ACR-SDEP-2020

National Conference on Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics 19-20 February 2020

> Sponsored by : University Grants Commission (UGC)

PROCEEDINGS OF THE CONFERENCE





Organized by Department of Chemistry **YOGI VEMANA UNIVERSITY** Vemanapuram, Kadapa - 516 005. Andhra Pradesh, INDIA.

www.yogivemanauniversity.ac.in

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Dr. K.S.V. Krishna Rao, Assistant Professor, Department of Chemistry, Yogivemana University, Kadapa.

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Massages

(తన్నుతానెలిగిన తానెపో బ్రహ్నంబు :: If know thyself, Thou Art Divinity)

ఆచార్య మునగాల సూర్య కళావతి Ph.D., Post-Doc (USA) Prof. Munagala Surya Kalavathi, Ph.D., Post-Doc (USA) ఉపకులపతి :: VICE CHANCELLOR



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MASSAGE

I am extremely delighted to know that the Department of Chemistry of our university is organizing a **two-day National Conference on** *"Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics [ACR-SDEP-2020]"* during February 19-20, 2020. It is worthy to mention that all the topics proposed in this conference are of significant importance and certainly needed for the well being of the society as well assafeguarding the



environment. Certainly, this conference not only brings all the students, research scholars and industry personnel to one platform with a noble aim to discuss on contemporary trends and innovations in chemical research directed towards energy, environment and pharmaceutics. I am sure that all the deliberations of the event provide prospective opportunities to young researchers to inculcate the healthy research culture among the young research fraternity whichultimately contribute to the development of our nation.

It is highly inspiring to know that scientists across the nation, especially from the Karnataka, Telangana, Tamil Nadu and many other states are conveyed willingness to deliver event as keynote/plenary and invitedlectures in this two day event. Further, I am very much happy to know that about 200 young students/researchers across the nation are expected to participate in this event and contributing to its great success. I hope that this conference would certainly induce innovative ideas among the participants paving way for new inventions and technologies on advanced level to meet the requirements of sustainable development.

I congratulate the Department of Chemistry for organising such a significant event in our esteemed university. I wish the *ACR-SDEP-2020* conference a great success and hope all the participants will have a wonderful time in the event and take home new ideas and knowledge.

My best wishes to all

Munagala Surya Kalavathi

యోగి వేమన విశ్వవిద్యాలయం YOGI VEMANA UNIVERSITY

Vemanapuram, Kadapa - 516 005, Andhra Pradesh, INDIAN. (తమ్మతానెలగిన తానెపో బ్రహ్మంబు :: If know thyself, Thou Art Divinity)

ఆచార్య మాచిరెడ్డి రామకృష్ణా రెడ్డి, Ph.D., కుల అమాత్యులు Prof. M. Ramakrishna Reddy, Ph.D., RECTOR





rectoryvu@yogivemanauniversity.ac.in reddy.mrk@rediffmail.com

MASSAGE

I am glad to note that the Department of Chemistry, Yogi Vemana University is organizing a National Conference on "Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics [ACR-SDEP-2020]" during February 19-20, 2020. I understood that the advances in chemical research in the field of energy, environment and pharmaceutics will certainly helpful in



realizing the sustainable development of society. In particular, harvesting the energy from renewable energy feed stocks, methods to eradicate contaminants in the environmental matrices, strategies to develop potential therapeutic molecules requires knowledge in chemical principles and research. I am sure that this two day event attracts young researchers, faculty, and industrial personnel to discuss the knowledge and ideas required to accelerate required chemical research with pragmatic solutions for the sustainable environment and society. It is appealing to note that good number of eminent scholars already given their consent to deliver lectures on various important topics relevant to the theme of the conference.

I particularly seen the faculty of chemistry department is enthusiastic and involved in advanced research in natural products, developing new synthesis methodologies for organic molecules, polymeric materials, advanced materials for energy and environment. I take this opportunity to congratulate the whole team of the chemistry department and committee members of ACR-SDEP-2020 for their dedicated efforts and I wish the event a great success.

Jonote

(M. Ramakrishna Reddy)

Vemanapuram, Kadapa - 516 005, Andhra Pradesh, INDIAN. (తన్నుతానెలగిన తానెపో బ్రహ్మంబు:: If know thyself, Thou Art Divinity)

ఆచార్య డి. విజయ రాఘువ ప్రసాద్, Ph.D., కులసచివులు (FAC) Prof. D. Vijaya Raghava Prasad, Ph.D., REGISTRAR (FAC)



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MASSAGE

I am extremely happy to note that the Department of Chemistry, Yogi Vemana University, Kadapa is going to organize an UGC sponsored two day national conference on "Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics (ACR-SDEP-2020)", during February 19th & 20th, 2020. I congratulate organizers for coming out with such programme which, I am sure, will go a long way in fulfilling the objectives. Indeed such activities are



essential to keep on track with rapid pace of sustainable developments in the frontier areas of chemical research. These will help to strengthen industry-university relations which in turn will give the scope to staff & students for a wide exposer of latest developments in their subject. This further will enhance Scientific, Economic & Technological growth of the country.

Hope, seminar will facilitate the students, academia, researchers and the industrialists to come on to a common platform and exchange their ideas and new developments in materials, equipments and processes.

I am confident that the two day deliberations among the galaxy of distinguished and young minds will be fruitful. I congratulate the organizers for conducting this important scientific event and wish them a grand success.

(D. VIJAYA RAGHAVA PRASAD)



Yogi Vemana University Kadapa – 516 005,(A.P)INDIA Office: (08562) 225410 Fax: (08562) 225419,225443 Mobile:+919490122461

MESSAGE

I am happy to note that the two-day National Conference on "Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics" [ACR-SDEP-2020] during 19-20 February, 2020 is being held at Department of Chemistry, Yogi Vemana University. It is learnt that this is a mega academic event where in researchers from all over the India are participating. About 10 delegates from various nationally reputed institutions also taking part in the



conference to speak about the sustainable developments in chemical research. The organizers of the conference have thought it fit to bring out the scientific Proceedings of the Conference, which would help the participants and those who could not attend the conference for some reason or the other.

I am quite sure that the conference will provide a common platform for deliberations and discussions which would lead to mutual progress and development in academic and research. I wish the organizers of the conference all success in their endeavours and I hope all the participants in the conference will be immensely benefited by the Conference Proceedings and will help to excel in their future research activities. On this unique occasion, I wish all the participants a very pleasant and memorable stay in our university campus.

With all the best wishes

ackel

(G. Sambasiva Reddy)



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Dr. A.G. Damu Professor Department of Chemistry Yogi Vemana University Kadapa

MESSAGE

I am happy to learn that the Department of Chemistry is holding a 2-Day National Conference on "Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics [ACR-SDEP-2020]" during $19^{th} - 20^{th}$ February, 2020.



I feel that the theme of the conference "Sustainable Developments in Research on Energy, Environment and Pharmaceutics" is very apt and appropriate in the wake

of umpteen global challenges. I hope the conference would provide a platform to scientists and Research Scholars for a meaningful deliberation, exchange of knowledge and sharing of experiences on the theme.

Being energy, environment and health issues are the main focus of the conference, I also hope that the conference will address the issues related to improving quality of life for the common man and initiate meaningful debate on the strategies for the sustainable development in green energy and health of humankind. I hope this event will offer new insights and innovative trends in the area of energy and health.

I take this opportunity to congratulate the organizers and appreciate the efforts of Dr. K.S.V. Krishna Rao and his team for their meticulous planning and execution of the event. I am sure that you will have an array of eminent speakers, a gripping scientific agenda and papers chosen for oral and poster presentations, out of large umber of abstracts received.

I hope the talks of this conference will familiarise the audience with their fields of work, enriching the august audience.

I wish the conference a grand success.

Kadapa 12-02-2020

(A. G. Damu)

Dr. K.S.V. Krishna Rao M.Sc., Ph.D Assistant Professor & Coordinator Department of Chemistry



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Message

It gives me an immense pleasure and honor to launch a two-day National Conference on "Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics [ACR-SDEP-2020]", during February 19th & 20th, 2020 at Yogi Vemana University (YVU), Kadapa. This event is being organized by the Department of Chemistry, one of the oldest and vibrant departments of Yogi Vemana University, Kadapa. With the cooperation of our dedicated team, we have taken greatest efforts to make these two days a



memorable one for all the participants of the event. We are fortunate to have eminent professionals with proven expertise in the field of Chemical Science and Technology from all over the country who are kind enough to travel to Kadapa and agreed to deliver lectures enabling the delegates to experience a good scientific feast. I personally take this opportunity to extend a warm welcome to all the eminent speakers, delegates, industrial personnel, researchers, students from different universities, institutions, and industries across the country.

I am very much motivated by the extraordinary commitment, dedication and hard work of the faculty and non-teaching staff of the department of chemistry as well as from other departments. With their sincere help and cooperation, I am sure that the event will be more successful in meeting its objectives. I sincerely thank all the members of the scientific committee and sponsors who are instrumental in organizing this conference successfully.

In the two-day national conferee several aspects of thrust areas of chemistry related to the Sustainable Developments in Energy, Environment and Pharmaceutics will be discussed. There are totally 8 lectures (including Key Note Adress) covering the topics on Natural Products, Chemical modification of peptide backbone, Sensors for Environmental Contaminant Sensing, Commercialization of Eribulin Mesylate: The Anticancer Drug, Modified Carbon Paste Electrode Sensor in Research, Polymer Solar Cells, Anti cancer drug delivery, Patents in Process Chemistry and Importance of Impurities in the API Manufacturing.

I am sure that this conference will help to disseminate the information on the latest and rapidly advancing technologies in Energy, Environment and Pharmaceutics and would provide platform to take the current state of Chemical Research and Education in the country.

I would like to thank each of you for sharing your expertise and contributing to the success of the conference and looking forward to see you all soon. I appeal to each of you to extend your continued support and cooperation to the future activities of our university.

I wish the conference a great success.

Dr. K.S.V. Krishna Rao Convener, ACR-SDEP-20

Department Faculty – Strength, Expertise & Awards



Dr. K. S. V. Krishna Rao Research expertise: Biomaterials, Nano-Composites & Drug Delivery

Department Faculty – Strength, Expertise & Awards

Date of Joining: 23rd July 2009

Experience: Teaching – 10.5 Yrs, Research – 20 Yrs

Publications: 45, Abroad visits: 2 Yrs Postdoc, TAIWAN, 3 Yrs Post Doc, Germany, 1 Yr Postdoc, USA

Awards: Alexander von Humboldt Fellow – Germany (2006), Young Scientist, DST (2010), UGC – Raman Fellowship (2016), Projects: BRNS – 1, DST – 1, CSIR - 1

Dr. P. Vasu Govardhana Reddy Research expertise: Organic Synthesis

Date of Joining: 23rd July 2009 Experience: Teaching – 10.5 Yrs, Research – 17 Yrs Publications: 49, Abroad visits: 1 Yr Postdoc, South Korea Awards: JRF (CSIR – 2002), Best SRF (IICT – 2006), Young Scientist – DST (2014), Projects: DST – 1, CSIR – 1

Dr. K. Venkateswarlu Research expertise: Organic Synthesis & Natural Products



Date of Joining: 27th July 2009 Experience: Teaching – 10.5 Yrs, Research – 24 Yrs Publications: 56, Abroad visits: 8 Yrs Postdoc, TAIWAN, 1.5 Yrs AvH Post Doc, Germany, JAPAN Awards: Alexander von Humboldt Fellow – Germany (2008) Projects: DST – 1 Ph. D supervised Awarded – 4 Working – 2



Ph. D supervised Awarded – Nil Working – 4



Ph. D supervised Awarded – 2 Working – 2



Dr. L. Subramanyam Sarma Research expertise: Nanomaterials & Electrochemistry



About the University

Yogi Vemana University was carved out from the erstwhile Sri Venkateswara University Post Graduate Center on 9th March 2006, by the Act of the Andhra Pradesh State Legislative Assembly. Presently about 1800 students are pursuing postgraduate and research programmes. The university was accorded 2 (f) recognition in 2007 and 12 (B) status in 2011 by the University Grants Commission, New Delhi. Also got 'B⁺⁺ grade Accreditation by National Assessment and Accreditation Council, New Delhi. The university is emerging as a premier institution to generate new breed of human resources needed for attaining progress, prosperity and social enrichment.

The university has 27 departments offering 30 PG courses under 7 interdisciplinary schools. The university is located 15 kilometers away from city of Kadapa on Kadapa-Pulivendula road in sprawling and serene campus. The University has adequate infrastructural facilities *viz*. majestic buildings with modern architecture and laboratories with sophisticated instruments and hostels with modern amenities. The university is moving forward with its aim of creation and dissemination of knowledge, attainment of enlightened wisdom through advancement of true learning, teaching, research and service.



About the Department

The chemistry department was established in 1979 at erstwhile SVU PG center and since then has grown into one of the biggest departments of Yogi Vemana University. The department is offering two year MSc course with a well-planned upto date course structure covering the latest developments in contemporary areas of Chemical Sciences with storing strong urge to develop man power with high potential to compete in academic and industrial areas at national and international scenario. The growth of the department both in teaching and research is due to the untiring efforts of teachers specialized in Organic Synthesis, Bioactive Natural Products, Bioactive Organometallics, Polymer based Drug Delivery systems, Nanomaterials and Fuel Cells. Research is also department's prime duty and it is pursued to enter into different new challenging areas along with strengthening of major thrust areas of like synthesis of biologically potent drugs like anti-cancer, anti-inflammatory, antioxidant, anti-Diabetic and to control the Alzheimer's Disease, in addition the this natural polymer based materials offers solutions to heavy metal pollution in the mineral-rich Kadapa basin, and efficient non-noble metal-based metal organic frameworks/polymeric composite membranes for purification water, dehydration of organic solvents, carbon dioxide capture and oxygen reduction relevant to environmental applications.

Success of a large number of post graduate students in national tests UGC-CSIR, NET and GATE bearing testimony to quality teaching in the department. The department faculty is engaged in various innovative projects funded by CSIR, DBT, DST BRNS and ISRO. The department is also offering fulltime PhD program in the above said thrust research areas



UGC – sponsored two-day National Conference on "Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics" [ACR – SDEP – 2020], 19th & 20th February, 2020

Department of Chemistry, Yogi Vemana University, Kadapa

ORGANIZING COMMITTEE

1. Registration & Reception

Dr. K. Venkateswarlu Mrs. V. Bhagya Lakshmi Mrs. B. Adi Lakshmi Mrs P. Radha Mr. B. Sateesh Mr. J. Suresh Mr. G. Dilwar Hussain Ms. G. Noorjhan Ms. K. Sahithi Ms. J. Nikitha Mr. K Bala Niranjan

4. Poster Session & Certificates

Dr. L. Subramnayam Sarma Dr. K. Venkateswarlu Mr. K. Ramakrishna Mr. U. Lakshmi Narayana

2. Programme Committee

Prof A.G. Damu Dr. N.C. Gangi Reddy Dr. K.S.V. Krishna Rao Dr. P. Vasugovardhana Reddy Dr. K. Venkateswarlu Dr. L. Subramnayam Sarma Mr. G. Kumar Mr. K Yelamanda Rao

3. Stage Decoration

Mrs. T.J. Sudha Vani Mr. G. Siva Shankar Mr. P. Tyaga Raju Mr. Kalluru Trinadha Reddy Ms. A. Varalakshmi Ms. Ambati Sravani Ms. Beenathi Aparna Ms. D. Adilakshmi Ms. P. R. Gowthami Ms. N. Anitha

5. Hospitality

Dr. P. Vasu Govardhana Reddy Dr. K.S.V. Krishna Rao Mr. U. Lakshmi Narayana Mr. S. P. Kalesha Mastan Valli Mr. N. Ramesh

6. Souvenir

Dr. K. S.V. Krishna Rao Mr. K. Nagaraja

UGC – sponsored two-day National Conference on "Advances in Chemical Research for Sustainable Developments in Energy, Environment and Pharmaceutics" [ACR – SDEP – 2020], 19th & 20th February, 2020

Department of Chemistry, Yogi Vemana University, Kadapa

PROGRAMME SCHEDULE DAY # 1 (19th February, 2020)

Venue: E-Class Room – 2 (Room No: 180), Sir C. V. Raman Science Block, Y. V. University				
Registration	09:00 ~ 10:00 AM			
Inauguration	10:00 ~ 11:00 AM			
Guest of Honor: Dr. A. V. Ramana Reddy, Ex. Head, Analytical				
Division, Bhaba Atomic Research Centre (BARC), Mumbai				
TEA BREAK & POSTER SESSION (11:00 ~ 11:20 AM)				
KEY NOTE LECTURE	11:20 ~ 12:20 PM			
Dr. A. V. Ramana Reddy,				
Ex Head, Analytical Division, Bhaba Atomic Research Centre (BARC),	Topic: Chemical Research for Sustainable Development			
Mumbai				
SESSI	ON - 1			
INVITED LECTURE #1	12:20 ~ 01:05 PM			
Dr. K. Suresh Babu				
Principal Scientist	Topic: Recent Approaches in Natural Products for New Drug			
Centre for Natural Products & Traditional Knowledge	Development			
CSIR-Indian Institute of Chemical Technology,				
Hyderabad-500 007, INDIA				
LUNCH BREAK	(1:05 ~ 2:05 PM)			
SESSION – 2				
INVITED LECTURE #2	02:05 ~ 02:50 PM			
Dr. Vommina V. Suresh Babu				
Department of Studies in Chemistry, Sneha bhavan, Jnana bharathi,	Topic: Chemical modification of peptide backbone:			
Bangalore University, Bengaluru-560056	Selenoxopeptides & Selenoureidopeptidomimetics			
Email: hariccb@gmail.com; sureshbabuvommina@rediffmail.com				



INVITED LECTURE #3	02:50 ~ 03:35 PM			
Associate Professor, Department of Chemistry, SoS, GITAM	Topic: MOF-Based Electronic Sensors for Environmental			
University Hyderabad Campus, Hyderabad - 502 329, Telangana, India	Contaminant Sensing			
INVITED LECTURE #4	03:35 ~ 04:20 PM			
Dr. Jagan Reddy Ph.D				
Managing Director- CNS Labs Private Limited	Topic: Synthetic Studies and Commercialization of Eribulin			
Managing Director- Raabta Pharma Private Limited	Mesylate: The Anticancer Drug			
TEA BREAK & POSTER SESSION (04:20 ~ 05:00 PM)				
PARALLEL SESSIONS				
Venue: E-Class Room - 2	05:00 ~ 06:00 PM			
ORAL PRESENTATIONS (OP No:1 to 8)				
Venue: E-Class Room – 1	05:00 ~ 06:00 PM			
ORAL PRESENTATIONS (OP No: 9 to 17)				

DAY # 2 (20th February, 2020) Venue: E-Class Room – 2 (Room No: 180), Sir C. V. Raman Science Block, Y. V. University

SESSION – 3				
INVITED LECTURE #5	10:00 ~ 10:45 AM			
Dr. B. E. Kumara Swamy				
Associate Professor				
Dept of PG Studies and Research in Industrial Chemistry	Topic: Modified Carbon Paste Electrode Sensor in Research			
Kuvempu University, Shankaraghatta – 577 451, Shimoga, Karnataka, INDIA,				
Email : kumaraswamy21@yahoo.com				
INVITED LECTURE #6	10:45 ~ 11:30 AM			
Dr. Numbury Surendra Babu				
Associate Professor, Department of Chemistry				
The University Of Dodoma, DODOMA, TANZANIA,	Topic: Design of Conjugated Polymers for Polymer Solar Cells:			
Mail:nsbabusk@gmail.com	Computational Quantum Chemistry Methods			
TEA BREAK & POSTER SESSION (11:30 ~ 12:00 Noon)				
INVITED LECTURE #7	12:00 ~ 12:45 PM			
Dr. M.C.S. Subha				

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UGC-BRS Professor, Department of Chemistry, S. K. University,	Topic: Gelatin coated heteroionic magnetite-sodium alginate microbeads			
Ananthapuramu, Andhra Pradesh, India	for targeted anti cancer drug delivery			
LUNCH BREAK (12:45 ~ 02:00 PM)				
SESSION – 4				
INVITED LECTURE #8	02:00 ~ 02:45 PM			
Dr. A. Veera Reddy	Topic: Patents in Process Chemistry			
Vice president-(R&D), #18, PHASE-III, JEEDIMETLA,				
Suven life sciences, HYDERABAD-500055				
Mobile: 09392483004				
INVITED LECTURE #9	02:45 ~ 03:30 PM			
Dr. K. Chowdoji Rao				
Department of Polymer Science & Technology, Sri Krishnadevaraya	Topic: Curcumin encapsulated chitosan and hydroxyethylcellulose			
University, Ananthapuramu, Andhra Pradesh	hydrogel blend membranes for controlled drug delivery.			
INVITED LECTURE #10	03:30 ~ 04:15 PM			
Dr. Naveen Mulakayala				
Head-Techno Commercial, SVAK Life Sciences, HYDERABAD	Topic: Importance of Impurities in the API Manufacturing: Process and Formulation Impurities			
	1			
TEA BREAK & POSTER SESSION (04:15 ~ 04:45 PM)				
Valedictory	04:45 ~ 05:45 PM			
Chief Guest: Dr. A. Veera Reddy				
Vice president-(R&D), Suven life sciences, HYDERABAD				







Dr. A.V.R. Reddy joined Nuclear Chemistry Section, RCD, BARC in 1977 after Training School. Obtained Ph.D in Nuclear fission and did post-doc on extension of periodic Table in Mainz, Germany. Till Sept 2008, he was Head, Nuclear Chemistry Section and then was Head, Analytical Chemistry Division, BARC till 31-05-2015. He worked as professor in Chemistry in V S University,

Nellore, AP for an year and presently he is CEO, Gemmological Institute of India, Mumbai. He has worked in the International Atomic Energy Agency (IAEA) during 1999-2000 as a technical officer. His areas of research are Nuclear fission, nuclear reactions, nuclear analytical techniques, non-destructive assay methods, electroanalytical chemistry and environmental science. He has about 700 publications (journals and symposia), coauthored 4 books and edited 32 books / compilations.

