)were synthesized by reacting 3-(6-methoxynaphthalen-1-yl)-1-(4-methoxyphenyl)prop-2-en-1-one (Chalcone)(3a-g) with hydrazine hydrate followed by 3-(2,4-dichlorophenyl)-5-methylisoxazole-4-carbonyl chloride (5) and isonicotinohydrazide respectively. Allthese compounds were characterized by means of their IR, ^{1}H NMR, mass and elemental analysis. All the synthesized products were evaluated for their antimicrobial activity. All the compounds exhibited significant to moderate antimicrobial activity.

Keywords : Chalcone, N-substituted-2-Pyrazoline, isonicotinohydrazide, Antibacterial, Antifungal activity.

Introduction

Medicinal chemistry is the science that deals with the discovery and design of new therapeutic chemicals. Many of these chemicals are used as medicine in treatment of infectious diseases. The high therapeutic properties of the related drugs have encouraged the medicinal chemists to synthesize a large number of novel chemotherapeutic agents[1]. Much attention has paid to synthesis of nitrogen containing heterocyclic compounds. Nitrogen and oxygen containing heterocycles are of special interest because they constitute an important class of natural and non-natural products, many of which exhibit broad spectrum of biological and pharmacological activities.

Much attention has paid to the synthesis of nitrogen and oxygen containing heterocyclic compounds like Pyrazoles and isoxazoles[2] mainly due to their broad spectrum of biological and pharmacological activities[3,4]. Pyrazoles signifies a key motif in heterocyclic chemistry and occupies a major position in medicinal and pesticide chemistry due to its wide range of bioactivities such as antibacterial[5], anticancer[6], analgesic and anti-inflammatory[7]. Whereas, isoxazoles possess a broad spectrum of pharmacological activities such as antibacterial[8], antiviral[9], antidepressant[10]and anti-TB activity[11]activity. As per literature review the pyridine, naphthalene derivatives also possess analgesic[12] and anti-inflammatory[13]activities. The synthesis of heterocyclic motifs containing multi-structure in one molecule has received much interest in recent years[14].

Literature survey revealed that when one biodynamic heterocyclic system was coupled with another, a molecule with enhanced biological activity[15]was produced. The chemistry of these linked biheterocycles have

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ONE POT SYNTHESIS OF NITRILES FROM ALDEHYDES AND HYDROXYLAMINE HYDROCHLORIDE USING CALCIUM CHLORIDE IN DMF SOLVENT UNDER REFLUX CONDITION

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Abstract: A rapid and facile one pot synthesis of nitrile has been carried out in high yields from the corresponding aldehydes and hydroxylamine hydrochloride in the presence of anhydrous calcium chloride and DMF Under reflux condition.

Key words: Nitriles, aldehyde, hydroxylamine hydrochloride, anhydrous calcium chloride.

Introduction

Nitriles(R-CN) are very useful starting materials for the synthesis of various bioactive molecules[I]. The versatile nitriles are used for the preparation of thiazole, 2-oxazolines, tetrazoles andtriazoles, imidazoles, benzamidines possessing a broad spectrum of biological activities[II]. Nitriles are widely used for transformation into amides, amines, ester and carboxylic acids[III]. Hence they have been used as intermediates for the synthesis of fine chemicals such as, agricultural chemicals, dyes and medicines[IV].One of the most general methods for the synthesis of nitriles is the nucleophilic substitution reaction of alkyl halides with metal cynaides. The method is, however inconvenient because of high toxicity of metal cyanides and troublesome handling. They are also usually prepared by regenerating CN group via oxidation[V], rearrangement[VI] or elimination. Consequently, other method such as, dehydration of primary amides[VII]or aldoximeshave attracted attention. It is known that dehydration of aldoximes into nitriles can be achieved by using a variety of reagents or new other reagents like, triethylamine/sulphur dioxide[VIII], zeolites[IX], sulfurylchloride[X], trichloroisocyanuricacid[XI],dicyclohexylcarbodiimide[XII],phosphonitrilicchloride[XIII],chlorosulfonylisocyanate,triphenylphosphine Burgess reagent[XIV],and also include the use of expensive (2,4-dinitrophenyl hydroxylamine)[XV], (hydroxylamine-o-sulphonic acid)[XVI],selenium dioxide[XVII], etc. but many of these suffer from limitations such as, high toxicity,vigorous reaction conditions, unsatisfactory yields, tedious work up and use of large excess of reagents. We have recently reported a rapid synthesis of nitriles in high yields from aldoximes using silica gel[XVIIIa] and one pot synthesis of nitriles from aldehyde and hydroxylamine hydrochloride using silica gel, Mont K-10 and KSF catalyst in dry media under microwave irradiation[XVIIIb]. Some rapid procedures for one pot synthesis of nitriles have been described using formic acid[XIX] and potassium peroxymonosulfate[XX]but whereas

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Synthesis and Charactrisation of Dehydroacetic acid based New Mn(II),Fe(III),Co(II), metal Complexes of Asymmetrical Ligand