Visited many countries in Asia, Europe and South America, delivered more than 400 lectures in nuclear analytical techniques, nuclear chemistry, general chemistry, QA/QC, analytical chemistry, spectrometric methods, organic spectroscopy, chemical safety and research methodology. He was a visiting professor in Mumbai University for 15 years and was a professor of Homi Bhabha National Institute, DAE.

Dr. Reddy is a fellow of International Union of Pure and Applied Chemistry (IUPAC). He is an active member of many Scientific Associations and immediate past President of Indian Association of Nuclear Chemists and Allied Scientists (IANCAS). He worked as a commission member of IUPAC for three terms. Dr. Reddy worked with two funding agencies, Board of Research in Nuclear Sciences (BRNS) and Science and Engg Research Board (SERB). Dr. Reddy is on the Editorial Board of two international journals.



Chemical Research for Sustainable Development

A V R Reddy

Chief Executive Officer

Gemmological Institute of India, 501, Mehta Bhavan, 5th floor, Raja Ram Mohan Roy Marg, Opposite Charni Road Station (East), Mumbai 400004.

Abstract: Need based drive for development, material production, new methods of agriculture and other industrial activities without fully evaluating consequences, resulted in asymmetry in material balance in the environment over the last few decades. It has been true, in general, in all industrial processes but, in particular, in the chemical and pharmaceutical industrial production. In the race for producing newer materials with higher yields, often due care was not taken towards environmental aspects, and thus affected general life. In the seventies of the last century, this was realized and thus began a new branch of science and engineering called "Environment, its monitoring and remedial action" for sustainability. By nineties the concept of sustainable development has been introduced. It can be defined as the development that meets the needs of the present without compromising the ability of future generations to meet their requirements. In view of the far-reaching anthropogenic induced environmental problems, during the last three decades, society has been focusing on sustainable development to be the best way to address these complex problems for the sake of current and future generations. As sustainable development is imperative, many universities across the globe have introduced this subject into curriculum. UN has taken keen interest and formulated 17 goals which are well publicized and action plans are aimed at achieving global sustainable development with a larger picture of harmonious development. The major requirement is multi-disciplinary approach with a focus on interactions between science and society.

Although all branches of science, engineering, medicine, industry, economies etc. are the players and stake holders for achieving this, chemists, engineers, pharmacists and environmentalists have a major role in achieving UN millennium targets on WEHAB (Water, Energy, Health, Agriculture and Biodiversity) towards sustainable development. Appropriately, the theme of the conference ACR-SOEP-2020 is aimed at discussing some of these aspects.

During this talk, a general introduction to the subject will be given followed by some aspects of green chemistry and environment management. The gist of this year's Nobel Prize work in Chemistry will briefly be presented which is a reflection of sustainable development to produce energy through lithium ion battery that results in minimum wastage and low load on environment.



Dr. Katragdda Suresh Babu was born in Guntur District of Andhra Pradesh, India. Dr. K. S.Babu obtained his Masters in 1999 and Doctorate in Natural Product Chemistry in 2005 from Kakatiya University (Work done at IICT, Hyderabad), Warangal. Later on, he moved to pursue his postdoctoral research at National Center for Natural Product Research, University of Mississippi, USA for three years. He returned to India and joined in CSIR service in 2007 at Indian Institute of Chemical Technology (IICT), Hyderabad. In his research career, Dr.

K. S. Babu has been able to successfully carry out extensive basic and applied research in the chemistry of Natural Products of biological relevance. Dr. Babu's research group has successfully isolated several new bioactive molecules from natural resources and He has published **160** papers in SCI journals and filed **10** patents of India, PCT & US. He is leading many projects of national importance in New Drug Discovery, Standardization of Herbal Drugs of commercial importance.

His research interests are New Drug Discovery from Natural Products, Herbal Drugs and their standardization, botanical pesticides, chemical modification of lead compounds, and SAR studies. Dr. Babu is a recognized research guide for doctoral and post-doctoral programs and **9** scholars are working under his able guidance and **17** scholars got the PhD Degree.

Awards& Honors

- OPPI Young Scientist Award for the year 2010 by Organization of Pharmaceutical Producers of India (OPPI), Mumbai.
- Andhra Pradesh Akademi of Sciences (APAS) Young Scientist Award for the year 2010.
- Best Performance Award for the year 2011 conferred by Director, IICT, Hyderabad
- Elected as Associate fellow of the AP Akademi of Sciences in the year 2012.
- Scientific consultant to M/S Himalaya Healthcare R&D, Bangalore in the year 2015-16.
- Elected as a Fellow of Association Biotechnology and Pharmacy (ABAP) in the year 2016.
- Editorial Board member of journal "Pharmacognosy Magzine" (International Journal in the field of Natural products)
- Elected as a Fellow of AP Akademi Sciences in the year 2018
- Two patents "New Natural agent for treatment of gastrointestinal toxicity, associated symptoms and ulcers [US Patent No. 7855200] and "New Intestinal α-Glucosidase inhibitors from natural source and use thereof" [EP patent number. EP20070700460] were commercialized to M/S Sami Labs, PVT Limited, Bangalore
- The process technology "Development of Process for Extruded Nutrafood products for management of metabolic disorder, anemia and malnutrition" was transferred to M/S Ameya Life, the brand of Wellcare Life LLP and SDG Healthcare Pvt. Ltd, Hyderabad.

Recent Approaches in Natural Products for New Drug Development

K. Suresh Babu

Principal Scientist Centre for Natural Products & Traditional Knowledge CSIR-Indian Institute of Chemical Technology, Hyderabad-500 007, INDIA Email: <u>suresh@iict.res.in</u>

Abstract: The Indian subcontinent has a vast costal belt along with the wide range of forest environment, which host large number of un explored plant/marine species. This diversity has been the source of unique chemical compounds with the potential for industrial development as pharmaceuticals, cosmetics, nutritional supplements, molecular probes, fine chemicals and agrochemicals. In recent years, a significant number of novel metabolites with potent pharmacological properties have been discovered from the natural sources including marine and terrestrial plants. Recent move of society towards nature for the treatment of various diseases where there is no satisfactory cure in modern medicine has diverted the attention of natural/medicinal chemists and biologists to unravel their chemical characteristics and biological activities together in order to define their therapeutic potential in the light of modern pathobiological understandings. This move has led collectively to rediscover, design and refine the therapeutic application of medicinal plants/marine sources.

During last eight years, we have studied several medicinal plants and marine organisms guided by in vitro based bioassays to delineate the chemistry of natural products responsible for biological activities. This effort has led to identify several potent multiple active medicinal plants/marine sponges, their active fractions and synergistic molecular compositions. We have identified particularly, several free radical scavengers, xanthine oxidase and α -glucosidase inhibitory principles present in substantial yields. Presence of multiple active phytochemicals in rich concentrations in some of the medicinal plants therefore offers exciting opportunity for development of novel therapeutics and also provides scientific justification for their use in traditional medicines. Therefore, biologically activity based chemical characterization of these medicinal plants may provide scientific explanation for their use in traditional medicines and also redesign and develop preparations for novel therapeutic applications.

Keywords: Natural Products, Drug Development, Indian subcontinent, Terrestrial plants



Dr. A. Veera Reddy Vice president-(R&D), #18, PHASE-III, JEEDIMETLA, Suven life sciences, HYDERABAD-500055 Mobile: 09392483004

M.Sc-1974-76 Batch of SVU campus-Tirupathi.

Experience:

Ph. D (*org.chem*) 1982 UNIV.OF HYDERABAD (CENTRAL UNIV.) +37 yrs. Of exp. Ph. D- Supervisor: Prof. Goverdhan Mehta

AFFLIATION TO SCIENTIFIC BODIES:

Patents in Process Chemistry

A. Veera Reddy

Vice president-(R&D), #18, PHASE-III, Jeedimetla, Suven life sciences, Hyderabad-500055

Abstract: A patent " is a form of intellectual property that gives its owner the legal right to exclude others from making, using, selling and importing an invention for a limited period of (usually 20 years), in exchange for publishing an enabling public disclosure of the years invention".

India from 1970 to 2005 honored the process patents for drugs. From 2005 onwards it is a product and process patents.

The following examples will clearly explain the importance of process patents. NOH соон BASE 1). ح Ċ 1.Br2 REPORTED 2.Na2SO3 NOH SO₃Na BASE Ś NEW IN: NI 2). CLICK REACTION REPORTED Þh `OAc N

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Prof. Kumar Swamy received his Ph. D from Kuvempu University, Karnataka in 2002 under the guidance of renowed electrochemist Prof. B. S. Sherigara, Former Vice-Chancellor of Kuvempu University. He immediately joined as a Post Doctoral Research Associate in Sothern Methodist University, Dallas, Texas, USA supported by the National Science Foundation and worked till January 2006. Later, he joined as a

Research Associate in University of Virginia, USA from Feb 2006 to Dec 2006 under Jefferson Memorial Trust Award. He then joined as an Assistant Professor in Dec 18, 2006 in the Department of Industrial Chemistry, Kuvempu University and subsequently promoted as Associate Professor. His research interests encompass development of chemical Sensor for some neurotransmitters, biosensors, nanosensors and electrochemical Sensors. He received good number of Projects from DST, Naval Research Board, and UGC worth of 1.2 crore as Investigator as well as Co-Investigator. Dr. Swamy is the Co-Cordinator for M.Tech Nanoscience and Technology supported by DST Nano Mission. At present he is serving as the Deputy Registrar in the Development Section Kuvempu University from July 2015 and Deputy Director in IQAC, Kuvempu University and worked in NAAC as the DVV member and other important assignments in NAAC, Govt of India from Feb 2019.

Presently he is the Chairman of Dept of Industrial Chemistry, Kuvempu University. He has published 265 research articles in International and National peer journals. Attended more than 52 in National and International Conferences. It is worthy to mention that his h-index is 38, i-10 index is 134 and the citations were 5029. Because of his outstanding contribution in the field of Chemical Sensors, he received "International Award – Prof.Dimitrioes Nicholis" on Sept 7, 2015, DR. A.P.J ABDUL KALAM Life time National achievement award by Krist foundation, Bengaluru (2016) and Outstanding Scientist Award from Distinguished Scientist Award – International Conference on Advances in Science & Engineering ICASE-2017 at East West Institute of Technology, Bengaluru and in Regents International College, Bangkok, Thailand.

Modified Carbon Paste Electrode Sensor in Research

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B. E. Kumara Swamy

Dept of PG Studies and Research in Industrial Chemistry Kuvempu University, Shankaraghatta – 577 451, Shimoga, Karnataka, INDIA Email : kumaraswamy21@yahoo.com

Abstract: Analytical chemists routinely use voltammetric techniques for the quantitative determination of bioactive molecules using different modifiers. The performance of the voltammetric procedure is strongly influenced by the working electrode material. The working electrode should provide high signal-to-noise characteristics, as well as a reproducible response. Thus, the selection of working electrodes depends on the redox behaviour of the target analyte and the background current over the potential region required for the measurement. Electron transfer plays a fundamental role in governing the pathway of chemical reactions. Cyclic voltammetry is the most versatile electroanalytical technique for the study of electroactive species. It is used in all fields of chemistry as a means of studying redox states, to know the reaction mechanisms, number of electrons involved and intermediate products in the electrode reaction. The versatility of this technique combined with its simplicity has resulted in its rapid growth in popularity. The primary objective of developing these cyclic voltammetric techniques was analytical, both qualitative as well as quantitative. This technique was used to study the electrochemical properties of the modified CPE was used for the simultaneous detection of dopamine, ascorbic acid and Uric acid. The design, fabrication and application of novel nanomaterial electrochemical sensor created a considerable interest in the sensor fields.



Manabolu Surya Surendra Babu, Ph.D Associate Professor, Department of Chemistry, SoS, GITAM University(Deemed to be University); Hyderabad (A.P) INDIA Mobile : +91-9440975442, e-mail : manabolu@gmail.com; surendrababu.manabolu@gitam.edu

M.Sc., : - 1998 -2000 Batch SKU campus-Anantapur M.Phil : - 2002 -2004 S K University -Anantapur Ph.D., :- 2004-2007 Batch S K University -Anantapur

1.	Teaching Experience	:	10 years in GITAM University ,
2.	Industrial Experience	:	3 years(Penn Bio Chem & Suven life sciences)
3.	Awards and Fellowships	:	CSIR-UGC NET -2002
4.	Publications	:	
	International Journal	:	30
	National Journal	:	13
5.	Conferences/ Workshop	:	35
6.	Invited Talks	:	8
7.	Projects	:	2
8.	Ph.Ds Awarded	:	3

MOF Based Electronic Sensors for Environmental Contaminant Sensing

M. S. Surendra Babu

Department of Chemistry, SoS, GITAM University Hyderabad Campus, Hyderabad - 502 329, Telangana, India.

Abstract: Automatically, gas sensors have sculpted out as mandatory in industrial applications and domestic households. The reasons behind prominence of gas sensors are (i) stringent legislative regulations i.e., OSHA and AEGL (ii) polluting gases from automobiles (iii) agroindustries - monitoring and detection of certain gases as indicators for the freshness of food and ripening of fruit. These are a few compelling necessities behind the usage of gas sensors. MOFs are ideal for sensing applications, being a hybrid material they possess several unique properties such as high and tuneable porosity, reversible adsorption, adsorption at room temperature, creation of active sites for selective and specific gas interaction, tailorable chemistry and diverse structures, elimination of disorder from the crystalline structure, defects that impede charge mobility, opportunities for creation of defects, and thermal and chemical stability are considered as unique features of MOFs for their application as sensing materials. Furthermore, the existence of electrically conductive and semi-conductive MOFs is cited as the prime motivating reason behind exploiting MOFs for the targeted sensing of gases and/or vapours. MOF-based electronic sensor devices are poised to make a meaningful impact on gas sensing by means of 1) Impedance Sensors; 2) Chemicapacitive Sensors, 3) Chemiresistive Sensors 4) Kelvin Probe and Field Effect Transistor Sensors. Chemiresistive sensors of MOFs as the active material are the simplest and most desirable sensor devices. The development of both porosity and electrical conductivity MOFs has enabled the applications in chemiresistive sensors fabrication to detect and distinguish NH₃, H₂S, NO, and H₂O at low ppm concentrations.



Scheme: Schematic illustration of ammonia-sensing mechanism for ZIF-8.



Dr. Numbury Surendra Babu Associate Professor Computational Quantum Chemistry Department of Chemistry College of Natural and Mathematical sciences The University Of Dodoma DODOMA, TANZANIA Phone:+255 67222123 Mail:nsbabusk@gmail.com

M.Sc-1994-96 Batch of SKU campus-Anantapur.

Experience:

Ph. D (*phy.chem*) 2002 S.K. University Ananatapur Teaching Exp. +**17 yrs.**

Affliation to Scientific Bodies:

- 1. Member in The Minerals, Metals & Materials Society (TMS), Pittsburg, Pa, USA
- 2. The solar energy of India
- 3. Chemical Society of Japan

Publications53 Ph.d's awarded2

Research Interest

Design of organic solar cells by using of computational quantum chemistry methods

Design of Conjugated Polymers for Polymer Solar Cells: Computational Quantum Chemistry Methods

Numbury Surendra Babu

Department of Chemistry, College of natural& mathematical Sciences, The University of Dodoma, Tanzania

Abstract: Polymer solar cells, a highly innovative research area for the last decade until today, are currently maturing with respect to understanding of their fundamental processes of operation. The increasing interest of the scientific community is well reflected by every year dynamically rising number of publications. Nowadays, conjugated polymers present new area of research, in both experimental and theoretical chemistry and physics, due to their interesting optoelectronics properties organic solar cells based on polymers have attracted great attention. They are mechanically flexible, light, and cost-efficient. Polymers that comprise both electron donor and acceptor moieties are specifically interesting as energy harvesting materials as they contain a large number of light absorption and charge-separation centers in one macromolecule and enable versatile synthesis with a variety of molecular building blocks.

Quantum-chemical methods provide a powerful tool set both for designing new copolymers and understanding their performance in organic photo voltaic devices. Thanks to computational methods, that it is possible to study large numbers of compounds even before synthesis. So quantum chemical methods can be used to study the series of compounds to establish the structure-efficiency relationship. To study the relationship between structure and properties, to used the theory of density functional theory (DFT) and time-dependent density functional theory (TD-DFT) to calculate the molecular geometry, electron injection, and optical properties.

DFT and TD/DFT based computational methods be used to calculate or develop structure function relationships for many properties in organic photovoltaic's including bandgap, optical absorption, intra-molecular and inter-molecular charge transfer, exciton binding energy, charge transfer integral, reorganization energy and the rate of charge transfer and recombination in donor-acceptor complexes.





Dr. Jagan Reddy Ph.D Managing Director- CNS Labs Private Limited Managing Director- Raabta Pharma Private Limited

After Completion of his M.Sc Degree at NIT- Warangal, he has worked for Dr.Reddy's Laboratories Ltd (2001-2003), Suven Life Sciences (2003- 2005) and then moved to USA for Ph.D studies. His Ph.D studies involve development of Novel organometallic reactions and its applications in organic synthesis.

After completion of his Ph.D at University of Minneapolis he has moved to Albany molecular Research Inc., as Scientist and then moved to Laxai Life sciences and Ind-Swift Laboratories Ltd as General Manger in Business development department. He was looking after the sales and Business development for North America region.

Then he has started CNS LABS Private Limited and recently we have started RAABTA Pharma Private limited.

His scientific work was published in many international journals and sufficient experience in research and development and Business development is the key for incorporation of the company and instrumental in driving the sales and execution of complex chemistry.

Synthetic Studies and Commercialization of Eribulin Mesylate: The Anticancer Drug

Jagan Reddy

Director – CNS Labs Pvt. Ltd. Director - RAABTA Pharma Pvt. Ltd.

Abstract: Eribulin mesylate (eribulin) an analogue of marine natural product halochondrin- B, is a microtubule-depolymerzing drug that has utility in treatment of patients with breast cancer. Further Eribulin mesylate is in clinical trials Phase –III/IV for other cancer cell lines. Recently NATCO launched Eribulin Mesylate for Lung Cancer. Owing to its importance and its complexity CNS Labs has decided to work towards synthesis of Eribulin Mesylate intermediates. We have developed very economical and seamless synthetic methods to prepare advanced intermediates. The synthesis involves many important reactions like: Asymmetric di hydroxylation, Jacobsens asymmetric resolution, Nozaki Hiyama Kishi reaction, Wittig reaction, Horner-Wadsworth-Emmons (HWE) reaction, Hosomi- Sakurai reaction and etc., We are going discuss about the named reactions and how we confirmed the obtained diastereomer by using NMR technique.







Dr. Naveen Mulakayala Ph.D Head-Techno Commercial, SVAK Life Sciences

He was born in Kadapa district and completed hisstudies till B.Sc. in Kadapa. He completed his M.Sc and Ph.D. from Sri Krishnadevaraya University-Anantapur. After his doctorate he started working with Dr. Reddy's Institute of Lifesciences (2008-2013), AAP Pharma Technologies India Pvt Ltd (2013- 2014), Clearsynth Labs Pvt Ltd (2014-2018), and then moved to SVAK Lifesciences (2018-till date). His Ph.D studies involve development of Novel Organo Sulphur and Selenium Compounds and its biological applications.

After completion of his Ph.D he worked as post doctoral fellow in DRILS and then promoted to Research Scientist there only. His research work consisting of Medicinal Chemistry, Impurity Synthesis, development of process for existing API, Labelled Compounds. He was looking after the sales and Business development in Clearsynth Labs along with R&D. In SVAK Life sciences he is taking care of both R&D as well as Business Development.

One Ph.D. student was completed and 3 were submitted their Ph.D. under his supervision from different universities. Seven students are working for their Ph.D. at present. His scientific work was published in many international journals and two patents were applied for novel anticancer molecule having good activity.

Importance of Impurities in the API Manufacturing: Process and Formulation Impurities

Naveen Mulakayala

Head-Techno Commercial, SVAK Life Sciences, ALEAP Industrial Area, Hyderabad-500090 Emial: <u>naveen071280@gmail.com</u>; <u>naveen@svakls.com</u>

Abstract: Analyzing the levels of impurities and the physical, structural and behavioral attributes of these impurities in APIs helps to identify the potential cause of variations in the finished product during drug development and formulation. International Conference on Harmonization (ICH) recommended guidelines to qualify the drug substance [1]. The impurities are $\geq 0.1\%$, concerning the stringent purity requirement, or else it should be identified and characterized [1], [2]. Therefore, process development of the drug molecules without impurity profiling is scant and will be a challenging task for organic chemists. Many reports displayed the approach for the identification and characterization of unknown impurities formed in the drug development process [3], [4]. In addition, some of the impurities are not available readily and would be essential in required quantity for method development and validation. Therefore, the synthesis of impurities is not an easy task for the development team since the synthesis approach is not known or described in the literature.



References: 1. International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH), Guidelines Q3B(R2): Impurities in New Drug Products, 2006, <u>(http://www.ich.org/fileadmin/Public Web Site</u>

/ICH_Products/Guidelines/Quality/Q3B_R2/Step4/Q3B_R2_Guideline.pdf) (accessed 12 August 2014). 2. Nicolas E.C., Scholz T.H; J. Pharm. Biomed. Anal. 1998;16:813–824. 3. Kumar N., Subba Rao D., Singh G; J. Pharm. Biomed. Anal. 2016;119:114–121. 4. Kumar N., Subba Rao D., Reddy G.P.; J. Pharm. Biomed. Anal. 2016;120:248–260.





Dr.K.Chowdoji Rao, M.Sc., Ph.D. Professor (Rtd.) UGC - BSR Faculty Fellow Department of Polymer Science & Tech. Sri Krishnadevaraya University ANANTAPUR-515 003 (A.P) INDIA.

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M.Sc-1976 Batch of SKU campus-Anantapuramu.

Experience:

Ph. D 1985 (Physical Chemistry) S.K.University, Anantapuramu. Total length of service as Professor in S.K.University, ATP: 12 years 6 months

Research Publications and Patents

(i) Total publications = 175 (One hundred and seventy five)(ii) Total Patents = 2 (Two)

Research Papers presented in Seminars/ Conferences: Total Papers presented = 103

Research Projects Completed and Grants Received 8 No. (Rs. 80.0 Lakhs)

Ph.d's awarded......26

Awards/Honors Received					
Sl.No	Award/Honor	Year			
1.	Best Teacher Award-2007 by Andhra Pradesh State	2007			
	Government, Hyderabad				
2.	SERC Visiting Fellowship, DST, New Delhi	1993-1994			
3.	UGC Visiting Associateship, UGC, New Delhi	1994-1995			
4.	INSA visiting Fellowship, UGC, New Delhi	2003-2004			
5.	UGC Senior Research Fellowship	1979-1981			
6.	UGC Junior Research Fellowship	1977-1979			
7.	Visiting Scientist Fellowship, University of Leicester,	1993			
	England, U.K				
8.	Visiting Fellow/Researcher fellowship, Loughborough	1994			
	University, England, U.K				
9.	Visiting Professor under UGC – Indo-Russian Cultural	2003			
	Exchange Programme in Russia				

Curcumin Encapsulated Chitosan and Hydroxyethylcellulose Hydrogel Blend Membranes for Controlled Drug Delivery

K. Chowdoji Rao

Department of Polymer Science & Technology, Sri Krishnadevaraya University, Ananthapuramu, Andhra Pradesh, India – 515003

Abstract: Curcumin (diferuloylmethane, 1,7-bis (4-hydroxy-3-methoxyphenyl)-1, 6-heptadiene-3, 5-dione) is a polyphenolic compound which is a natural product obtained from an Asian spice called turmeric. Curcumin is a member of the ginger family, it is believed to have many biological activities such as antioxidants, anti –inflammatory, and even anticancer effect. Several studies suggest that it might reduce inflammation and pain symptoms resulted from osteoarthritis and rheumatoid arthritis.

Curcumin has been revealed high cytoxicity towards different cancer cells, but its instability and water-insolubility make its bioavailability extremely low and thus it usually displays low anticancer activity in in-vivo tests. Several studies have demonstrated the therapeutic effects of curcumin.

Functional biomaterials research has built on new drug delivery systems and enhanced scaffolds for regenerative medicine that is recently one of the most developing fields in the life sciences. Hydroxyethylcellulose (HEC) and chitosan (Cs) are biopolymers that are widely used in this field due to their biocompatibility, nontoxicity, noncarcinogenicity, and their swelling properties are mainly responsible and useful for this application in controlled drug delivery.

Curcumin loaded HEC and chitosan membranes have not yet studies to be used as adrugeluting stent.Biodegradable interpenetrating polymer network hydrogel blend membranes of chitosan (CS) and hydroxyethyl cellulose (HEC) were prepared by the solvent casting evaporation method for the controlled release of Curcumin, an anticancer drug. The membranes were characterized by different techniques such as Fourier Transform Infrared Spectroscopy (FTIR), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), X-ray diffraction (X-RD) and scanning electron microscopy (SEM). The in vitro release studies were carried out in phosphate buffer pH 7.4 at 37°C to observe its rate of swelling and drug release features with curcumin. Moreover, the mechanism of curcumin release from these membranes are anomalous as transport, as the value of 'n' lies between 0.506-0.624, which indicates non-Fickian diffusion mechanism. It has an excellent release rate up to about 90% absorption cumulative amounts of curcumin upto 16h.




Dr. (Mrs.) M.C.S.Subha, M.Sc., M.Phil., Ph.D.

UGC BSR Faculty Fellow Formerly Vice-chancellor (I/c), Rector & Senior Professor Department of Chemistry Sri Krishnadevaraya University ANANTHAPURAMU -515 003 (A.P) INDIA. Mobile: +91-9441039629. Ph: +91- 8554-275266(R), 255656(O) Fax: +91-8554-255244 & 255805 E-mail: mcssubha3@gmail.com

M.Sc- SKU campus-Anantapuramu.

Experience:

Ph. D (Physical Chemistry) S.K.University, Anantapuramu. **Total Teaching Experience:** 36 years 7 months 14 days in S K University only

Research Publications and Patents

(i) Total publications = 187

Research Papers presented in Seminars/ Conferences: Total Papers presented = 100

Research Projects Completed and Grants Received 8 No.

Ph.d's awarded.....27

Awards/Fellowships/Honours Recieeved National :

(i) UGC BSR Faculty Fellowship – 2019

(ii) Andhra Pradesh State Best Teacher Award- 2006.

(iii) UGC New Delhi, INSA award - 1998-99

(iv) UGC, New Delhi visiting Scientist - 1994-1996.

(v) Bharat Jyothi Award, International Friendship Society (New Delhi)-2006

(vi) Maharani Jhanshi Puraskar awarded by BharatiyaSumskruthiNirmanParishad, Hyderabad-2010.

Inter-national :

(i) Visited University of Leicester, U.K. during the year 1993-1994 under Commonwealth academic staff fellowship.

- (ii) Academic visit Department of Chemistry, University of Swansi, U.K. (1994).
- (iii) Academic visit Department of IPTME, Loughborough University, U.K. (1994).
- (iv) MARQUIS WHO's WHO in Science & Engineering (New Jersey, U.S.A), 2009-2010.

Gelatin Coated Heteroionic Magnetite-Sodium Alginate Microbeads for Targeted Anti Cancer Drug Delivery

M.C.S. Subha

Department of Chemistry, Sri Krishnadevaraya University, Ananthapuramu, Andhra Pradesh, India – 515003

Abstract: The aim of the present work is fabrication of gelatin coated dual cross linked magnetite-sodium alginate (SA) microbeads as potential drug vehicle for extended release of doxorubicin (DOX). The microbeads were prepared using in situ ion-exchange followed by simple ionotropic gelation technique. The developed beads were characterized by fourier (FTIR), differential transform infrared spectroscopy scanning calorimetry (DSC). thermogravimetric analysis (TGA), X-ray diffraction (X-RD) and scanning electron microscopy (SEM). Dynamic swelling studies and in-vitro release studies were investigated in simulated intestinal fluid (pH 7.4) and simulated gastric fluid (pH 1.2) at 37 °C. Results suggested that both the swelling and in-vitro release studies were influenced by the pH of test media, which might be suitable for intestinal drug delivery. The release mechanism was analyzed by fitting the release data into Korsmeyer-Peppas equation. The cytotoxicity of the fabricated compounds was studied using in vitro cultures of fibroblasts and a colorectal cancer cell line. The results suggest that the fabricated DOX loaded compounds are good drug delivery carriers for colorectal cancer drug delivery applications.

Keywords: Gelatin, Doxorubicin, Sodium alginate, Magnetite, Microbeads, Drug delivery



Professor V V Sureshbabu

1)	Educational Q	Qualification:				
	Graduation	Subject	Class	Year	University	
	& above					
	B.Sc	Zoology, Physics	First	1978-	S. V. University,	
		Chemistry		81	Tirupathi.	
	M.Sc	Chemistry	First –	1981-83	S. K. University,	
			II rank		Ananthapur	
	Ph.D.	Title of the thesis: Synthesis of Peptides of		1989		
		Biological Interest- Peptides related to			Bangalore Universit	
		LHRH, Enkephalins and Dermorphin			Bangalore.	

2) Position held

	From	То	Institution
Lecturer	1990	1998	Bangalore University
Reader, Direct	1998	2006	Bangalore University
Professor, CAS	1998	Till date	Bangalore University

- 3) a. No. of publications (international and national) : 235
 - b. Book chapter : 01
 - c. Reviews: 06
 - d. General articles: 03
- 4) Ph. D's Guided : 27 (completed) and 03 (in progress)

5) Awards & Recognitions

S. No.	Year	Name of award	Awarded by	Purpose and nature of award
1	1993	Young scientist in organic	Indian Council of	In recognition of research
		chemistry	Chemists	carried out by an young
				researcher
2	2001	Professor D. K. Banerjee	Dept. of Organic	Medal and cash prize for
		Memorial Lecture award	Chemistry,	carrying out quality research
			I.I.Sc., Bangalore (The	
			first recipient)	
3	2001	The Overseas Associate	Dept. of Biotechnology,	Cash award sponsoring a short
		ship Award (short term)	Govt. of India	term visit to a foreign country's
				laboratory for research in
				peptide science
4	2001	Sir C. V. Raman Young	Govt. of Karnataka	For excellence in research in
		Scientist Award in		chemical sciences by an
		Chemical Sciences		emerging scientist within
				Karnataka
5	2002	Young Scientist Award in	Karnataka Association	Cash prize and certificate in
		Chemical Sciences	for the Advancement of	recognition of excellent research
		the Advancement of	Science, Bangalore	carried out by an young faculty
		Science for the year		
6	2005	Professor S. Siddappa 60 th	Dept. of Chemistry,	A talk entitled
		birthday commemorative	Karnataka University,	"Peptidomimetics' was
		lecture	Dharwad	delivered
7	2008	CRSI Bronze medal	CRSI, Bangalore, India	In recognition of overall quality
				of research in chemistry

6) Research Projects: 25 (completed) and 02 (in progress) (funding agencies: DST, DST-Nano-mission, DBT, CSIR, UGC, BRNS)



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Chemical Modification of Peptide Backbone: Selenoxopeptides & Selenoureidopeptidomimetics

Vommina V. Sureshbabu

Department of Studies in Chemistry, Sneha bhavan, Jnana bharathi, Bangalore University, Bengaluru-560056 Email: hariccb@gmail.com; sureshbabuvommina@rediffmail.com

Abstract: Due to the improved biological and structural properties possessed by the unnatural analogs, the field of peptide backbone modification has grown tremendously over the last decade. The thrust of our group is to design and develop key intermediates through C- and N-terminal modifications and demonstrate their utility for the assembly of peptidomimetics. Selenium bearing compounds have gained prominence with the identification of various selenoproteins where Se is preponderantly present as selenocysteine. Selenamides have substantial interest as pharmaceutical agents and synthetic precursors for biologically relevant peptide heterocycles. We have developed useful selenium bearing building blocks namely isoselenocyanates at both N- and C- termino of amino acids and demonstrated their use in synthesis of selenoureidopeptidomimetics. Further PCl₅/ LiAlSeH reagent system was employed for construction of selenoxopeptides and employed as structural units for N-terminal chain extension through N^{α} -deprotection/ coupling to yield peptide-selenoxopeptide hybrids. Some of these results will be presented in this talk.





References: a) Vishwanatha, Narendra, Chattopadhyay, Mukherjee, Sureshbabu, J. Org. Chem. 2012, 77, 2689-2702. b) Hemantha, Sureshbabu, J. Pept. Sci. 2010, 16, 644-651.(c) Chennakrishnareddy, Nagendra, Hemantha, Das, GuruRow, Sureshbabu, Tetrahedron 2010, 66, 6718-6724. d) Sureshbabu, Narendra, Nagendra, J. Org. Chem. 2009, 74, 153-157. e) Sureshbabu, Patil, Venkataramanarao, J. Org. Chem. 2006, 71, 7697-7705. f) Sureshbabu, Naik, Hemantha, Narendra, Das, GuruRow, J. Org. Chem. 2009, 74, 5260-5266. g) Sureshbabu, Lalithamba, Narendra, Hemantha, Org. Biomol. Chem. 2010, 8, 835-840. h) Patil, Vasanthakumar, Sureshbabu J. Org. Chem. 2003, 68, 7274-7280. i) Narendra, Viswanatha, Sureshbabu, Synthesis. 2011, 3247-3254. j) Chattopadhyay, Hemantha. Narendra. Sureshbabu, Warren, Helliwell, Mukherjee, Monika, Crystal Growth & Design, 2010, 10, 2239–2246. k) Rumpa Pal, Nagendra G, Reddy M. S, V. V Sureshbabu T. N Guru Row, Chem. Commun., 2015, 51, 933-936. 1) Narendra. N, Vishwanatha. T. M, Basavaprabhu. H, Girish prabhu, L. Roopesh Kumar, V. V. Sureshbabu, Org. Biomol. Chem., 2018, 16, 3524-3552. m) Sagar N. R. C. Srinivasulu, Basavaprabhu H, Santhosh L, V. V. Sureshbabu, Chemistry Select, 2018, 3, 12089-12092. n) Santhosh L, Durgamma S, Shekharappa, V. V. Sureshbabu, Org. Biomol. Chem., 2018, 16, 4874-4880. o) Sagar N. R. Durgamma S. C. Srinivasulu, Basavaprabhu H, V. V. Sureshbabu, Chemistry Select, 2019, 4, 6408-6413



Oral Presentations

A Novel, Green and Efficient Transition-Metal Free Approach to Synthesis of Bis(Indolyl)Methanes by Using K₂S₂O₈

): PROCEEDINGS OF ACR-SDEP-2020

S. Naga Chandrudu*, M. E. Rani*

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Abstract: Oxidative-coupling of alcohols and amines have been emerged as an attractive and challenging methods to construct C-C and C-X (X = heteroatom) bonds. Most of the efforts in this field were achieved by noble metal catalysts, such as Ru, Rh, Pd and Ir etc. However, the limited availability of these metals as well as their high price and considerable toxicity makes it desirable to search for green, sustainable and environmentally friendly alternatives; especially first row of transition metals. Among those, Iron is inexpensive, less toxic, benign, which shows variable oxidation states, and amenable to ligation with nitrogen-, oxygen- or phosphorus-based ligand sets. Iron is present in many oxidative enzymes, which perform some of the most difficult admirable ease.¹Recently, chemical transformations with we reported the ironcatalyzedbis(indolyl)methane synthesis from aryl methyl amines and indoles.

In this presentation, I would like to present a novel route to synthesis of bis(indolyl)methanes from benzylamines and indoles in the presence of $K_2S_2O_8$ as a catalyst under aerobic conditions. This method promises versatility, cost- effectiveness, and efficiency.² **Keywords**: Green Chemistry, $K_2S_2O_8$, Oxidative-coupling, Bis(Indolyl)Methanes.



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Controlled Synthesis of Core/Shell Structured Materials for Superior Photocatalytic Hydrogen Production

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Abstract: Materials chemistry plays vital role in design and development of highly efficient photocatalysts. In the process of tuning photocatalytic properties such as separation efficiency of photo-excitons and its surface-interface reactions, nanocomposite based photocatalyst with coreshell morphology showed immense benefits for hydrogen production. In our recent publication, it was elaborated the influence of shell thickness both on opto-electrical and catalytic properties [1]. The present study attempted to synthesize hierarchal nanocomposite through facile chemical route. The materials characterization results confirm that presence of CuS/NiO with core/shell morphology. In addition, valence state of optimized photocatalysts exits copper +2, sulfur -2, nickel +2 and oxygen -2 respectively highly influenced on photocatalytic properties. The photocatalytic activity carried out in aqueous solution in the presence of sacrificial agent displayed enhanced photocatalytic performance of 13.4 folds higher than pristine photocatalytic activity is confirmed with photoluminescence spectra that shows separation of photo-excitons in core/shell than pristine, the peak intensity of core/shell displayed 3.6 fold greater than pristine CuS photocatalyst.

Keywords: Core/Shell, CuS, photocatalyst, Materials chemistry.

Acknowledgement: Authors thankful to Ministry of Renewable Energy, New-Delhi for financial support. V. Navakoteswara Rao gratefully acknowledges Council of Scientific Industrial Research (CSIR-SRF), New Delhi, India for financial support through fellowship (ACK 124480/12K18) to carryout Ph.D.

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Tamarind Gum based Stimuli Responsive Hydrogels/Silver Nanocomposites for Controlled Drug Release and Antimicrobial Applications

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Abstract: Hydrogels are three dimensional polymer networks, which possess of superior physico-chemical properties due to the presence of multi functionalities. Tamarind gum, a carbohydrate polymer has shown great potential in food, agriculture, pharmaceutical, tissue engineering and drug delivery applications. The present study deals with the development of novel biodegradable polymer based silver nanocomposite hydrogels (TGNIE) [Figure 1 & Scheme 1] fabricated with tamarind gum, acrylamide, N-isopropyl acrylamide and ethylene glycol vinyl ether by a simple free radical polymerization using potassium per sulphate as an initiator and bis(2-(methacryloyloxy)ethylphosphate as a crosslinker. TGNIE silver nanocomposite hydrogels were developed by green synthesis method using of Echinops echinatus leaf extract as reducing agent. The formation of Ag-NPs in TGNIE hydrogels was confirmed by UV-Vis spectra. Fabricated hydrogel networks and silver nanocomposites were characterized by FTIR, DSC, TGA, XRD SEM, EDX, TEM and DLS. The hydrogel networks are successfully utilized for 5-fluorouracil loading and encapsulation efficiency. The pristine hydrogels were evaluated for swelling, deswelling and different polymer network parameters in double distilled water. The in vitro drug release studies were performed both pH 1.2 & 7.4 and various temperatures at 25 & 37 °C. The release time of drug from the hydrogels is extended up to 48 h. Evaluation of antibacterial activity TGNIE silver nanocomposites performed various MDR resistant bacteria's such Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus and Klebsiella pneumonia.

Keywords: Tamarind gum, Hydrogels, Cancer, Silver, Drug delivery, Antibacterial applications.

Figure 1: Photographic images of TANEB hydrogels (A) Swollen hydrogel (B) Dried hydrogel.



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Scheme-1: Schematic representation of TANEB hydrogel networks

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Optimal Dye Sensitized Solar Cell Performance with Superior Electrocatalytic Active Single Wall Carbon Nanohorn Assisted Conductive Carbon Counter Electrode

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Abstract: Dye-sensitized solar cell (DSSC) offers potential advantages includes cost effective materials, economic fabrication, suitable for diffused light conversion, etc. The present work demonstrates the solar photovoltaic performance with single wall carbon nanohorns assisted conductive carbon counter electrode (*SWCNH-CE*) dye sensitized solar cell witnessed power conversion efficiency (PCE) 11.11 %, is higher than platinum (10.63 %), pristine single wall carbon nanohorn (7.74 %) and conductive carbon (9.08%) CE based DSSCs. The achieved results owing to *SWCNH-CE's* higher conductive nature, excellent electrochemical activities, champion current density (J_{SC}) value. The work encouraged to fabricate the DSSC module, and is integrated with supercapacitor (SC), results are presented.

Keywords: Solar Cells, DSSC, supercapacitor, carbon nanohorns.



Graphitic Carbon-TiO₂ Nanocomposite; An Efficient Photocatalyst for Dye Degradation and Enhanced Hydrogen Evolution

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Abstract: In this study, Graphitized TiO₂ composites were prepared by hydrothermal process. This was achieved by decorating graphitic carbon with commercially available TiO₂ by hydrothermal synthesis. The presence of graphitic carbon in composite was confirmed by X-ray diffraction (XRD), Raman, FTIR, and TEM analysis. The photocatalytic performance of the Graphitic carbon $-\text{TiO}_2$ composites was evaluated for the photo-degradation of methyl orange dye. It was found that the ratio of Graphitic Carbon to TiO₂ in the composites significantly affects the photocatalytic activity. Higher amounts of graphitic carbon in the composites showed lower photocatalytic activity than pure TiO₂. The composite with 1 wt. % of graphitic carbon showed the highest photocatalytic activity, with a 3-fold enhancement in photocatalytic efficiency over pure TiO₂. It is expected that the synthesis of "high surface area- less particle size" TiO₂ and simultaneous conversion of glucose to graphitic carbon "without using strong reducing agents" could be a promising strategy for preparing other types of carbon based TiO₂ nanotube composite photocatalysts as well.