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Abstract: Solid asymmetrical complexes of Mn(II),Fe(III), and Co(II)of Schiff bases are synthesized from o-phenylenediamine,3-Acetyl-6-methyl-pyran-2,4-dione (DHA)and4-N,N, Diethyl amino Salicylaldehyde. The structures of ligands and complexes are characterized by thermal analysis, X-ray diffraction,^{1}H-NMR, mass, IR,UV-visible spectra, elemental analysis, magnetic susceptibility, and conductometry. Thermal study carried out to calculate kinetic parameter through TGA/DSC.The ligand field parameters have been characterized for Mn(II), Fe(III), Co(II)complexes, which recommend high spineoctahedral geometry. The x-ray diffraction data proposes monoclinic crystal system for all three complexes. The ligand and their metal complexes were subjected for fungicidal activity against Trichoderma and Aspergillus Niger and antibacterial activity against Escherichia coli and Staphylococcus aureus.

Keywords : Dehydroactic acid, Powder X-ray diffraction, Thermal analysis Antimicrobial activity.

Introduction

In search of novel chemical nuclease. the method designed by Hugo Schiff appeared in a paper entitled *"A New Series of Organic Bases"* is a milestone for researchers [1]. So chemists started to synthesize various imines from carbonyl carbon and amines and their metal complexes and used it as medicinal power house. These metal complexes have numerous potential to use it as anti-inflammatory, antiviral, antitumor, anti-oxidant, anti-cancer, DNA-cleavage[2-7].DHA appeared as an striking ligand to synthesize tetradeotate Schiff bases. In present study we synthesized complexes of various color, of Mn(II), Fe(III),and Co (II) with tetradentate ligands formed by the reaction of o-phenylenediamine, DHA, and 4-N, N, Diethyl amino Salicylaldehyde[Fig.1(a)],and characterized by different spectral methods, evaluated for microbial activity.

Experimental

Materials

Reagents and solvents used as it is obtained from Merck. DHA,o-phenylenediamine, and 4-N,N, Diethyl amino Salicylaldehyde of AR grade were used for synthesis of ligand. AR grade metal chlorides were also used for the formation of the complexes.

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Educational Dimensions for Value Based Future

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Abstract

Education plays a vital role in transforming human lives, undoubtedly educating the human beings since centuries has brought total transformation and made the world a better place to live as compared to our ancestors. On one side, we have better means of transportation and communication, improved medical, educational facilities at our door step. Technological developments are making life easier than before in one sense. In general all of us have improved lifestyle in every respect. But, on the other side, no one can deny that there are life threatening challenges too. Human race today is facing never before problems. These problems are adding worries to our lives and taking away values such as happiness, love, peace, knowledge and ultimately draining out our energy. We are finding difficult to cope with stress levels, impetuousness and putting all in a miserable situation. Ego problem, lack of self respect, lack of respect for women, domestic issues, religious and civil wars, suicidal tendencies, environmental pollution, over extraction of natural resources etc. are some of major issues which need to be directed by education. Solutions to some of these issues are attempted in the paper.

Keywords: Education, transformation, knowledge, time, values, faith.

Introduction:

Education means progress, growth, equity, development of individual and of course of the society, transformation for better, solutions to various difficulties and problems and promotion of moral, ethical and social values leading to a value based societies, nations and ultimately world. The best educational systems prepare people to be successful, productive, and engaged members of society. These systems provide appropriate knowledge, skills, and experiences, enabling students to obtain jobs that promote social equity, security and economic growth. The educational programs should nurture religious pluralism and the spirituality in the society.

Since, century's human beings are acquiring knowledge through observations, experiments, exchange programs etc. and getting educated but something is missing. Human beings as whole are still far away from tasting and enjoying the fruits of

Differential Inequalities and Comparison Principles for Linearly Perturbed Differential Equations of First Type

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Abstract: In this paper, some results concerning the global existence as well as comparison theorems for an initial value problem of first order hybrid differential equations with a linear perturbation of first type have been proved. The main results rely on the hybrid fixed point technique of Dhage involving the sum of two operators in a Banach space. Our results include several basic results for unperturbed nonlinear differential equations as special cases.

MSC: 34A12, 34A45, 47H07, 47H10

Keywords: First order hybrid differential equation, Hybrid fixed point principle, Existence theorem, Maximal and minimal solutions.

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1. Statement of the Problem

Given a bounded interval $J = [t_0, t_0 + a]$ in $\mathbb{R}$ for some fixed $t_0, a \in \mathbb{R}$ with $a > 0$, consider the initial value problem of nonlinear hybrid differential equation (in short HDE) with a linear perturbation of first type perturbed by a nonlinear term,

$$\left.\begin{aligned} x'(t) &= f(t, x(t), x(\theta(t)) + g(t, x(t), x(\eta(t)), \quad t \in J, \\ x(t_0) &= x_0 \in \mathbb{R}, \end{aligned}\right\} \tag{1}$$