Key words: Graphitic carbon, TiO₂, Hydrothermal Synthesis, Graphitic Carbon-TiO₂ photocatalyst.

Investigation on the Structural and Morphological Properties of Different TiO₂ Nanostructures on the Performance of Dye Sensitized Solar Cells.

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Abstract: The TiO₂ nanostructures such as nanotubes (TNTs), nanoparticles (TNPs) and nanorods (TNRs) were synthesized by a simple hydrothermal method. These different TiO₂ nanostructures were used to make photoanode film for dye sensitized solar cell (DSSCs). The synthesized nanostructures crystalline nature was evaluated by X-ray diffraction, the surface and internal morphology of the samples were observed by scanning electron microscopy (SEM), field emission scanning electron microscopy and transmission electron microscopy (TEM). DSSCs were fabricated by using the prepared nanostructures as photoanode on FTO glass, N719 dye as light absorber and Idolyte as an electrolyte. The impact of each nanostructure on the overall performance of DSSC was studied by measuring photocurrent voltage (I-V) characteristics and electro chemical impedance spectroscopic (EIS). Among all the nanostructures, TNTs based DSSC shown the highest power conversion efficiency of 5.03% with short circuit current density of 10.2 mA/Cm².

Keywords: Dye sensitized solar cells, TiO₂ nanostructures, Photoanode, Power conversion efficiency



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Manganese Oxide Phase and Morphology Effect on Electrochemical Performance

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Abstract: The monometallic oxides such as Mn_3O_4 nanoparticles (NPs) and MnO_2 nanowires (NWs) were successfully synthesized by a facile simple hydrothermal method at low processing temperature and less time. The prepared materials have same crystal structure with different phase and morphology. These were characterized by X-ray power diffraction (XRD), Fourier transformed infrared spectroscopy (FT-IR), Scanning electron microscopy (SEM) and Transmission electron microscopy (TEM). The electrochemical performance of prepared materials characterized by cyclic voltammetry (CV), galvanostatic charge discharge (GCD) and electrochemical impedance spectroscopy (EIS). The specific capacitance (Cs) performance of the Mn_3O_4 and MnO_2 exhibited about 182 and 243 F/g at 0.5 A/g current density in the 1 M KOH compared with 0.5 M KOH electrolyte solution. From these results a wire like morphology have better Cs than a particle shape morphology in 1 M KOH electrolyte solution.





Green Synthesis of Silver Nanoparticles using Stem Extract of Vitex leucoxylon and its Antimicrobial Activity

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Abstract: The ecofriendly synthesis of silver nanoparticles using *Vitex leucoxylon* stem extract provides environmental friendly, simple and effective route for the synthesis of silver nanoparticles. AgNPs were rapidly synthesized using aqueous stem extract of Vitex leucoxylon with AgNO₃ solution. The synthesized AgNPs were characterized by using UV-Vis, Fourier transform-infrared spectroscopy and Zeta techniques. The absorption peak of silver nanoparticle was observed around 400-450 nm, in case of V. leucoxylon it was found that the silver nanoparticles show SPR peak at around 420 nm. From our studies, we found that SPR peak for V. leucoxylon at 436 nm and confirmed that V. leucoxylon stem extract has more potential to reduce Ag^+ ions into Ag^0 nanoparticles which lead us for further studies on synthesis of silver nanoparticles from V. leucoxylon stem extracts. The zeta potential of AgNPs was found to be -23.2 mV. The antibacterial activities of extract of V. leucoxylon tested against Gram-positive-Staphylococcus aureus, Gram-negative-Escherichia coli. Zone of inhibition of extracts were compared with that of different standards like ampicillin, streptomycin for antibacterial activity. The results showed that the remarkable inhibition of the bacterial growth was shown against the tested organisms. The microbial activity of V. leucoxylon was due to the presence of various secondary metabolites. Hence, these plants can be used to discover bioactive natural products that may serve as leads in the development of new pharmaceuticals research activities.

Keywords: Green Synthesis, Vitex leucoxylon, Silver nanoparticles, Zeta potential,

Biosynthesis of Silver Nanoparticles by using *Nepeta cataria*, Their Spectrochemical analysis and Antibacterial Activity

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Abstract: The present study focused on the fabrication, demonstration and application of silver nanoparticles (Ag-nanoparticles), which can be used in biomedical research and ecological cleaning applications. The reducing agents which are present in the leaves of *Nepeta cataria*(NC) plant were involved in the conversion of metal ion to metal nanoparticles. Formation of colloidal Sr-Ag-nanoparticles was preliminarily confirmed by UV-Visible spectroscopy. In the UV-Visible analysis, a predominate peak was observed in the range of around 425 nm relating to the Plasmon absorbance of the NC-Ag-nanoparticles. Fourier transform infrared spectroscopy (FTIR) was used for the confirmation of phenolic groups involved in the reduction mechanism in the formation of NC-AgNPs; X-ray diffraction (XRD) and Energy Dispersive X-ray analysis (EDX) are used on behalf of the morphology and elemental composition. The interpretation of size and shape of the NC-Ag nanoparticles were performed by Scanning Electron Microscopy (SEM) systems which confirmed a size range of 10 to 20 nm. Antibacterial activity of biosynthesized NC-Ag nanoparticles shows effective inhibition against human pathogens including, Bacillus subtilis (ATCC 6633) and Escherichia coli (ATCC 25922). Thus, the significant outcomes of this study would help to formulate value-added herbal-based nano-materials in biomedical and nanotechnology industries.

Keywords: *Nepeta cataria*, NC-Ag nanoparticles, Green-Synthesis, Analytical analysis and Antibacterial activity.

Solvent-Free Mechanochemical Synthesis of 2,4-Di Substituted Thiazoles : A Green and Sustainable Procedure

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Abstract: Nitrogen and sulphur based heterocycles are important structural motifs in several natural products as well as in synthetic compounds of pharmaceutical interest.¹Among them, 2-aminothiazole ring systems have attracted great attention from chemists because of their wide variety of applications in both biology and optoelectronics.² Because of their broad based utility, several synthetic routes have been reported in the literature.³ To the best of our knowledge, none has been reported on ZnO catalyzed solvent-free mechanochemical route for the synthesis of 2-pyridyl/amino-4-aryl/naphthyl/coumaryl thiazoles. Therefore, herein we demonstrated a solvent-free mechanochemical method for the synthesis of a series of 2-pyridyl/amino-4-aryl/naphthyl/coumaryl thiazoles (3 & 5) from ω -bromoketones (1) and pyridine-3-carbothioamide/thiourea (2 & 4) at room temperature. The present procedure has several advantages which include wide substrate scope, easy to perform, cleaner reaction profile, excellent isolated yields of products in short reaction times (10-15 min) and reusability of catalyst. Further, the method can be scaled up to a gram level and the products do not require any chromatographic purification.

Keywords: Green synthesis, Heterocycles, Mechanochemical synthesis, thiazoles



Scheme 1. Solvent-free mechanochemical synthesis of 2-pyridyl/amino-4-aryl/naphthyl/coumaryl thiazoles catalyzed by ZnO.

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Novel Synthesis of Bio-redusable Polymeric-Metal-Metaloxide Doped Nanocomposites; their Photocatalytic Activity and Removal of Toxic Effluents from the Industrial Wastes

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Abstract: The significant objective and core novelty of the projected work is to synthesis the Polymeric-Metal-Metaloxide doped nanocomposite materials (P-M-MOx#NCs) by natural and synthetic biodegradable polymers. Further, these fabricated P-M-MOx#NCs nanocomposite materials are utilized for the removal of toxic effluents from the industrial wastes and photodegradation of the organic pollutants. The P-M-MOx#NCs will be synthesized by adopting simple polymerization and efficient doping method. Several analytical methods will be performed to determine the surface area, oxidation state of metals and morphology of the P-M-MOx#NCs nanocomposites. The X-ray photoelectron spectroscopy (XPS) is used for the determination of binding energy of the available metals in P-M-MOx#NCs nanocomposites. The energy dispersive X-ray spectroscopy (EDS) will provide information about the elemental composition, which helps to confirm the removal of sacrificial metals from P-M-MOx#NCs. The surface morphology along with the shape and size of pores of P-M-MOx#NCs will be characterized by scanning electron microscopy (SEM), Transmission electron microscopy (TEM). Further, the charge transfer and band structure, density of state and catalytic stability of P-M-MOx#NCs will be determine using absorption spectroscopy. The most important phase of proposal is utilization of the novel P-M-MOx#NCs nanocomposites for the degradation dyes and removal toxic contaminants from industrial effluents in water. The photocatalytic efficiency of the P-M-MOx#NCs nanocomposite will be determined using UV-Vis spectroscopy. Also, the kinetic and charge transfer which is involved in the photodegradation process will be clearly explained. The total organic carbon (TOC) will be employed for the photodegradation of dye and toxic components in the industrial effluents.

Keywords: P-M-MOx#NCs nanocomposites, Photo catalyst; Dye degradation; Effluents, Toxic metals.

Design and Development of New N-Heterocycles with Diverse Biological Properties

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Abstract: Heterocycles constitutes a major part of biologically active compounds. Among them, nitrogen scaffolds play a pivotal role.¹ Most of the isolated natural products,² and pharmaceutical ingredients³ possess *N*-building blocks. Worthy to mention purines and pyrimidines are the essential components of nucleic acids. Similarly, other simple to complex nitrogen containing nuclei including pyridine, pyridazine, indole, quinoline derivatives etc., deploy distinct natal activities. Here in our present study, we prepared distinct series of pyridine, quinoxaline and triazine analogues and carried out their activity studies. Most of these executed mild antioxidant, antimicrobial, and anti-alzheimer's proficiency however less adopted for anti-diabetic property. **Keywords:** N-Heterocycles, Antioxidant, Antimicrobial, Anti-alzheimer's, anti-diabetic.



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Selective Halogenation of Benzimidazoles with Oxone / NaX: Environmentally Benign Approach for the Preparation of Halobenzimidazoles

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Abstract: Benzimidazoles are an important heterocyclic compounds and drug substances in pharmaceutical industry due to their potential biological activities. The benzimidazole ring is an important pharmacophore and synthesis of benzimidazoles led to potent drug molecules such as omeprazole, lansoprazole, rabeprazole, and pantoprazole. Therefore, the preparation of benzimidazoles and their halogenations studies have an important role. The improvement of direct functionalized aromatic sp² C-H bond conversion to C-X bond has become most challenging strategies in current research. As part of our ongoing research on Regioselective halogenation, we have reported halogenations of acetanilides, benzanilides, sulphonamides and heterocyclic compounds with oxone and NaCl/NaBr. The present study describes the transition-metal free C-H halogenation of benzimidazoles with NaX and Oxone system. The reaction proceeded on aromatic ring *via* C-H bond activation. The selective halogenations of benzimidizoles have been achieved by using commercial available Oxone as powerful oxidant and NaX as a halogen source (**Scheme I**).



X = Cl, Br

Scheme I

Synthesis and Antibacterial Activity Studies of 8, 9-Dihydro 7H benzo 1,2,4-Oxadiazol-3-yl]-4-Methyl-2H-Chromen-2-ones

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Abstract: Synthesis, spectral analysis and bioactivity of new coumarin derivatives are described in this paper. Eight new coumarin derivatives were synthesized in moderate to good yields by react with 4-carbonyl chloride via 1,2-dichloroethane and done by the conventional and micro wave irradiation. The structures of all the newly synthesized molecules were assigned by elemental analysis and spectral data. The synthesized compounds were screened for their antibacterial activities strains using Cup plate method.

Keywords: Coumarin, Cup Plate Method, Antibacterial Activity, Bioactivity



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Fabrication and Characterization of Polymer Blend Matrix of Sodium Alginate/Gellan Gum/Magnetite Nanaparticles Beads for Increasing the Antibacterial Studies of Amikacin Sulfate

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Abstract: Magnetic nanoparticles (MNPs) are of great interest due to their unique purposes, especially in medicine. Functionalized magnetite (Fe₃O₄/ C_{18}), with an average size not exceeding 50 nm, has been synthesized by co-precipitation method using ferric and ferrous salts. These nanoparticles are used in the present work and to evaluate the properties of amikacin sulfate (antibiotic drug) loaded, sodium alginate-gellan gum blend micro beads which are prepared by ionotropic gelation method. These beads are characterized by different characterization techniques such as Fourier transform infrared spectroscopy (FTIR), Differential scanning calorimetry (DSC), Thermogravimetric analysis (TGA), Scanning electron microscopy (SEM) and X-ray diffraction (X-RD) etc. The in-vitro release studies were carried out in terms of effects of crosslinking agent and polymer concentrations, and confirmed the decrease of drug release with increase in crosslinking agent and polymer concentration. The release data were fitted to an empirical equation to confirm the release mechanism. Anti bacterial activity studies were also carried out for micro beads and tested against bacteria species by agar disc diffusion method. It was found that amikacin sulfate loaded micro beads could significantly inhibit bacterial development. Thus the prepared microbeads are useful carriers for controlled release of amikacin sulfate.

Keywords: Magnetite nanoparticles; Amikacin sulfate; Sodium alginate, Gellangum, Drug release studies.

Pd(5%)-KIT-6, Pd(5%)-SBA-15 and Pd(5%)-SBA-16 Catalysts in Water Extract of Pomegranate Ash: A Case Study in Heterogenization of Suzuki-Miyaura Reaction Under External Base and Ligand Free Conditions

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Abstract: Pd-catalysed Suzuki-Miyaura cross-coupling (SMC) reactions have become most essential tools in synthetic organic chemistry for making biaryls. SMC reactions are applied extensively for the synthesis of natural products, pharmaceuticals, functional materials, polymers and nucleoside analogues. Herein we have developed heterogenization of Suzuki-Miyaura cross-coupling (SMC) using mesoporous silica supported Pd-nanoparticles (Pd-NPs) under ligand and external base free conditions. Pd-mesoporous silica catalysts such as Pd-KIT-6, Pd(5%)-SBA-16 and Pd(5%)-SBA-15 were synthesized and studied for SMC in water extract of pomegranate ash (WEPA). The catalyst Pd(5%)-KIT-6 showed better activity than others. The successful reusability of Pd(5%)-KIT-6 upto five recycles indicates high stability of the catalyst, conveys pure heterogenous mechanism over unavoidable homogenous mechanism of heterogenous catalysts in SMC. The wide choice of substrates, high stability of the catalyst in green and renewable medium & base systems, and absence of ligand are the notable futures of this investigation.

Keywords: Biaryls, Suzuki-Miyaura, Pomegranate Ash, Eco-friendly, Pd-Catalyst,

Development of Flavone-Cyanoacetamide Hybrids as Innovative Multifunctional Therapeutic agents for Alzheimer's Disease

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Abstract: Alzheimer's disease (AD) is an irreversible, progressive neurodegenerative brain disorderthat assaults the central nervous system¹. Facing the complex etiology of AD, atpresent researchers are focused on developing new multi-targetdirectedligands (MTLDs) to fight back against this disease. In line with this modern paradigm of AD, a congeneric set of compounds composed of flavone and cyanoacetamide moieties have been synthesized and evaluated as multifunctional agents against AD². Biological evaluation demonstrated that compounds with N-(1-phenylethyl), N-(2-Bromobenzyl), N-(3-Bromobenzyl), N-(4-(tert-Butyl) benzyl) and -N-(2-(2-methoxyphenoxy) ethyl) moieties exhibited excellent inhibitory potency and selectivity to AChE (IC₅₀ of 0.271 \pm 0.012 to 1.006 \pm 0.075 μ M), good anti-oxidant activity, strong modulation effects on self-induced A β aggregation, low cytotoxicity, and neuroprotectivity in human neuroblastoma SK-N-SH cells.





Experimental Approach

Flavone Derivative

Computational Approach

Further, an inclusive study on the interaction of active compounds with AChE using fluorescence, circular dichroism, and molecular docking methods suggested that these derivatives bind strongly to the peripheral anionic site of AChE. Overall, the multifunctional profiles and strong AChE binding affinity highlight these compounds as promising prototypes for further pursuit of innovative MTDLs against AD.

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Poster

Presentations

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One-Pot Facile Synthesis of Nanorice-Like Structured CuS@WS₂ as an Advanced Electroactive Material for High-Performance Supercapacitors

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Abstract: Binder-free nanorice-like featured CuS@WS₂ structures have been synthesized using a simple and cost-effective chemical bath deposition approach and their application as electroactive material for high-performance supercapacitors. The surface properties of morphology, structure and composition of the as-prepared electrodes are examined using the scanning electron microscopy, transmission electron microscopy, X-ray diffraction and X-Ray photoelectron spectroscopy, respectively. The nanorice-like featured CuS@WS₂ electrode exhibits nanorice-like structures, which provides the abundant active sites for redox reactions and facilitates the electrolyte diffusion. The electrochemical performance of the supercapacitor (SC) electrodes was examined by cyclic voltammetry and galvanostatic charge-discharge studies. From the electrochemical tests, the CuS@WS₂ electrode exhibit a higher specific capacitance (C_s) of 887.15 F g⁻¹ at current density of 3.75 A g⁻¹ with greater energy density, and excellent rate capability compared to bare CuS (588.0 F g⁻¹) and WS₂ (19.40 F g⁻¹) electrode. Overall, these results demonstrate that the as-synthesized CuS@WS₂ could be a promising material for next-generation high-performance electrochemical energy storage applications.

Keywords: CuS@WS₂; Nanorice-like; Chemical bath deposition method; Supercapacitors; Specific capacitance.

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Marker Pen Lithography Base PEDOT: PSS, Platinum Counter Electrode Development: Easy, Cost-Effective Route for Dye Sensitized Solar Cell

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Abstract: Progress in development of cost-effective counter electrodes (CE) for dye sensitized solar cells is increased within a short time period. Herein, a cost-effective approach namely marker pen lithography (MPL) using commercially available refillable marker pen process is demonstrated for preparation of counter electrodes for DSSC. The catalyst solutions are filled into ink tank, fabricated CE is examined through various characterization techniques. Uniform distribution is perceived through scanning electron microscope (SEM), atomic force microscope (AFM) studies, resulted to higher average surface roughness. Cyclic-Voltammetry (C-V) and Electrochemical impedance spectroscopy (EIS) testing revealed as superior electrocatalytic activity and lower interfacial resistances, etc. The power conversion efficiency (PCE) of DSSCs made with platinum gave of 4.25%, and PEDOT: PSS resulted to 3.00 %. The results are discussed.

Keywords: PEDOT, PSS, Pen Lithography, Cyclic-Voltammetry.



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Enhanced Electrocatalytic Formic Acid Oxidation on Eeduced Graphene Oxide-Supported Core-Shell Structured Au@Pd Nanocomposites

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Abstract: CO tolerant anode electrocatalysts with promising catalytic activity are necessary to realize direct formic acid fuel cells (DFACs) as promising renewable energy sources. Herein, we developed bimetallic Au_{Core}–Pd_{Shell} nanoparticles supported on a reduced graphene oxide (RGO) support (Au@Pd/RGO) with an average particle size of 5.7 nm with fairly uniform dispersion. The as prepared electro catalysts were characterized by X-ray diffraction (XRD), transmission electron microscopy of low and high resolution (TEM&HR-TEM) with selected area electron diffraction (SAED) patterns, Energy dispersive X-ray spectroscopy (EDS), and cyclic voltammetry (CV). The prepared nanoparticles was examined the catalytic efficiency towards formic acid oxidation reaction (FAOR). The electrocatalytic activity of nanoparticles was recorded in a mixed solution of N₂ saturated 0.5 M H₂SO₄ and 0.5 M HCOOH at room temperature (RT). Au@Pd/RGO catalyst showed higher catalytic performance and more stability towards the formic acid electro oxidation compared to Pd/RGO, Au-Pd/RGO and Au-Pd/MWCNT catalysts.

Keywords: Electrocatalysts, Core-Shell, Au@Pd/RGO, cyclic voltammetry.

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Decoration of Flower like Pt-Cu Nanopartices on Reduced Graphene Oxide

for Electrocatalytic Oxygen Reduction Reaction

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Abstract: Ultrathin Pt-based nanoparticles shows promising activity towards oxygen reduction reaction (ORR) and are currently in demand to realize fuel cells as power generating devices.^[1,2] In this presentation, we show a simple method for the fabrication of flower-like Pt-Cu nanostructures deposited on reduced graphene oxide (RGO) supports. Moreover, combination of flower-like Pt-Cu nanostructures with graphene oxide (GO) could further increase the electrocatalytic performance. A one- pot chemical reduction method utilizing ethylene glycol both as a solvent and reducing agent without any additional involvement of surfactants and pH maintenance was developed to fabricate Pt-Cu nanoparticles on RGO support. As prepared Pt-Cu/RGO catalysts were characterized by various techniques, such as X-ray diffraction spectroscopy (XRD), transmission electron microscopy (TEM), energy dispersive X-ray spectroscopy (EDX), scanning electron microscopy (SEM), Raman spectroscopy, cyclic voltammetry and linear sweep voltammetry (LSV). The as-prepared flower-like PtCu/RGO nanostructures exhibited significantly higher specific activity than commercial Pt/C towards oxygen reduction reaction (ORR). The present chemical reduction method will be significantly helpful to the further design nanocomposites with desired properties relevant to ORR applications.

Keywords: Fuel cells, Oxygen reduction reaction, Pt-Cu/RGO, Electrocatalysis.

Acknowledgement: One of the authors (BS) thank the Department of Science and Technology, New Delhi for the INSPIRE fellowship (IF160123).

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Nanoporous Reduced Graphene Oxide Supported Pt-TiO₂ and Pt-Mn₃O₄ Nanocomposites for Fuel Cell Reactions

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Abstract: Electrochemical methanol oxidation reaction (MOR) and oxygen reduction reactions (ORR) are important anodic and cathodic reactions, respectively in proton exchange membrane fuel cells. Electrocatalysts which can deliver promising activities towards MOR and ORR are highly sought to realize fuel cells commercialization. Pt-based catalysts finely dispersed on conductive carbon supports are commonly utilized as MOR and ORR catalysts. Many strategies are focused on manipulating the structure of Pt-based catalysts and developing promising carbon based supports to improve the electrocatalytic activity. In this study, we deposited Pt, Pt-Mn₃O₄ and Pt-TiO₂ nanocomposites on reduced graphene oxide support (Pt/RGO, Pt-Mn₃O₄/RGO and Pt-TiO₂/RGO). The morphology and structure of the resulting catalysts are studied by transmission electron microscopy (TEM), X-ray diffraction (XRD) and scaning electron microscopy (SEM). The electrocatalytic activities of the fabricated catalysts are evaluated for MOR and ORR and will be presented.

Keywords: Fuel cells, Oxygen reduction reaction, Pt-Cu/RGO, Electrocatalysis.

Acknowledgement: One of the authors (YCS) thank the Andhra Pradesh Pollution Control Board (APPCB), Andhra Pradesh for Junior Research Fellowship (APPCB-RF01).

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Hydrazine Based Ferrocene Derivative as Optical and Electrochemical Sensor for the Detection of Copper(II) and Iodide ions

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Abstract: Ferrocene derivatives are ideal platforms for development of cations, anions and neutral molecules recognition. Schiff bases are one of the most important and widely explored organic species because of their potential applications as catalysis corrosion inhibitor, enzymatic agent and chelating ligands. Schiff bases have become one kind of most popular fluorescent chemosensors to detect metal ions. Fluorescent chemosensors have many advantages such as high selectivity, rapid response, easy operation, and high sensitivity. In the current study we designed and synthesized ferrocene schiff base derivatives using acetyl ferrocene (L_1) and ferrocene carboxaldehyde (L₂). The synthesized receptors were characterized by ${}^{1}H$ NMR, ${}^{13}C$ NMR, ESI-Mass, FTIR and UV spectroscopy. The sensing behavior of synthesized receptor was studied using spectral and electrochemical techniques. The acetyl ferrocene Schiff base derivative showed very high fluorescent response to Cu^{2+} and Γ ion. Ferrocene carboxaldehyde schiff base showed fluorescent response only to I⁻ ion. The probe L_1 and L_2 exhibited 4.45×10^6 M^{-1} , $3.42 \times 10^6 M^{-1}$ and $3.62 \times 10^5 M^{-1}$ binding constant values for $L_1 + Cu^{2+}$, $L_1 + I^-$ and $L_2 + I^$ ions respectively. The detection limit of the probe L_1 and L_2 towards $L_1 + Cu^{2+}$, $L_1 + I^-$ and $L_2 + I^-$ 0.16 μ M, 0.04 μ M and 0.05 μ M. Other ions, including Hg²⁺, Pb²⁺, Al³⁺, was found to be Zn²⁺,Co²⁺, Ni²⁺, Mg²⁺, Mn²⁺, K⁺, Cd²⁺, Cr²⁺, Cu²⁺, Fe²⁺, Fe³⁺and Cl⁻, SCN⁻, Br⁻, F⁻, HSO₄⁻, I⁻, BH₄⁻ and CH₃COO⁻ had nearly no influence on the sensing behavior.

Keywords: Ferrocene derivatives, Chemosensor, Optical sensor, Electrochemical sensor, Bioimaging sensor application.



Figure 1: Chemical structure of Hydrazine based Schiff base ferrocene derivative **References:** X. Liu, Y. Xiang, X. Ma, G. Ren and L. Gao, 87, **2017**, 2986–2988.



Nanocomposite Membranes of Sodium Alginate-MnO₂ Nanorods for Dehydration of Isopropanol

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Abstract: Nanocomposite membranes of sodium alginate - manganese oxide nanorods [NaAlg-MnO₂ NRs] were prepared by incorporating nanorods of manganese oxide, which are prepared by a simple hydrothermal method, by solution casting method and further cross-linked with glutaraldehyde. The effect of MnO_2 NRs loading on mechanical strength and thermal stability of the derived nanocomposite membranes was investigated. These results suggested that the mechanical and thermal stability of nanocomposite membranes were improved over pristine NaAlg membrane. has been The developed membranes were assessed for intermolecular interactions using Fourier transform infrared (FTIR). Further, X-ray diffraction (XRD) studies were also performed to evaluate the morphology of the MnO₂ NRs and distribution of these nanorods in NaAlg matrix membrane. The % degree swelling (DS) was calculated for all membranes in isopropanol-water mixtures at 30 °C to evaluate the ability of these membranes for pervaporation (PV) separation applications. The membranes were tested for suitability to dehydrate isopropanol by PV. The effects of feed composition as well as amount of nanorods loading on PV separation performance of these membranes were evaluated in terms of flux and selectivity. These results suggested that the nanocomposite membranes have shown improved serration of the water from water-isopropanol mixtures than the NaAlg membranes.

Keywords: Pervaporation; Nanocomposite membrane; Sodium alginate; MnO₂ nanorods



Metal Complexes Catalyzed Degradation of Methylene Blue from Waste Water

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Abstract: About 15% of the total world production of dyes is lost during the dyeing process and is released in the textile effluents. The release of those colored waste waters in the ecosystem is a dramatic source of non-aesthetic pollution, eutrophication and perturbations in the aquatic life. Therefore it is of prime importance to remove dyes from Industrial effluent. Among many methods available for removal of dyes, the photocatalytic degradation has been considered to be an efficient process for degradation of organic pollutants, which are present in the effluents released by industries. The photocatalytic bleaching was carried out on Methylenen Blue dye in the presence of Transition metal complexes containing Schiff bases and was observed spectrophotometrically. The effect of various operating variables like pH, concentration of complex, dye and duration etc. was also observed on the efficiency of the reaction. A tentative mechanism has also been proposed for this photocatalytic degradation of methylene blue dye. **Keywords:** Photocatalytic degradation, methylene blue dye, metal complexes, pH.

Synthesis and Characterization of Poly(vinyl alcohol) and Guar gum-g-Acrylamide Blend Membranes for Dehydration of Aqueous-Isopropanol

ROCEEDINGS OF ACR-SDEP-2020

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Abstract: Blend membranes of poly(vinyl alcohol) (PVA) and copolymers of guar gum-g-Acryl amide (GG-g-AAm) were prepared by solution casting method and cross linked with Glutarldehyde (GA) for separation of water-isopropanol mixtures by Pervaporation (PV) at 30 °C. The graft copolymer structures were analyzed by IR spectroscopy. Circular (1.5 cm dia) disc-shaped samples were cut out from sheet membranes to perform gravimetric sorption experiments in water- isopropanol mixtures at 30 °C. Diffusion coefficients are calculated. The PV performance of these membranes is compared to other membrane materials reported in literature. The membranes were giving good Pervaporation separation index with increasing the GG-g-AAm in the blend. The polymer blend solution such as viscosity, ultrasonic velocity and refraction index have also been measured to estimate the compatibility of the blend membrane under study

Keywords: Pervaporation; poly (vinyl alcohol); blend membrane; Glutarldehyde (GA), waterisopropanol mixture


Facile Hydrothermal Synthesis of RGo/PtRu Nano Catalyst for Electro Metahanol Oxidation

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Abstract: PtRu nano spheres (NSs) were uniformly deposited on reduced graphene oxides (rGOs) sheets by using simple a one pot hydrothermal method. Synthesized binary nano catalyst were characterized through X-ray power diffraction (XRD), Fourier transformed infrared spectroscopy (FT-IR), Raman Spectroscopy, Scanning electron microscopy (SEM), Energy Dispersive X-ray spectroscopy (EDAX) and Transmission electron microscopy (TEM). The electrochemical properties tested by cyclic voltammetry (CV), Chronoamperometry (CA). RGO/Pt-Ru nano catalyst exibited more efficient electro metanol oxidation than the mono catalysts such as rGO/Pt, rGO/Ru and bare Pt. The bimettalic nano catalyst (rGO/PtRu) better suitable for electro metanol oxidation for direct metanol fuel cells (DMFC) due to synergistic effect of individual rGO, Pt and Ru catalysts.

Keywords: Hydrothermal method, Methanol oxidation, PtRu nano catalyst, Synergistic effect.

Electrochemical Oxidation of Sulfamethoxazole Using Ti/SnO₂-Sb/PbO₂ (Ti/SnO₂-Sb/PbO₂-Pr) Through ANN-PSO

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Abstract: The presence of antibiotics in aqueous solution has raised more and more attention even if they are present in trace amounts. Appropriate technologies are vital to remove these compounds efficiently from aqueous environments. In this study, we investigated the electrochemical oxidation (EO) of sulfamethoxazole (SMX) on praseodymium modified PbO₂ electrode. The process of EO of SMX in aqueous solution followed the pseudo first order kinetics pattern, and the removal efficiency of SMX reached the maximum value of 93.8% within 45 min. The influence of major factors on SMX kinetics were studied in detail by single-factor experiments, namely current density (1-20 mA cm⁻²), solution pH value (2-9), initial concentration of SMX (10-500 mg L⁻¹) and concentration of electrolytes (0.01-0.50 mol L⁻¹). An artificial neural network (ANN) model was used to simulate this EO process. Based on the obtained model, particle swarm optimization (PSO) was used to optimize the operating parameters. The maximum removal efficiency of SMX was obtained at the optimized conditions (*e.g.*, current density of 10.25 mA cm⁻², initial pH value of 3.52, and initial SMX concentration of 74.45 mg L⁻¹, electrolyte concentration of 0.24 molL⁻¹ and electrolysis time of 51.49 min). The validation results indicated that the proposed method can ideally be used to optimize the related parameters and predict the anticipated results with acceptable accuracy.

Keywords: Sulfamethoxazole, electrochemical oxidation, artificial neural networks, particle swarm optimization.



Carbon Re-breath for Higher Mileage Energy System

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Abstract: Present day conventional energy is a consequence of burning of fossil fuels. During the process apparently the fossil fuels does not burn completely. These incompletely burned fossil fuels produce GHG. Furthermore the energy thus produced will not be completely consumed. Present study elucidates an enhanced energy system with assurance of complete burnt of fossil fuels along with complete consumption of energy produced by any source. The versatile behaviour of thermal energy storage applications of zeolites had lead a path way to Zeoengines. When compared to water it can hold nearly 30 times more heat, thus it is the best and efficient way to store complete consumption of heat energy. Natural zeolites like natrolite, analcime, apophyllite, chabazite, heulandite mesolite etc, have a unique property of releasing heat by absorption of water and liberate water vapour on heating. The exhaust of the engine is passed through the specially prepared mixed bed phases resulting for trapping of unburned fluid and fluidized gasses. This trapped fuel is enhanced and enriched by Wave blasting and reinjected into the engine by non-return valve (NRV) system which is automated with integration of SCADA. This system result an additional high energy, nearly10-20% higher mileage along with low GHGs. By adopting this system in gas based or diesel based power plants PLF can be increased. An integrated closed cycle of adsorption and liberation of heat manages industrial cooling and heating system, thus saves energy by complete consumption of heat produced by any energy system. The system is a proved long lasting, eco friendly, cost effective system.

Keywords: Zeoilite, Thermal energy, Analcime, Apophyllite, Chabazite.

Madagascar Periwinkle Leaves as a Green Source for Facile Synthesis of Silver Nanoparticles and their Efficacy Towards Catalytic Activity

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Abstract: Biosynthesis of nanoparticles emerged into considerable offshoot approach of nanoscience as herbal extracts can potentially eliminate the toxicity problem and gained attention due to growing demand to create a secure, low-cost, non-toxic and eco-friendly route for synthesis of nanomaterials. In the current investigation, we report the reducing and capping potential of aqueous extract from leaf infusion of *Catharanthus roseus* for the synthesis of silver nanoparticle (AgNPs). The inclined properties of prepared AgNPs were typified by optical examination, UV-Vis spectroscopy, FT-IR, SEM-EDAX, and X-ray diffraction (XRD) studies. The color change of the reaction mixture from light yellow to dark brown was observed within 60 minutes, which indicated the formation of silver nanoparticles. UV-visible spectroscopic analysis showed an absorption peak at 420 nm. The average range of particle size calculated using dynamic light scattering measurements (DLS) was found to be 18.17 nm. The rapid electro kinetic behavior of the silver was evaluated using zeta potential (appox.-27.7 mV). The catalytic efficiency of the prepared leaf broth AgNPs was also investigated on methylene blue (MB) dye degradation and the result demonstrates the completion of degradation process at the end of 5th h, signifying excellent catalytic properties.

Keywords: Catharanthus roseus, Methylene Blue dye, DLS, XRD.

Electro Chemical Studies of New Schiff's Base Derivatives of Vanillin

ROCEEDINGS OF ACR-SDEP-2020

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Abstract: Kinetic and spectral parameters are most vital properties of any chemical compound to determine structure and reactivity. In this present study we are intended to report the kinetic and spectral parameters of the new schiffs base derivatives of ortho vanillin (2-hydroxy-3-methoxybenzaldehyde) and meta vanillin (4-Hydroxy-3-methoxybenzaldehyde), synthesized by condensation with 2-amino-2methyl-1-propanol. Characterized by UV and IR spectroscopy and melting points. Kinetic parameters were evaluated by DC polarography and Cyclic voltametry in 40% aqueous di methyl formamide KCl was supporting electrolyte. On applying milli coulometric method of analysis on polarograms it was clear that the schiffs bases undergone two electron reduction. The experimental results observed from the effect of concentration and mercury column height on the limiting current confirmed the diffusion-controlled nature of the limiting current. Cyclic voltametric results shows reversible nature of electron transfer.

Keywords: Kinetic parameters, Schiffs bases, vanillin, cyclic voltametry and polarography

ROCEEDINGS OF ACR-SDEP-2020 Antibacterial Polyelectrolyte Hydrogels with Polysaccharides and Reduced

Graphene Oxide via Green Method; Membrane and Oxidative Stress

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Abstract: A simple and green method has been employed for the preparation of reduced graphene oxide (rGO) in polyelectrolyte complex hydrogels (PECHs) from xanthan gum (XG) and chitosan (CS). In this study glucuronic acid δ -galactone (GDL) was used as acidifying agent for the formation of PECHs and fenugreek seed extract as preparation of rGO. As synthesized rGO was characterized by Fourier transform infrared spectroscopy (FTIR), UV-Visible (UV-Vis) spectra X-ray diffraction (XRD). The developed rGO-PECHs were characterized by FTIR, and XRD techniques to confirm the formation and structural interactions between rGO with PECHs. The microstructure of rGO-PECHs was confirmed by scanning electron microscopy (SEM). In future by we will study biological performance of in terms of biocompatibility and antibacterial property against both gram-positive and gram-negative bacteria via membrane and oxidative stress for possible application in wound dressing.

polysaccharides, polyelectrolyte **Keywords:** rGO, complex, hydrogel, antibacterial, cytocompatability.



Fuels from Green Algae

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Abstract: Regular depletion of non-renewable fuels such as fossil fuels alerting the society to look in to renewable fuels. In general, algae were used for the purpose of food, neutraceuticles, medicine with some extent biofuels etc. Specifically, green algal species are useful due to their photosynthetic ability which in turn accumulates more biomass. Most of the algal species belong to aquatic group and lived in both fresh water and marine conditions. They have both uni and multi cellular nature with short life span. Recently, green algal species are also using to produce biofuels such as bioethanol, biohydrogen, biobutanol, biodiesel etc. In our laboratory, green algal species such as *Chlamydomonas reinhardtii, Chlorella vulgaris* and *Chlorococcum minutum* were using to produce bioethanol as well biohydrogen through various physico-chemical parameters. Particularly we are using vitamins, nano particles etc. to improve biomass in turn biofuel production. This work may be useful for commercial level production of biofuels. **Keywords:** Energy, Fuels, Green Algae, Biofuels.

Effect of Lactose on Production of Cellulase by Aspergillus Unguis in Solid State Fermentation on Groundnut Fodder

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Abstract: Nowadays, the use of agricultural residues, as the cheap substrate for the production of value-added products, is of high interest for the researchers and practitioners. Cellulase is a relatively expensive and a very important industrial enzyme where in this study was produced from groundnut fodder in solid state fermentation. In the previous experiment, production of cellulase by *A. unguis* was studied at only 1% (w/v) of lactose supplementation. Further experiments were conducted to determine the effect of lactose at various concentrations such as 0.5%, 1.0%, 1.5%, 2.0% and 2.5% (w/v) on production of cellulose by *A. unguis*. Groundnut fodder with 0.5% lactose supplementation by *A. unguis* gave the maximum FPase titers of 7.35 FPU/g groundnut fodder on 4th day of incubation. Lactose at 2% level showed higher yields of CMCase on 2nd day of incubation (23 U/g of groundnut fodder). Maximum β-glucosidase production (32.40 U/g of substrate) was occurred on 3rd day of incubation at 1.5% lactose concentration in SSF by *A. unguis*. Lactose at concentration of 2.0% yielded maximum protein content with 147.5 mg/g of groundnut fodder on 1stday of incubation.

Keywords: Aspergillus unguis, Groundnut fodder, Solid state fermentation, Cellulase, FPase, CMCase, β-glucosidase

Groundwater Quality Characterization in and Around Cement Industrial Zone, Yerraguntla Mandal, Andhra Pradesh, South India

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Abstract: The main objectives of this study is to evaluate characterization of groundwater quality and fluoride and nitrate health risk assessment and to as certain ground water quality for drinking, irrigation purpose and associated health risk assessment in and around Yerraguntla, Y.S.R district, South India. 40 ground water samples were collected from bore wells, analyzed for several cations and anions. Nitrate concentration ranges between 82.38 mg/L to 751.15 mg/L. Around 43% of the groundwater samples exceeded the World Health Organization (W.H.O) standards of nitrate (45mg/L). Fluoride concentrations varying from 0.49 mg/L to 5.81 mg/L. 48% of the samples are above the fluoride permissible limit of WHO standards (1.5mg/L). Irrigational quality indices such as Percent Sodium (%Na), Sodium Adsorption Ratio (SAR), Residual Sodium Carbonate (RSC), Magnesium Hazard (MH), Permeability Index (PI), Soltan classification (R1, R2), Kelly's Ratio (KR), Chloroalkaline Indices (CI), and Corrosivity ratio (CR) have been determined. Piper diagram reveals that most of the water is of mixed $Ca^{+2}-Mg^{+2}$ -Cl⁻ and Ca⁺²-Na⁺-HCO₃⁻ type. Non- carcinogenic health risk of nitrate and fluoride was also evaluated using United State Environmental Protection Agency (USEPA) method. THI values ranged from 0.39 to 18.26 (adults), while THI values for children and infants varied between 0.40 to 19.02 and 0.30 to 14.49 respectively. Hence proper ground water management techniques have to be adopted to mitigate ground water contamination and Government should take necessary steps to supply alternate drinking water.

Keywords: Groundwater, Cement, Fluoride, Nitrate, Kelly's Ratio

Non Carcinogenic Effect of Nitrates (NO₃⁻) in Drinking Water Surrounding Inactive Mine Lands in Cuddapah Basin, Andhra Pradesh, South India.

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Abstract: 50 groundwater samples were collected and analysed for major cations, anions, fluoride and nitrate in the Southwestern parts of Cuddapah basin (SW). Nitrate concentration ranges between 0.14 to 589 mg/L. Around 62.5 % of the groundwater exceed the permissible limit of 45 mg/L. Groundwater is not potable in terms of nitrate contamination hence health risk assessment has been carried out in this area. As per the USEPA guidelines hazard Quotient (HQ) and total hazard index (THI) has been evaluated. HQ values of nitrates varied from 0.001 to 14.6 (adults), 0.002 to 14.36 (children), 0.01 to 11.18 (infants). Therefore, proper ground water management techniques have to be implemented to mitigate ground water contamination and Government should take necessary steps to supply alternate drinking water.

Keywords: Groundwater, Cuddapah Basin, Nitrate, Kelly's Ratio

Evaluation of Water Harvesting Structures in Watershed Programme in YSR Kadapa District, Andhra Pradesh, India

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Abstract: An evaluation of Water Harvesting Structures (RWH) in watershed programme has been carried out in YSR Kadapa district. To mitigate drought effects under drought-prone area programme watershed development is taken up in Andhra Pradesh. Main aim of the programme is to increase soil moisture and groundwater. In YSR Kadapa district since 2016 there are more than 350 watersheds are developed, only five watersheds are taken up for evaluation of water harvesting structures. Data were collected from primary stakeholders pertaining to land and water resources. In 2017-18 area irrigated under Kharif before construction of watersheds are 61.20 hectors and after construction of watersheds in Kharif season area irrigated 75.70 hectors. Change of area irrigation in this season is nearly 14.5 hectorsi.e. 23 percent. In Rabi season area irrigated before construction of the watershed is 46.3 hectors and area irrigated after construction of watershed is 57.5 hectors. Change of area irrigation in Rabi season is 11.2 hector i.e. 24 percent. Before construction of the watershed total number of dug wells and bore wells are 37 and 48 and after the construction of the watershed total number of dug wells and bore wells are 37 and 79 and increase of wells nearly 31 i.e. 21 percent. The analysis indicated that there was an increase in all factors in the watershed area compared to non-watershed area.Lastly, it is suggested that RWH might be developed at appropriate areas and it is fundamental to set up vegetation for ideal accomplishment of the program.