where, $f, g : J \times \mathbb{R} \times \mathbb{R} \to \mathbb{R}$ and $\theta, \eta : J \to J$ are continuous functions. By a solution of the HDE (1) we mean a function $x \in C(J, \mathbb{R})$ that satisfies the equations in (1), where $C(J, \mathbb{R})$ is the space of continuous real-valued functions defined on J. The importance of the investigations of nonlinear differential and hybrid differential equations lies in the fact that they include several dynamic systems as special cases. See Hartman [14] and references therein. The consideration of hybrid differential equations is implicit in the works of Krasnoselskii [15] and Burton [2] and extensively treated in the several papers on hybrid differential equations with different perturbations. See Dhage and Jadhav [10], Dhage and Lakshmikantham [11] and the references therein. This class of hybrid differential equations includes the perturbations of original differential equations in different ways. A simple classification of different types of perturbations of differential equations appears in Burton [2] which can be treated with hybrid fixed point theory (see Dhage [5-6] and the references therein). In this paper, we initiate the basic theory of hybrid differential equations of linear perturbations of first type involving two nonlinearities and prove the basic result such as local existence theorem and existence of maximal and minimal solutions etc. We claim that the results of the paper are basic and important contribution to the theory of ordinary differential equations

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27. Mathematics Education

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Abstract

In up to date education, Mathematics education is that the follow of teaching and learning Mathematics, together with the associated pedantic analysis.

Elementary Mathematics was a part of the education system in most ancient civilizations as well as Ancient Balkan country, the Roman Empire, religious writing society and ancient Egypt. In most cases, a proper education was solely on the market to male youngsters with a sufficiently status, wealth or caste.

Researchers in Mathematics education are primarily involved with the tools, ways and approaches that facilitate follow or the study of practice, but, Mathematics education analysis identified on the continent of Europe because the didactics or pedagogy of Mathematics, has developed into an in depth field of study, with its own ideas, theories, methods, national and international organizations, conferences and literature. This text describes a number of the history, influences and up to date controversies.

Introduction

The first Mathematics textbooks to be written in English and French were printed by parliamentarian Recorde, starting with The Grounde of Artes in 1540. However, there are many alternative writings on Mathematics and Mathematics methodology that originate to 1800 BCE. These were principally set in geographic area wherever the Sumerians were active multiplication and division. There also are artifacts demonstrating their own methodology for finding equations just like the quadratic. Once the Sumerians a number of the foremost illustrious ancient works on Mathematics return from Egypt within the kind of the Rhind Mathematical Papyrus and therefore the capital of the Russian Federation Mathematical Papyrus. The additional illustrious Rhind Papyrus has been dated to close to 1650 BCE however it's thought to be a duplicate of a good older scroll. This papyrus was basically in early textbook for Egyptian students.

The position of mathematical study was rising by the seventeenth century, with the University of Aberdeen making a Mathematics Chair in 1613, followed by the Chair in pure mathematics being came upon in University of Oxford in 1619 and therefore the Lucasian Chair of Mathematics being established by the University of Cambridge in 1662. However, it had been uncommon for Mathematics to be schooled outside of the colleges. Newton, for instance, received no formal Mathematics teaching till he joined Trinity faculty, Cambridge in 1661.

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TO INCREASE DIGESTIBILITY OF WINGED BEAN USING DIFFERENT COOKING METHODS

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Abstract

Pulses are the rich sources of proteins. Country like India where large population is strictly vegetarian its value increases many fold. Protease inhibitors like trypsin and chymotrypsin inhibitors are the main protease inhibitors occur in pulses. Winged bean seed meal was used for study. Cooking methods and treatment like boiling, autoclaving soaking, microwave, and roasting were applied during present study. Water Boiling and Autoclaving are the most successful treatments and they shown lowering down the activities of trypsin and chymotrypsin inhibitors.

Introduction

Winged bean (Psophocarpus tetragonolobus (L) DC.) is one of the rich source of protein.

It has large potential to cater the need of staple food, rich in protein and oil aside from as fodder for animals. It has been recognized by US National Academy of Science of USA for its capacity to fix carbon and nitrogen in the unfavorable humid tropical environment and to transform its seed proteins and oil made up of nutritionally important configuration of amino & fatty acids (NAS 1981).

Protease inhibitors:

Protein inhibitors are very common in plant kingdom. They are the polypeptides composed entirely of L-amino acids with peptide bonds. The molecular weight of protease inhibitors in plant varies from 4000-60000 daltons although most of them ranges over 8000 to 20000 daltons. Winged bean contains a specific trypsin inhibitor and chymotrypsin inhibitors (Kortt, 1980).

These protease inhibitors are having inhibiting effect on the activity of specific proteolytic enzymes. They are very stable molecules, often resistant to heat, extremes of p^{H} and proteolysis.

Materials and methods:

The seed material of Winged bean was used in the present studies.

Physical treatments:

Soaking:-

Seeds were soaked in the water for 20 h until reaching maximum seed weight and hydration. Seed to water ratio was 1:5(w/v).

Boiling:-

Seeds were kept in boiling water until seeds become soft and tender for 35 min as in ordinary cooking.. seed to water ratio was 1:5(w/v).

Roasting:-

Seeds were kept in sand and roasted at the 180^{o} C temp. for 15 min..

Autoclaving:-

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