Keywords: Artificial recharge structures, Watersheds, Kharif and Rabi seasons, Check dams.

Tree Diversity and Edaphic Factors Relationship in Srilankamalleswara Wildlife Sanctuary, Andhra Pradesh, India

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Abstract: A total of 133 tree species representing 7262 tree individuals was recorded in Sri Lankamalleswara wildlife (SLKM) sanctuary. The edaphic factors like SOC, pH, and Nitrogen and altitude of the forest site have contributed significantly to the variation of tree diversity. The edaphic factors like SOC, pH, Nitrogen, Phosphorus and Potassium were estimated by standard methods. Principal Component Analysis (PCA) indicated that F1 axis accounted for 59% of variation for soil variables and the F2 axis accounted for 16% of variation for altitude. The range of Nitrogen values was 2-32 ppm and was found to be lower than the other dry forests of Southern Eastern Ghats. A strong positive relationship between soil potassium, phosphorus and nitrogen with soil organic carbon was recorded. The low values of nitrogen and phosphorus in these forest soils may explain the dominants of leguminaceae trees. The rich diversity and symbiotic association with mycorrhizae strengthen the sustainable forest conservation efforts being carried out in the wildlife sanctuary.

Table 1: Physico-chemical properties of soil in sri Lankamallesw	ara wild life sanctuary (SLKM)
in Kadapa hill ranges.	

S.No	Soil type	Shallow, Red ferruginous loam
1	Soil pH	5.14-6.82
2	Soil organic carbon	0.75±0.03% (31.72 t/ha)
3	Bulk density	$1.34-1.54 \text{ g/cm}^3$
4	Electrical conductivity	33 µsiemens/cm
5	Soil nitrogen	39.3 kg/ha
6	Soil phosphorus	17.34 kg/ha
7	Soil potassium	97.32 kg/ha

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Soil Organic Carbon and Soil Respiration Rate in A Dry Deciduous Forest of Kadapa Hill Ranges, Andhra Pradesh, India

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Abstract: The interaction of soil-vegetation systems in forests play an important role in terrestrial carbon cycle as they act as active carbon sinks. Especially forest soils under natural vegetation are regarded as one of the major sinks of carbon. The objective of the study is to estimate the Soil organic carbon (SOC) and soil respiration (SR) in a dry deciduous forest of Kadapa hill ranges. Nine soil samples were collected randomly and at each site soil samples were collected at surface layer (0-10 cm) and sub surface layer (10-30 cm). SOC was analysed by Walkley-Black method and soil respiration by alkali absorption method. SOC was in the range of 1.33 to 1.81% at top surface layer and 0.83 to 1.51% in the below surface layer and thus the SOC values got decreased with increase in soil depth. A positive trend but not significant relationship was observed between SOC and SR and a significant negative correlation was noticed between SOC and soil bulk density. While SR showed a positive trend with soil temperature. The results reveal a definite linkage between SOC and rich forest diversity leading to sustainable conservation of forests and ecosystem services.

Table 1 Details of physico-chemical parameters, mean and range of soil organic carbon and soil respiration values of soils at varied depths in a dry deciduous forest.

Soil depth (cm)	рН	Electrical conductivit y (µsc/cm)	Temperat ure (°C)	Soil Moistu re (%)	Mean Soil organic carbon (%)	Bulk density (g/cm ³)	Soil respiration Co ₂ /mg/m ² /h
0-10	5.3-6.2	163.7	26.5-33.2	3.37	1.67±0.17	1.35	113.91
10-30	5.6-6.0	150.2	25.8-32.2	5.40	1.1±0.23		

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Hydrogeochemical Studies of Simhadripuram Mandal, YSR Kadapa District, Andhra Pradesh

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Abstract: Assessment of water quality has been carried out to determine the sources of dissolved ions in groundwater. Ground water is clean but it depends upon quality and quantity of minerals dispersed and dissolved in it. Quality of groundwater in Simhadripuram Mandal of YSR Kadapa District, a semi-arid region of south India is evaluated for its suitability for drinking and irrigation purposes. The study area falls in the Survey of India Toposheet nos. 57 J/02 and J/06 on 1:50,000 scale. Geologically, the middle Protorozoic Cuddapah Super group and Kurnool Group of rocks underlie most of the study area. The main lithologic units consist chiefly of quartzite, dolomite, shale, and the study area contains layers of basic volcanic rocks, including sills of trap and trap conglomerate with volcanic pellets. Twenty two samples of ground water using for drinking and agricultural purpose were collected from either hand pumps or open wells at different places from the study area, during the month of December 2019. The pH of ground water in the study area is ranging from 7.5 to 9.3. The total hardness of the groundwater in the study area is ranging from 37 to 4730 mg/l. Calcium concentration of Groundwater in the study area is ranging from 18 to 194 mg/l during the post-monsoon period. Magnesium concentration of Groundwater in the study area is ranging from 24 to 182 mg/l during the post-monsoon period. Chloride concentration of the ground water in the study area ranging from 49 to 614 mg/l during post-monsoon period. Bicarbonate concentration of the groundwater in the study area is ranging from 122 to 1610 mg/l during the post-monsoon period.

Keywords: Groundwater, Hydrogeochemistry, Nambulapulakunta, and Anantapur District

Drinking Water Treatment by Using Ultra Filtration Fiber Membranes

ROCEEDINGS OF ACR-SDEP-2020

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Abstract: Ultra filtration of river water for drinking water production was performed with hollow fiber membranes in a cross flow filtration system with frequent membrane backwashing. The effects of membrane material, operating conditions and raw water quality on Ultra filtration (UF) behavior were investigated. The permeate flux for the hydrophilic cellulose acetate (CA) membranes was much higher than that of the hydrophobic polyethersulfone (PES) membrane, a phenomenon which was explained by membrane fouling due to the adsorption of substances in raw water on and in the pores of the membranes. In order to maintain the high and stable flux for the CA membrane, the operating backwashing pressure should be more than twice as high as the filtration pressure. It was also shown that efficient removal of organic compounds from raw water was accomplished by the fouled CA membrane.

Keywords: Ultra filtration, Hollow fiber membranes, Drinking water treatment, Cellulose acetate membrane

Assessment of Ground Water Quality in and Around the Mica Mine in Sydapuram Mandal, Nellore District, Andhra Pradesh, India.

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Abstract: Ground water is an important resource that needs to be protected from pollution and biological contamination with rapid growth in population, urbanization, industrialization and competition for economic development. The underground water is clean but it depends upon quality and quantity of materials dispersed and dissolved in it. Therefore, the presence of contaminants in natural fresh water continues to be one of the most important environmental issues in many areas of the world, particularly in developing countries, where several communities are far away from potable water supply. Management of this valuable resource is determined by its accessibility and utilisability in terms of quality and quantity. Where groundwater is the main source of drinking and irrigation purpose. This study was carried out to analyse ground water quality in certain parts of Sydapuram area of Andhra Pradesh. Eleven water samples were collected from bore wells and taps, analyzed such as pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total hardness, Calcium, Magnesium, Alkalinity, Sulphate, Chloride and Fluoride. The result shows the 10% of the water sample concentrations exceeding the WHO and ISI permissible limits. Hence it is suggested that there is a need to take all the necessary precautions before the water is used for drinking.

Keywords: Groundwater quality, physico-chemical parameters, Mica mine area, Sydapuram mandal, Nellore district.

A Review on Contamination of Soil by Neonicotinoid Pesticides and Trends it's in Soil and Water Samples with Advanced Analytical Techniques

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Abstract: Pesticides are used to kill the pests and insects which attack on crops and harm to them. Pesticides benefit the crops; however the prophylactic use of broad spectrum pesticides goes against the long established principles of Integrated Pest Management (IPM), leading to environmental concerns. It has recently emerged that neonicotinoid pesticides can persist and accumulate in soils. They are water soluble and prone to leaching into water ways, and also they are found in honey, honey bees, honey liquor, olive oil, fruits, vegetables, grains, songbird plasma, and human being urine samples. The applied neonicotinoid pesticides and its metabolites accumulate in the soil and will transfer from soil to plants, surface water, ground water and ultimately affects the human health. Therefore the knowledge of regional variability, the background values and anthropogenic versus natural origin of potentially harmful of title pesticide in soils measurement is critical importance to assess on human impact. In view of its seriousness, quantification of neonicotinoid pesticides using analytical techniques in soils is significant. This review article is mainly focusing on extensive literature survey regarding soil contamination by neonicotinoid insecticides, employing of various analytical techniques including GC-MS/MS, LC/DAD/ESI/MS, LC-DAD, HPLC-UV, LC-ES-MS, UHPLC-MS, and Micellar Electro kinetic Chromatography in quantitative estimation of neonicotinoids.

Keywords: Soil contamination, neonicotinoid pesticides, anthropogenic, analytical techniques.

Design and Synthesis of Phaspomolebdinic acid Embedded Composite Membranes Based on Polymeric Sulphonic acid Grafted Pectin for Fuel Cell,

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Drug Delivery and Toxic Metal Ion Removal Application

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Abstract: Phaspomolebdinic acid embedded composite membranes were fabricated by polymeric sulphonic acid grafted pectin graft copolymers by blending with poly(vinyl alcohol) by solution casting method. Graft-copolymers were synthesized from pectin, a carbohydrate (2-acrylado-2-methyl-1-propanesulphonic polymer, with acid) and (sodium 4vinylbenzenesulfonate) by using KPS potassium persulfate as an initiator. The effect of variables like concentration of initiator, concentration of monomer, temperature and time has been studied. Graft copolymers and the developed membranes were successfully characterised by Fourier transform infrared spectroscopy, scanning electron microscopy, and X-ray diffraction studies. These membranes were evaluated fuel cell application as proton exchange membrane and studied ion-exchange capacity, water uptake, methanol permeability and proton conductivity. In addition, these membranes are successfully utilized for the anti-cancer drug (5-fluorouracil) delivery as well as toxic metal ion (Cu^{2+} & Ni²⁺) removal.

Keywords: Polyacid, Pectin, Fuel Cells, Drug Delivery, Toxic Metals, Adsorption.



Scheme: Synthesis of biaryls.

A highly Sustainable Synthesis of Chiral *tert*-butane Sulfinyl Imines in Water Extract of Pomegranate Ash under Metal Free Condition

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Abstract: The chiral *tert*-butanesulfinylimines developed by Ellman et al. become prevailed substrates in organic synthesis. These are proved as effective auxiliaries in several reports for making chiral amine-containing precursors and biologically significant complex molecules. Moreover, (S)- and (R)-*tert*-butanesulfinamides and (S)- and (R)-a-methylbenzylamines are widely accepted chiral ammonia equivalents among all the chiral amine substrates. In this connection we have recently developed a versatile procedure for the effective synthesis of sulfinyl aldimines from aryl/heteroaryl/aliphatic aldehydes and *tert*-butanesulfinamide by using water extraction of pomegranate ash (WEPA) as catalyst and media. Simple operation, excellent yields in a short reaction time, eco-friendly solvent/catalyst, environmental beneficial aqueous media, absence of external additives, metal-free condition are the notable advantages of this method.

Keywords: Sulfinyl Imines, Pomegranate Ash, Eco-friendly, Catalyst,



Scheme: WEPA catalyzed synthesis of chiral *tert*-butane sulfinyl imines.



Synthesis of Some New Chromone Derivatives and Biological Evaluation as Antioxidants

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Abstract: A series of novel chromone derivatives (*N*-(4-oxo-2-(trifluoromethyl)-4*H*-chromen-7yl) benzamides) were synthesized and investigated for their cytotoxic activity against three human cancer cell lines including HeLa, MCF-7, and A549. The title compounds were prepared by treating 7-amino-2-(trifluoromethyl)-4*H*-chromen-4-one with an appropriate amine, K₂CO₃ or NaH, appropriate alkyl halides. The described methodology was characterized by short reaction times, side-products free, high yields (68 to 77%), and provides chromones with a variety of substituent's on the aromatic rings. The structure of the isolated compounds has been determined by means of ¹H/¹³C NMR and FT-IR Spectroscopy.

Keywords: Chromones, Cytotoxic activity, Cancer, HeLa, MCF-7, A549.

Metal-N-Heterocyclic Carbene Catalyzed Synthesis of bis Benzofused Heterocycles

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Abstract: Direct arylation has emerged as an increasingly viable alternative to traditional crosscoupling techniques such as Sonogashira, Suzuki-Miyaura, Stille, Kumada and Negishi reactions have been developed with a variety of metal catalysts. Since, all these processes require the functionalized starting materials, aryl halides on one side and organometallic derivatives on the other end, which are frequently not commercially accessible or are relatively expensive. In these reactions, the organometallic reagent of traditional cross-coupling reactions is replaced by a simple arene (Ar-H), thus minimizing the number of synthetic manipulations prior to crosscoupling. ctron-rich and electron deficient heterocycles, as well as simple benzenes. Since a decade our group effectively involving N-heterocyclic carbine (NHC's) catalyzed C-C and C-N bond forming reactions,¹⁻⁴ in view of the great importance of NHC's we focus on the metal-NHC catalysed oxidative homo/cross C-H/C-H coupling reactions between benzofused heterocycles and aryl/heteroaryl halides either two (hetero)arenes through 2-fold C-H activation. **Keywords:** Metal-N-Heterocyclics, Carbene, cross-coupling techniques, C-H activation.

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Preparation, Characterization of Guar gum Polymer Based Silver-Nanocomposite-Hydrogels for Anticancer Drug Release, and Antimicrobial Applications

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Abstract: In this work, we fabricated a pH/temperature responsive nanocomposite hydrogels (NCH) from guar gum-graft-polyacrylamidoglycolic acid (GG-PAGA) polymer with silver nanoparticle (SNPs) containing hydrogels. These NCHs were formed by cross-linking between cis-diol groups on guar gum molecular chains with NaBO₂ (sodium metaborate), obtained from NaBH₄ which also induces the silver nuclei growth by reduction through a rapid and simple way. The stability and formation of SNPs inside the hydrogel was confirmed by the UV-vis spectrum, and their size in nano form (<10 nm) anchoring on the network was determined by transmission electron microscopy (TEM). Furthermore, the presence of N (indicates the grafting), B (indicates the cross-linking), and Ag (indicates the *in-situ* SNPs formation) by the EDX color mapping. The as-prepared NCHs have been utilized to deliver a 5-flurouracil (5-FU), an anticancer drug and also tested their potential antimicrobial efficiency against Bacillus subtilis (B. subtilis) and Salmonella ebony (S. ebony). The cross-linking network structure in the NCHs were demonstrated by scanning electron microscopy, which confirmed the porous 3D network formation. Furthermore, the different network parameters (Mc, χ , ξ , ϕ and D) were investigated in terms of average molecular weight between cross-linkers/network, swelling characteristics, and evaluated to assess the release profile of 5-FU drug. The changes in the obtained NCHs such as functional-interactions, thermal, and morphological properties were identified by Fourier transformation infra-red, Differential scanning calorimetry, Thermo gravimetric analysis, and Xray diffraction study. The NCHs possess ionizable groups and these were responsible to exhibit sol-gel behavior due to pH and temperature effect, therefore the mesh size, and molecular weight of polymer cross-link network has been greatly influenced in the NCHs. As a result, the swelling ratio of NCHs showed maximum at higher pH and minimum at lower pH; also enhanced the 5-FU loading and encapsulation efficiency (i.e. 56%). Furthermore, the NCHs showed higher invitro release of 5-FU at pH 7.4 than at pH 1.2 and 37 °C. Moreover, the 5-FU release was

prolonged up to 18 h with 83% follows the non-Fickian diffusion mechanism and showed higher antibacterial activity towards *B. subtilis* and *S. ebony* (i.e. \geq 12.5). However, the incorporation of SNPs inside the hydrogel network (NCHs) potentially enhanced in terms of swelling, encapsulation efficiency, 5-FU release, and zone of inhibition, thermally stable compared to hydrogels without SNPs. Finally, the results of present investigations suggest that the developed NCHs could be useful for controlled drug delivery of therapeutic agents and wound healing applications.

Keywords: Graft polymer, Nanocomposite hydrogel, Kinetic parameters, Drug release, Antibacterial activity

Mussel-Inspired Multifunctional Hydrogels for Skin Tissue Engineering Applications

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Abstract: The combination of multiple physiological (swelling, porosity, mechanical and biodegradation) and biological (cell/tissue adhesive, cell proliferation, and hemostatic) properties on a single hydrogel has great potential for skin tissue engineering. Adhesive hydrogels based on polydopamine (PDA) have become the most popular in the biomedical field; however, integrating multiple properties on a single adhesive hydrogel remains a challenge. Here, inspired by the chemistry of mussels, we developed PDA-sodium alginate-polyacrylamide (PDA-SA-PAM)-based hydrogels with multiple physiological and biological properties for skin tissue engineering applications. The hydrogels were prepared by alkali-induced polymerization of DA followed by complexation with SA in PAM networks. The chemical composition of the hydrogels was characterized by X-ray photoelectron spectroscopy (XPS). PDA-SA complexed chains were homogeneously dispersed in the PAM network and exhibited good elasticity and excellent mechanical properties, such as a compressive stress of 0.24 MPa at a compression strain of 70% for 0.4PDA-SA-PAM. The adhesive hydrogel also maintained a highly interconnected porous structure (~94% porosity) along with PDA microfibrils. The hydrogel possesses outstanding swelling and biodegradability properties. Owing to the presence of the PDA-SA complex in the PAM network, the hydrogels show good adhesion to various substrates (plastic, skin, glass, computer screens, and leaves); for example, the adhesive strength of the 0.4PDA-SA-PAM to porcine skin was 24.5 kPa. The adhesive component of the PDA-SA chains in the PAM network significantly improves the cell proliferation and cell attachment, cell spreading and functional expression of human skin fibroblasts (CCD-986sk) and keratinocytes. Moreover, the PDA chains exhibited good hemostatic properties, resulting in rapid blood coagulation. Considering their excellent cell affinity, rapid blood coagulation ability, and moderate antibacterial property, these mussel-inspired hydrogels have substantial potential for skin tissue engineering applications.

Keywords: Mussel-inspired, polydopamine, hydrogel, cell adhesion, and hemostasis.

Mussel-Inspired Sodium Alginate-Dopamine/Graphene-Based Hydrogels for Strain Sensitive Properties

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Abstract: Recently, self-healing, adhesive, and strain-sensitive hydrogels have attracted great interest for electronic skin wearable devices. In this work, mussel inspired hydrogels were developed using sodium alginate-dopamine conjugate/graphene within the polyacrylamide networks using alkali-induced polymerization. The hydrogel shows high flexibility, stretchability, and self-healing properties. Additionally, the hydrogel exhibits good and repeatable adhesive behavior on various substrates (skin, computer screen, leaf, plastics, etc). Furthermore, the existence of graphene greatly improved the mechanical property, and conductivity and enabled the hydrogels to be used into wearable strain sensors to monitor the human motion signals.

Keywords: Mussel-inspiration, sodium alginate, polydopamine, graphene, hydrogel, strain-sensitive property.

Zestoretic A Anti-Hypertensive Drug Shows Adverse Effects on Fertility in Male Rats

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Abstract: Zestoretic, is a combination of lisinopril and hydrochlorothiozide commonly used as anti-hypertension drug in humans. No reports are available to know the role of zestoretic effects on reproductive system in men. The present study focused to see the effects of zestoretic on reproductive behavior and sperme quality in Wistar rats. Zestoretic (lisinopril varied concentrations + hydrochlorothiozide 12.5mg) at a dose of 25, 50 and 100 mg/Kg body weight were administered orally to three different groups of mature males (90 days old) consisting of each 4 animals on day 1, 3, 5, and 7 and sacrificed to check the fertility parameters on day 8. Control males were maintained by administering water orally. The sperm parameters like daily sperm count, motility, viability, sperm functional test (HOS Test) along with weight of reproductive organs were measured in all the rats. Significant decrease (P<0.005) in the daily sperm count, motility and viability was observed in the experimental groups in a dose dependent manner when compared to controls. HOS test clearly shown the dose dependent effect of zestoretic and its intensity in a way with increased number of abnormal/damaged/inactive sperm. The significant (P < 0.005) reduction in the weight of reproductive organs such as prostate gland, seminal vesicle, testis and epididymis in a dose dependent manner is correlated with decreased sperm quality in the zestoretic administered experimental rats. This study is directly evidenced the side effects of zestoretic on male reproductive health by lowering the reproductive organs weight thereby producing low quality sperm.

Keywords: Zestoretic, anti-hypertension, sperm quality, reproductive organs, infertility

Substrate Suitability of Minor Millets to Aflatoxin B₁ Elaboration

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Abstract: Millets are one of the cereals besides wheat, rice, maize that are recognized as nutricereals which are traditionally consumed as staple food by a large number of people living in arid and semi-arid parts of world. Besides being rich with health promoting phytochemicals they are highly nutritious and known to have potential health benefits. Mycotoxins such as aflatoxins are toxic secondary metabolites produced by Aspergillus species. Aflatoxin B₁ is the most carcinogenic one and has been classified as carcinogenic to humans. Aflatoxin contamination of agricultural commodities is becoming more or less inevitable because of the promoting factors in its production such as temperature, moisture, soil properties, insects and rodents attack etc. Wide variation in the AFB₁ content between the minor millets was observed at diff periods of fungal infestation (day 3, 6, 9, 12). Among the millets foxtail millet and kodo millet were more susceptible as high aflatoxin B1 was produced in foxtail millet cultivars when compared to all other minor millets investigated. Little millet (Sama) and finger millet cultivars (Ragivakula and FMAVT-2) were found to offer high resistance to aflatoxin production. Sorghum and maize showed higher aflatoxin B1 production than minor millets. Little millet, Sama showed high phytic acid content which correlated negatively with aflatoxin content. All the millet cultivars at different time points of infection were significantly different for the α amylase activity. α -amylase activity correlated well with respect to the aflatoxin production in foxtail millet (Krishnadevaraya), sorghum and maize. Aflatoxin contamination is a persistant serious threat to man irrespective of the measures taken to control it, and in these circumstances minor millets with no natural occurrence and good resistance to fungal attack, offer one of the solutions to combat aflatoxin contamination and can be regarded as low risk agricultural commodities.

Keywords: aflatoxin, Millets, nutricereals, Little millet



Antidiabetic Activity of Millets

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Abstract: Diabetes mellitus is a silent disease and is now recognized as one of the fastest growing threats to public health in almost all countries of the world. It is estimated that with more than 41 million diabetics, India leads the world and thereby known as the "Diabetes Capital of the World". Therefore, there is a need to develop novel therapeutic foods containing complex carbohydrates with higher levels of dietary fibre. The intake of whole grain foods is suggested to be beneficial for the prevention and management of diabetes mellitus, and epidemiologically lower incidence of diabetes has been reported in millet-consuming populations. Dehulled and heat-treated barnyard millet has been reported beneficial for type 2 diabetics. In one study, finger millet polyphenols (FMPs) were reported as major antidiabetic and antioxidant components, when evaluated for aldose reductase (AR)-inhibiting activity. In another study, phenolic compounds from the millet seed coat showed strong inhibition toward α -glucosidase and pancreatic amylase. The aqueous extracts of foxtail millet grains were found to have excellent antihyperglycemic activity. Pennisetum glaucum(Pearl Millet) supplementation showed high hypoglycemic effect and also hypolipidemic property in alloxan induced hyperglycemic wistar rats. Millet (Kodo Millet, Pearl Millet, Little Millet) and pulse incorporated noodles is effective in controlling blood glucose levels and improving lipid profile in diabetic rats. Millets have been reported to be a rich source of dietary fibre which is present in soluble and insoluble form, and is proved to play an important role not only in the management of metabolic disorders like diabetes mellitus and hyperlipidemia, but also improves bowel motility thereby reducing the incidence of colon cancer.

Keywords: Millets, Hyperlipidemia, Hyperglycemia, α-glucosidase, Antioxidant.

Green Synthesis of Silver Nanoparticles Using Fresh Water Microalgae Spirogyra sp. and their Anti-Bacterial Activity

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Abstract: Fresh Water Algal biomasses are being used as fertilizer and as a food source for humans and animals. Large scale application of these algae in waste water treatment and bioremediation were also reported as an extension part of industrial applications. In this present study Silver nanoparticles were synthesized through bioreduction of silver ions using fresh water algae Spirogyra sp. The sample was collected in Penna river Siddavatam, and cultured in large scale in the net house facility of Department at YVU, YSR Kadapa district, Andhra Pradesh India. Green synthesis of silver ions (Ag^{+}) as shows a yellow color solution to red color extract and these silver nanoparticles synthesis having an absorption peak at 430nm. Further. nanoparticles were characterized by using UV-visible spectrophotometer, scanning electron microscopy (SEM), EDX, Fourier Transform Infra Red (FTIR), Dynamic light scattering (DLS). The Silver nanoparticles average size was estimated around 28-58 nm and the antimicrobial activity of SNPs was tested Gram-positive bacteria as Bacillus subtilis, Staphylococcus aureus, Clostrium Sporogenus. Gram-negative bacteria as Echeresia Coli, Pseudomonas aeruginosa, Klebsiella pneumoniae by measuring the inhibition zone and result confirmed that Silver nanoparticles can be an antimicrobial agent against some pathogenic microbes. The results will be presented.

Keywords: Fresh Water Algae, Green synthesis, Silver nanoparticles, Antimicrobial activity,

Development of Sodium Alginate/Graphene Oxide Beads: Effect of Heteroionic Crosslinker on *In vitro* Anti-Cancer Drug Delivery

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Abstract: Polymeric beads are playing an important role in the filed like food and medicine. In the present study, sodium alginate/graphene oxide (NaAlg/GO) hydrogel beads were fabricated by simple ionotropic gelation technique with different ions (Ca⁺², Mg⁺², Ba⁺² & Al⁺³) as crosslinking agents. 5-Fluorouracil, an anti-cancer drug successfully loaded in to the NaAlg/GO hydrogel beads. The resultant pristine and drug loaded beads were characterized by Fourier transform infrared spectroscopy (FTIR), X- ray diffraction (XRD) analysis and scanning electron microscopy (SEM). In addition, swelling studies and drug release were performed in pH 1.2 and 7.4 at 37 °C. The anticancer activity of the fabricated beads will be studied by using MTT assay using MCF-7 breast cancer cell lines.

Key words: Sodium Alginate, Graphene Oxide, Crosslinker, Cancer, Drug Delivery



The Attempted Synthesis of Alatamide-Amino Acid and Lansiumamide-Amino Acid Hybrids by Alkylation of N(Diphenylmethylene)Glycine Methyl Ester

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Abstract: An efficient method for the preparation of novel Alatamide-amino acid and Lansiumamide- amino acid hybrids has been designed. The key step involves the alkylation of N (Diphenylmethylene) Glycine Methyl Ester with bromo-methyl alatamide and lansiumamide derivatives. Various attempts to reduce the unsaturated ester (**5**) to alcohol have been described.

Introduction: Imides are compounds consisting of two carbonyl groups bound to nitrogen atom.¹ Imides are versatile building blocks in the synthesis of nitrogen heterocycles. ²The imide moiety is also an important component in many natural products that exhibit a broad range of activities including immune-suppressants,³ cytotoxic anticancer agents,⁴ antibiotics,⁵ and antifeedants.⁶ Cyclic imide moiety and their derivatives play an integral part in various important molecules such as thalidomide, isogranulatimide and rebeccamycin etc.⁷



N-Formyl Benzamide (Imide)

OMe

Alatamide

Lansiumamide A

Synthetic Scheme:

Lansiumamide B



Conclusion: We developed the preparation of novel Alatamide-amino acid and Lansiumamideamino acid hybrids viathe alkylation of N (Diphenylmethylene) Glycine Methyl Ester with bromo-methyl alatamide and lansiumamide derivatives. Various attempts to reduce the unsaturated esterto alcohol are under progress.

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Synthesis Benzamides by the Ring Opening of Azlactones and Biological Properties

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Abstract: Benzamides are important structural motifs, which are present in many natural products and building blocks involved in the synthesis of bio-active molecules. SAHA (Vorinostat) and FK-228 (Romidepsin) are the benzamide based FDA approved drugs and are used for the treatment of cutaneous T-cell Limphoma. Parsalmide is commercially available non-steroidal anti-inflammatory drug and Roflumilast is also a well-known anti-inflammatory agent identified as a potent and selective phosphodiesterase (PDE4) inhibitor. As part of our ongoing research on novel heterocyclic compounds, we have nicotinaldehyde based azlactones. The azlactones were reacted with various amines provided series of benzamide derivatives. These compounds will be screened for their biological properties (**Scheme I**).

Keywords: Benzamides, SAHA, FK-228, Ring Opening, Azlactones



Scheme I

Novel and Simple Methodology for the Synthesis of 3-Acetylindoles and their N-Alkvl Derivatives Using TBAB as Phase Transfer Catalyst

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Abstract: Using 5% aq. NaOH, a simple method for the transformation of 3-cyanoacetylindoles 2 into 3-acetylindoles 3, in good yields, is reported. Tetrabutylammoniumbromide (TBAB) is found to be an efficient phase transfer catalyst for the synthesis of N-alkyl derivatives 5 of 3acetylindoles 3 giving products in excellent yields. 2 were themselves obtained from simple idols 1 by reaction with cyano acetic acid in the presence of propionic anhydride at 100 °C for 5-10 min. Partial hydrolysis of 2 under hot acidic conditions yielded the corresponding carboxamides α -(3-indolecarboxoyl) acetamides 4. This could be readily transformed into the respective 3 by refluxing with 5% aq. NaOH for 2-2.5 h.

Keywords: 3-cyanoacetylindole, 5% aq. NaOH, 3-acetylindole, alkylating agent, Phase Transfer

Catalyst (TBAB).



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Dual Responsive PVA-DMAEMA Hydrogels: Effect of Crosslinking Agent on Swelling and Anti-Cancer Drug Release Properties

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Abstract: In this work, pH responsive semi-IPN hydrogels (PVPAD) fabricated from poly(dimethyl amino ethyl methacrylate), DMAEMA and poly(vinyl alcohol), PVA, and acryl amide for anti-cancer drug delivery application. PVPAD hydrogels were successfully prepared by a simple free radical polymerisation using N,N¹-methylene-bis-acrylamide and bis[2-methacryloyloxy] ethyl phosphate as a cross linkers. The aim of this study was to investigate the effect of crosslinker on swelling behaviour and delayed release of 5-fluorouracil from PVPAD polymeric network. The studied parameters included: monomer concentration, crosslinking agent type & concentration and their overall effect on swelling of the hydrogels, drug loading efficiency, diffusion and *in vitro* release characteristics of 5-fluorouracil from PVPAD hydrogels. These hydrogels were characterized by FTIR, XRD, TGA and SEM spectroscopy.

Keywords: Hydrogel, Poly(vinyl alcohol), (2-Dimethylamino)ethyl methacrylate, Stimuli responsive, Drug delivery, 5-Fluorouracil.

Fabrication of Sodium Alginate and Hydroxyethyl Cellulose Blend Microbeads for the Controlled Release of D-Penicillamine

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Abstract: The aim of the present work is fabrication of D-Penicillamine (D-PA) encapsulated microbeads from sodium alginate (SA) and hydroxyethyl cellulose (HEC) using glutaraldehyde as crosslinker by simple ionotropic gelation technique. These beads were characterized by Fourier transform infrared (FTIR) spectroscopy, differential scanning calorimetry (DSC), scanning electron microscopy (SEM) and X-ray diffraction measurements (XRD). Swelling and drug release behaviours of these beads were investigated in simulated intestinal fluid (pH 7.4) and gastric fluid (pH 2.0) at 37°C. Results illustrated that both the swelling and degradation of the optimized beads were influenced by the pH of the test medium, which might be suitable for intestinal drug delivery.

Keywords: Sodium alginate, Hydroxyethyl cellulose, D-Penicillamine, microbeads, drug delivery.
Effect on Mechanical Flow Properties after Conversion into Amorphous Solid Dispersions by Spray Drying of Valsartan in Poly(vinyl pyrrolidone)

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Abstract: Amorphous solid dispersions are those which are used to improve the oral bioavailability of drugs which are crystalline in form and have limited solubility and dissolution rates. Amorphous solid dispersion comprises of a drug substrate and a polymer which stabilizes the drug in its amorphous state during storage and to inhibit precipitation in-vivo. Amorphous solid dispersions are manufactured by using the technologies like spray drying, hot melt extrusion, and co-precipitation among which spray drying is effective. The process of spray drying ensures amorphous solid dispersions with optimum bioperformance, stability and manufacturability can be engineered. The aim of manufacture of spray dried amorphous spray dried dispersions was to engineer four samples with same formulation but with different particle properties to illustrate the range of particle properties achievable using spray drying process. Particle engineering by spray drying process ensures the production of amorphous solid dispersion particles with a wide range of particle sizes, densities, and particle morphologies demonstrating that this approach can be directly used to optimize downstream manufacturability of a finished dosage form.

Keywords: Polyvinyl Pyrrolidone, Solid Dispersions, Valsartan, Spray Dry

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Thermodynamic, Transport and Aucostic Properties of Butyl Acetate with Some Alcohols at Different Temperatures

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Abstract:

Objective: The objective of this investigation is to study the variations of ultrasonic Velocity, density and viscosity and various acoustic and thermodynamic parameters.

Mehods: The binary mixtures of butyl acetate with ethanol, propanol, butanol, pentanol and hexanol containing different ultrasonic properties have been studied at different temperature of 303.15K and 313.15K at the frequency range from 0.5 to few mega hertzs. The ultrasonic related physical parameters like velocity (U), density (ρ), viscosity (η), adiabatic compressibility (β ad), free volume (V_f), intermolecular free length, are determined.

Results: The results of these studies may also be used for examining the suitability of these mixtures for other practical applications such as in paints, varnishes, printing ink industries, biomedical engineering, textile industry, leather industry and pharmaceutical industry. In recent years sound velocity measurements are very useful in the technology of polymers.

Conclusion: This work can be effectively utilized as a qualitative study to predict the extent of molecular interactions between the components.

Keywords: Ultrasonic interferometer, Butylacetate, Ethanol, Propanol, Butanol, Pentanol, Hexanol.

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Ultrasonic Velocity Study of Binary Liquid Mixtures of Isobutyl Methyl Ketone with Different Amines at 308.15K

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Abstract: The densities and ultrasonic velocities were determined for the binary liquid mixtures of isobutyl methyl ketone (IBMK) + n-butylamine (NBA), + sec-butylamine (SBA) + tertbutylamine (TBA), + n-hexylamine (NHA), + n-octylamine (NOA) and + cyclohexylamine (CHA) have been measured at 308.15K. From the experimental data, the other acoustical parameters such as acoustic impedance (Z), isentropic compressibility (K_s), intermolecular free lentth (L_f), relative association R_A , excess acoustic impedance (Z^E), excess isentropic compressibility (K_s^E) and excess ultrasonic velocity (u^E) have been computed and the results concluded that the molecular interactions are in the following order

IBMK+CHA<+NOA<+NHA<+TBA<+SBA<+NBA

The dissociation of self associated amines by the addition of IBMK leads to an increase in free length in mixtures contributing to negative deviations in sound velocity and positive deviation in compressibility.

Keywords: Densities, Ultrasonic velocity, Isobutyl methyl ketone, Amines, liquid mixtures.

Second Derivative Spectrophotometric Determination of Zinc(II) using 2-Acetyl Pyridine Thiosemicarbazone/Semicarbazone in Biological Samples

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Abstract: 2-Acetylpyridine thiosemicarbazone (APT) and 2-acetylpyridine semicarbazone (APS) have been used for the spectrophotometric determination of zinc(II) in aqueous medium. APT and APS react with zinc(II) in acidic medium. The colour reactions between reagents with zinc(II) are instantaneous and the absorbance of complexes remains constant for over 24h. The maximum absorbance (λ_{max}), composition (M:L), molar absorptivity and sandells sensitivity of the Zn-APT and Zn-APS complexes respectively are 360, 355 nm , 1:2, 4.06×10^4 , 8.12×10^3 L. mol⁻¹.cm⁻¹ and 0.0160, 0.080 µgcm⁻² of Zn(II) respectively. The Zn-APT and Zn-APS systems obey Beer's law for 0.105-1.046, 0.523-5.231 µg/ml of Zn(II)respectively. Large number of cations, anions and complexing gents (e.g. Triethanolamine, thiourea) do not interfere in APT method. The method is successfully applied for the determination of zinc in biological samples.

Keywords: Spectrophotometry, zinc determination, 2-acetylpyridine thiosemicarbazone, 2-acetyl pyridine semicarbazone, biological samples.



Synthesis, Characterization and Antimicrobial Evaluation of Novel Compounds of 3-((Benzo[d]thiazol-2-ylmethyl)amino)-1-(2,5difluorobenzoyl)-4-(2-(4-(substituted)phenyl)hydrazono)-1H-Pyrazol-5(4H)-one

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Abstract: New novel derivatives of 3-((benzo[d]thiazol-2-ylmethyl)amino)-1-(2,5-difluoro benzoyl)-4-(2-(4-(substituted)phenyl)hydrazono)-1H-pyrazol-5(4H)-one (2a-g) were prepared by refluxing a mixture of ethyl 2-(4-(2-(4-subtituted methyl)phenyl) hydrazono)-1-(2,5-difluoro benzoyl)-4,5-dihydro-5-oxo-1H-pyrazol-3-yl)amino carboxylic acid (1a-g) and 2- aminothio phenol.

Methods: The newly synthesized compounds were characterized by IR, ¹H-NMR, ¹³C-NMR, mass spectra & Elemental analysis. The newly synthesized compounds were screened for their Biological activity.

Keywords: Benzthozole, 2-amino thio phenol, Antibacterial and Antifungal activity, spectral data.

A study of Anti-Cancer Activity of *Ximennia americana* on MDAMB231 Cell line *In vitro* Cytotoxicity - Molecular Docking

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Abstract: The knowledge of the traditional plants in India is a collection over millennia by our ancient people. The scientific analysis is carried out all over in India since Vedic times (greater than 6000 BC), and are present in a group of herbal preparations of the Indian traditional health care system (Ayurveda) proposed for their valuable anti-cancer and other valuable properties. The present study deals with the two important on Akt2 protein because of its complex docking study. The plants which were subjected to phyto chemical analysis showed that 22 bioactive compounds are present in Ximennia americana. Two isolated compounds hesperidin and qurcetrins within the binding packet of Akt2 protein responsible for the breast cancer, a detailed molecular modeling study was carried out. The molecules were optimized at B3LYP/6-31g(d) level using Gaussian 09 suite of program. These compounds were docked with the on Akt2 protein to know the best binding site using various bio informatics software and tools. The interaction rate was determined by using molecular docking software between herbal compounds against on Akt2 protein based on binding free energy requirements. The results were analyzed and it showed that most of the herbal compounds were effective against the target proteins. Hence, this study will form the basis for designing therapeutic lead molecules from the traditional plants which could results into massive reduction in experimental validations and clinical trials. Also, it reduces the disease at much faster rate, as well as that it avoids the harmful side effects.

Keywords: Ayurveda, *Ximennia americana*, Akt2 protein, hesperidin and qurcetrins, Molecular docking software, Clinical trials, Therapeutic lead molecules.

Design, Synthesis and Anti-cancer Activity of 2-Amino-N-(4-(2-methyl-2H-tetrazol-5-yl)-3-(trifluoromethyl)phenyl)-2-phenylacetamide Derivatives

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Abstract: Tetrazoles are a class of heterocyclic compounds which are ubiquitous structural motifs of the most common heterocyclic compounds found in both natural products and biologically active compounds. Tetrazole derivatives exhibit remarkably a wide range of biological activities such as anti-inflammatory, anti-leukemic, antihypertensive, antipsychotic, vasodilatory, neurobehavioral disorders, cytotoxic, herbicidal, antiangiogenic and TNF- α inhibitor. In the present work,a new facile strategy was developed for the construction of 2-amino-N-(4-(2-methyl-2H-tetrazol-5-yl)-3-(trifluoro methyl) phenyl)-2-phenyl acetamide derivatives using sodium azide and nitrile compounds as starting materials and tributyltin as a catalyst in aqueous medium. To comprehend the efficacy of the synthesized derivatives, the anti-cancer activities of the compounds were also evaluated.

Keywords: Anti-Cancer, Heterocyclic Compounds, Tetrazole Derivatives, Tributyltin



Scheme 1:Synthesis of of 2-amino-N-(4-(2-methyl-2H-tetrazol-5-yl)-3-(trifluoromethyl)phenyl)-2-phenylacetamide derivatives.

Density and Refractive Index Studies on Tetrahydrofuran with Benzenes

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Abstracts: Densities and refractive indices have been measured for the binary mixtures of Tetra hydro furan (THF) with Benzene (B), Chloro Benzene (CB), Bromo Benzene (BB) and Nitro Benzene (NB) at 308.15K. From these results excess refractive indices (n^E) and excess molar refraction (R_m^E) have been calculated. The study concludes that, excess refractive indices parameters are positive and excess molar refraction parameters are negative.

Keywords: Density, refractive index, excess refractive indices and excess molar refraction,

THF, Benzenes

Synthesis and Anticancer Activity of Novel 3-(1-(4-(benzoyl)benzyl)-1H-indol-5-yl)-1,2,4-oxadiazol-5(4H)-one Derivatives

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Abstract: A novel class of 3-(1-(4-(benzoyl)benzyl)-1H-indol-5-yl)-1,2,4-oxadiazol-5(4H)-one derivatives has been synthesized. Structure-activity relationship studies revealed that attaching N-(4-methoxyphenyl)-4-methylbenzamide group to the 1H-indol-5-yl-1,2,4-oxadiazol-5(4H)-one ring significantly improved anticancer activity. Furthermore substitution of electron withdrawing groups such as chloro, fluoro, or cyano substitutions on 4- and 6-positions of the N-(4-methoxyphenyl)-4-methylbenzamide significantly improved metabolic stability. Some of the synthesized compounds showed improved *in vitro* activity compared to most of the current standard anticancer drugs such as rifampicin and isoniazid. Thus, substituted 3-(1-(4-(benzoyl)benzyl)-1H-indol-5-yl)-1,2,4-oxadiazol-5(4H)-one derivatives may serve as promising new class of anticancer agents.

Keywords: Anticancer, Rifampicin, Isoniazid, Electron withdrawing groups.



Synthesis and Biological Activity of N-((5 Phenyl-1, 3, 4 oxadiazol-2yl) methyl)thiazolo[5,4-b]pyridine 2 amine

PROCEEDINGS OF ACR-SDEP-2020

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Abstract: Pyridine Thiazoles are important class of heterocyclic compounds which were found to have potential biological active compounds and were found to possess diverse biological activity like antibacterial, antifungal, anti-tubercular and anti-inflammatory activities. On the other side 1,3,4 oxdiazole nucleus has been used into a wide variety of therapeutically important agents mainly showing antibacterial, antimicrobial, anticonvulsant, anthelmintics, insecticidal, analgesic. These reports prompted us to synthesise some new pyridine thiazole derivatives containing oxadiazole rings. It is an important attempt to prepare a new class of anti-bacterial agents and it is an efficient method for synthesis of N-((5 phenyl-1, 3, 4 oxadiazol-2yl) methyl) thiazolo[5,4-b]pyridine 2 amine. The products were obtained in a good yield and in high state of purity .And the structural assignments of the obtained compounds were based on their elemental analysis and spectral (I.R, ¹H NMR) data. The exploration of biological activities of these compounds is in progress.

Keywords: Heterocyclics, Pyridine, Thiazoles, Oxadiazole.

In-Vitro, In-Vivo and Toxilogical Evaluation Studies of Curcumine Loaded pH Dependent Sodium Alginate-g-Acryloyl Phenylalanine-Polyethylene Glycol Vinyl Ether Hydrogels

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Abstract: pH responsive interpenetrating polymeric network hydrogels (IPN-HGS) composed of natural polysaccharide (sodium alginate) macromolecules and ethylene glycol vinyl ether were designed by a facile free radical polymerization reaction. A hydrophobic drug curcumin was successfully loaded into these hydrogels by the in-situ method. The formulated Curcumin encapsulated hydrogels were well dispersed and shows good bioavailability in physiological buffer. The maximum percentage encapsulation efficiency found at 75%. The formation of graft copolymer (NaAlg-g-APA) and chemical structure of hydrogels as well as its chemical interaction with the drug molecules and polymer matrix were investigated by the FT-IR, XRD, TGA and DSC techniques. The surface morphology was explained by SEM. The *in-vitro* drug delivery profile was studied at pH 1.2 (stimulated gastric fluid) and pH 7.4 (intestinal condition) with 0.5% tween 80 dissolution medium at 37°C. *In-vivo* studies of the designed formulations (SAAE 4) revealed that significant superior action on cell death (compared to free curcumin). The results of acute and sub-acute toxicity experiments have supported the oral administration of these formulations. There is no toxicity observed in histopathological study. The in-vivo pharmacokinetic studies revealed that SLNs showed long circulation $(t_{1/2})$, better residence time (MRT) and low elimination rate (Kel) compared with pure drug solution. This study, testify that this formulation is suile for sustained release of the proposed drug.

Keywords: Hydrogel, Sodium alginate, Curcumin, Drug delivery, Pharmacokinetics.



Grafting Parameters of Essential Amino Acid Grafted Guar Gum and Synthesis of pH Responsive Hydrogels and Their Swelling and Network Studies

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Abstract: This study focuses on the synthesis of a new GG-g-PNPA graft copolymer by grafting reaction between guar gum and N-Acryloyl-L-Phenyl Alanine through free radical polymerization reaction. This grafting is confirmed by the FTIR spectroscopy studies. This work also deals with determinations of various grafting parameters like % grafting (%G), % grafting efficiency (%E), % conversion (%C), % yield (%Y), % Add on (%A), % Homo polymer (%H) and rate of grafting (Rg). The factors controlling graft copolymerization like concentration of monomer and initiator concentrations, reaction temperature and reaction time are discussed. The optimum conditions to get maximum grafting yield (188 %) and grafting efficiency (60.45 %) are evaluated at monomer concentration $(18.35 \times 10^{-2} \text{ mol/dm}^3)$; initiator concentration (26.32×10⁻² mol/dm³); Temperature (60 °C); and Time (180 min). The synthesis of GG-g-PNPAcl-(PHEA-co-PAMPSA) [GGHA] hydrogels and the structural, swelling and drug release properties of GGAH formulations are evaluated by the determination of various network properties. The maximum swelling capacity of GGHA hydrogels are found in pH 7.4 when compared to 1.2 pH solutions and distilled water. The swelling capacity of GGHA hydrogels is lowered with increasing concentration of salt solution and increasing valence of cation in the salt.

Keywords: Guar gum, Grafted parameters, Hydrogel, pH responsive, Network parameters.

Chitosan/Poly(Dimethylaminoethylmethacrylate-co-Hydroxyethylacrylate) Based Semi-IPN Hydrogels and Silver Nanocomposites: Synthesis, Evaluation of Amoxicillin Release Studies and Antibacterial Studies

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Abstract: Recently, increasing the interest on chitosan based biomaterials for wound dressings and drug delivery devises, and great deal of work has been dedicated to developing the new smart materials that can be deliver both pharmaceutically active molecules and metal nanoparticles. To take a closer look on this we have been developed different formulations of hydrogels and their silver nano particles along with the amoxicillin. Here, chitosan based poly(DMAEMA-co-HEMA) semi-IPN hydrogels were fabricated via free radical polymerization method using methylene bis acrylamide as cross linker and ammonium persulphate as an initiator. Afterwards, the resultant hydrogels were loaded with model drug amoxicillin alone and along with silver nanoparticles for in vitro studies like release of drug in simulated body fluid, and DNA cleavage studies. The samples obtained at different steps were characterized by FTIR, TGA, SEM, TEM and swelling studies. The swelling behavior study by gravimetric measurement indicates the extensive swelling in water and each constituent in the gel has significant effect on both the swelling and drug release rate. The in vitro drug release studies indicates the Higuchi model was best fitted for release data compared to Korsmeyer-Peppas's model. The hydrogels with amoxicillin derived silver nanoparticles shows better activity than individual amoxicillin (AMX) and silver nanoparticles. Similarly, the hydrogels with amoxicillin derived silver nanoparticles have better ability to cleave DNA than pure AMX and nano silver.

Keywords: Semi-IPNs, Hydrogels, Silver Nanocomposites, Drug Delivery, Antibacterial Studies, DNA Cleavage.



Antibacterial Dual Responsive Aminothiazole Based Copolymeric Nanogels for Controlled Release of Anti-HIV Drug

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Abstract: Dual responsive copolymeric poly(N-(2-aminothiazolyl) maleamic acid-co-Nisopropyl acrylamide) nanogels (PAMNI-NGs) produced from N-(2-aminothiazolyl) maleamic acid (AMA) and N-isopropyl acrylamide (NIPAM) via a simple free radical emulsion polymerization. The formations of PAMNI-NGs were confirmed by Fourier-transform infrared (FTIR) spectroscopy, dynamic light scattering (DLS), transmission electron microscopy (TEM) and atomic force microscopy (AFM). TEM, DLS, and AFM results showed that PAMNI-NGs are semi-spherical and are found to have the size of around 100 nm. Further, Zidovudine (ZDV), an anti-HIV drug was successfully loaded into the developed PAMNI-NGs using an equilibrium swelling method. The formation of PAMNI-NGs was investigated through FTIR, DLS, AFM and TEM analyses, while the ZDV loaded PAMNI-NGs were confirmed from FTIR and XRD studies. The encapsulation efficiency of ZDV is varied from 33 to 82%. The in vitro release studies of ZDV from the PAMNI-NGs were examined in different gastrointestinal tract pH conditions (pH 1.2 and 7.4) at 25° and 37 °C. The presence of aminothiazole functionality in the PAMNI-NGs also showed excellent antibacterial activity towards bacterial strains of Grampositive (Bacillus cereus) and Gram-negative (Escherichia coli). Therefore, the in vitro release and antibacterial studies revealed the efficiency of PAMNI-NGs towards site-specific drug delivery and antimicrobial applications, respectively.

Keywords: N-(2-aminothiazolyl) maleamic acid, *N*-isopropyl acrylamide, copolymer, nanogels, controlled release, antibacterial activity.



Synthesis and Characterization of Silver/Montmorillonite/Gelatin Bionanocomposites and their Antibacterial Asctivity

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Abstract: Silver nanoparticles (AgNPs) of montmorillonite/gelatine (MMT/Gltn) bionanocomposite were synthesized by using the chemical reduction method in the external and interlamellar space of montmorillonite (MMT) as a solid support at room temperature. AgNO₃, MMT, Gltn, and NaBH4 were used as the silver precursor, the solid support, the natural polymeric stabilizer, and the chemical reduction agent, respectively. MMT was suspended in aqueous AgNO₃/Gltn solution. The interlamellar space limits were changed (d-spacing = 1.24-1.54 nm); therefore, AgNPs formed on the interlayer and external surface of MMT/Gltn with daverage = 4.23-8.63 nm diameter. Characterizations were done using different methods, ie, ultraviolet-visible spectroscopy (UV), powder X-ray diffraction (X-RD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), and Fourier transform infrared spectroscopy (FTIR). Silver/montmorillonite/gelatin bionanocomposite (Ag/MMT/Gltn BNC) systems were examined. The antibacterial activity of AgNPs in MMT/Gltn was investigated against Gram-positive bacteria, ie, Staphylococcus aureus and methicillin-resistant S. aureus and Gram-negative bacteria, ie, Escherichia coli, E. coli O157: H7 and Pseudomonas aeruginosa by the disc diffusion method using Mueller Hinton agar at different sizes of AgNPs. All of the synthesized Ag/MMT/Gltn BNCs were found to have high antibacterial activity. These results show that Ag/MMT/Gltn BNCs can be useful in different biological research and biomedical applications.

Keywords: Gelatin, Montmorillonite, Silver, Bionanocomposite, Antibacterial activity



Fabrication of Carboxymethyl Chitosan/Sodium alginate Blend Microbeads for the Controlled Release of Valganciclovir Hydrochloride

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Abstract: This paper reports the fabrication of carboxymethyl chitosan (CMC)/sodium alginate (SA) microbeads by simple gelation technique for controlled release of valganciclovir hydrochloride (VHC) using glutaraldehyde as a crosslinker. The obtained microbeads were characterized by FTIR Spectroscopy, differential scanning calorimetry, thermogravimetric analysis, X-ray diffraction and scanning electron microscopy. Further, the swelling and drug release studies of the microbeads were investigated in both simulated intestinal fluid (pH 7.4) and gastric fluid (pH 1.2) at 37°C. Results illustrated that microbeads were influenced by the pH of test media. Hence the drug might be suitable for intestinal drug delivery. The drug release kinetics was analyzed by evaluating the release data using different kinetic models.

Keywords: Carboxymethyl chitosan, sodium alginate, microbeads, valganciclovir hydrochloride, drug delivery.

Montmorillonite/Sodium alginate/Poly(vinylpyrrolidone-co-vinyl acetate)/ Nanocomposite Beads as an Oral Extended Drug Vehicle: Intercalation and *In-vitro* Release of Glycopyrrolate

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Abstract: The aim of the present study was to fabricate nanocomposite clay beads based on sodium alginate/poly (vinylpyrrolidone-co-vinyl acetate)/montmorillonite (MMT) for controlled release of glycopyrrolate (GLY) drug by simple ionotropic gelation technique. The nanocomposite clay beads were obtained. In the present work we examine the beneficial effects of MMT mineral as drug carrier for GLY because clay minerals play a vital role in drug delivery applications. The developed micro beads were characterized by fourier transform infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), thermogravimetric analysis (TGA), X-ray diffraction (X-RD), energy-dispersive X-ray spectra (EDS) and scanning electron microscopy (SEM). The effect of MMT content on drug intercalation kinetics, drug encapsulation efficiency and the drug release of the nanocomposite beads were investigated. Drug release kinetics of intercalated GLY has been investigated in both simulated intestinal fluid (pH 7.4) and simulated gastric fluid (pH 1.2) at 37 °C and also various kinetic models (zero, first, Higuchi and Korsmeyer-Peppas) have been used to find out the drug release profile. The drug release studies suggested that controlled release of GLY from nanocomposite beads have been observed during in-vitro release experiments.

Keywords: Sodium alginate, Poly(vinylpyrrolidone-co-vinyl acetate), Montmorillonite, Nanocomposite clay beads, Glycopyrrolate.

Simple HPLC Method for the Determination of Cibenzoline Succinate in the Formulation Product

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Abstract: Cibenzoline is known to improve left ventricular diastolic dysfunction by reducing left ventricular pressure gradient. Cibenzoline also called (\pm) -2-(2,2-diphenylcyclopropyl)-2-imidazoline succinate, is generally used in stereo combination of R(+) and S(–) forms. Objective of this study was to develop a simple and accurate HPLC method for Cibenzoline and its impurities determination. RP-HPLC method was developed and chromatographic conditions are, sol-A (Milli-Q-Water pH 2.50 With OPA) and sol-B acetonitrile, gradient program (0min and 2min sol-B 10%, 6min and 21min sol-B 50%, 23min and 30min sol-B 10%), Inertsil ODS-2, 150 X 4.6 mm S-5 μ column, 1.0 mL / min flow rate, 20 μ L injection volume, 30 °C column oven temperature, diluent (Acetonitrile: Water (75:25)) were used. Three known impurities were well separated and resolution also more than 2.0 and good peak shape was achieved. Precision, linearity results were within the limits %RSD 2.0 for precision results and linearity correlation coefficient value more than 0.999. Recovery studies were carried out to evaluate the accuracy of the method and results were 98% to 103%. Optimized HPLC method was applied for drug substance and drug product analysis.

Keywords: Chromatography, RP-HPLC, Cibenzoline Succinate, Drug product analysis



Cibenzoline succinate



Acid impurity







Benzophenone

Cibenzoline Succinate and impurities

Development and Validation of Stability Indicating RP-HPLC Method For the Determination of Related Substances in Alprazolam Tablets Dosage Forms

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Abstract: This work is aimed to develop a stability indicating high performance liquid chromatographic method for the analysis of Alprazolam related compounds in pharmaceutical dosage forms. Separation was achieved ODS C_{18} (125 x 4 mm ID, 3µm) column using as gradient method. Here in this work mobile phase A is ammonium acetate buffer (pH 4.5) and mobile phase B is methanol respectively. The flow rate is 1.0 mL/ minute and detection wave length is monitored at 280nm. The method was validated for specificity, limit of quantification, limit of detection, linearity, accuracy, method precision, intermediate precision, robustness and stability. The LOQ values were experimentally verified by six injections of standard solutions of the impurities at the predicted concentrations at 4.0 µg/mL. Correlation coefficient of the all impurities is more than 0.99. All impurities meet the criteria for linearity of both the impurities and Alprazolam. The relative standard deviation of recovery obtained for impurities are not more than 10%. The results obtained in this study demonstrated that the present HPLC method is selective, linear, precise, rugged, and robust and stability indicating for the determination of related substances in alprazolam tablet dosage form.

Keywords: Alprazolam; RP-HPLC; Method Validation; Degradation products; Stability indicating method.

Validation of A Head Space Gas Chromatographic Method for the Determination of Ethylene Oxide Content in Dipyridamole API

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Abstract : To provide quality control over the manufacture of any API, it is essential to develop highly selective analytical methods. Gas chromatography with Head space (HSGC) is widely used for the determination of residual impurities and solvents in API's. In the current article we are reporting the development and validation of a rapid and specific Head space gas chromatographic (HSGC) method for the determination of Ethylene oxide in Dipyridamole API. The developed method was validated in terms of Specificity, Linearity, Precision, Accuracy, Limit of detection (LOD) and Limit of quantitation (LOQ) and Precision and Accuracy at LOQ. The developed method was utilized for the investigation of Ethylene oxide content in bulk drug. A single, rapid and highly selective HSGC method was developed and validated for the quantification of Ethylene oxide present in Dipyridamole API through an understanding of LOD,

LOQ, and nature of stationary phases of columns. In linearity study the correlation coefficient values observed were more than 0.99. The residue Ethylene oxide was determined in ppm levels also. The method was shown to be specific for Dipyridamole API and was applied successfully to monitor and control impurity level. Further to the validation study, three batches of Dipyridamole were analyzed for the content of Ethylene oxide and the results showed that the Ethylene oxide was absent in all the three batches. Hence, after studying the data obtained from the validation activity and analysis of three batches, this Method was applicable for the routine analysis of the Dipyridamole API in pharmaceutical industry.

Keywords: Ethylene oxide, Dipyridamol, Head Space Gas Chromatography, Method development, Method validation.

Spectrophotometric Determination of Riboflavin using Sodium Nitroprusside as Chromogenic Agent

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Abstract: A simple, sensitive and accurate spectrophotometric method has been developed for the determination of riboflavin in pure and pharmaceutical formulations. The method is based on the reaction of riboflavin with sodium nitroprusside in the presence of hydroxylamine hydrochloride and sodium carbonate to give an intense greenish yellow coloured species which absorb maximally at 445nm. Beer's law is obeyed in the concentration range of 0.94-7.52ppm with a coefficient of determination r^2 =0.9996. Statistical analysis of this method exhibited relative standard deviation of 1.28% with the limit of detection 0.564ppm and limit of determination 1.690ppm. The proposed method has been applied successfully for determination of riboflavin in pharmaceutical products and can be extended for the routine analysis in bulk drugs.

Keywords: Spectrophotometry, Riboflavin, Sodium nitroprusside, Chromogenic Agent

Spectrophotometric Determination of Labetalol in Bulk and Pharmaceutical Formulations

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Abstract: A new spectrophotometric method has been developed that is simple, accurate and reproducible for the determination of Labetalol (LBT). The present developed method is based on the formulation of charge-transfer complex between the drug LBT and 2,5-dichloro-3,6-dihydroxy cyclohexa-2,5-diene-1,4-dione (CAA) reagent, formed yellowish green complex. The complex was showed maximum absorbance at 430 nm against blank. The limit of detection and quantitation were 0.1540 mg/ml and 0.5128 mg/ml respectively. The influence of commonly used exipients on the determination LBT was studied. The linearity was observed between 6-32 μ g/ml. The results of analysis were validated by recovery studies, accuracy, precision, LOD, LOQ, robustness and ruggedness, which indicated that the present method can be successfully applied for the determination of LBT in bulk and pharmaceutical formulations.

Keywords: Spectrophotometric method, Labetalol, 2,5-dichloro-3,6-dihydroxy cyclohexa-2,5-diene-1,4-dione, Charge-transfer complex.

Spectrophotometric Determination of Metal Ions Using Organic Compounds

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Abstract: Organic analytical reagents are the carbon compounds capable of reacting quantitatively with metal ions resulting the formation of an insoluble complex or a stable color. Based on this of type reactivity, the reagents are broadly classified as gravimetric or calorimetric reagents. In either case, it is observed that the chelating properties of the organic compounds play a significant role. The complex forming reagents are required to possess the functional groups capable of coordinating with the metal ions concerned to form stable and colored metal complexes. A careful analysis of the different reports made in the literature on the use of organic compounds as inorganic analytical reagents suggest that, certain groups are specific for certain metals or groups of metals.

The facts mentioned above indicates that the presence of a coordinating group (>C=N-) together with the acidic grouping(-OH, -SH) seems to favor the reactivity of the compound with metal ions such as Copper, Cobalt, Nickel, Vanadium, Molybdenum, Uranium, Thorium, Ruthenium, Palladium Zirconium etc. Among the compounds possessing these characteristics, hydrozones or azomethines characterized by the presence of atomic group (>C=N-N<) seems to offer advantageous over other. A large number of such hydrozones find applications as spectrophotometric analytical reagents.

Schiff bases also possess similar atomic groupings as present in the hydro zones. These bases are characterized by the presence of >C=N- group capable of coordinating with the metal ions. Many poly-dentate ligands having delocalized orbitals gained importance because of their use as model compounds for biological systems. Schiff bases yielding bi-nuclear and bridged complexes occupy a special place in the spectrophotometric determination of metal ions.

Keywords: Spectrophotometry, Hydrozones, Azomethines, Metal Ions



Replacement of Injections with Biodegradable Pills

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Abstract: Biodegradable polymers are a specific type of polymer that breaks down after its intended purpose to result in natural byproducts such as gases (CO₂, N₂), water, biomass, and inorganic salts. These polymers are found both naturally and synthetically made, and largely consist of ester, amide, and ether functional groups. The capsule can be swallowed, and once it reaches the GI tract, the pH-sensitive coating dissolves, uncovering the small micro-needles. The drug is then released into these needles, which slowly inject it directly into the stomach lining. Thankfully, as there are no pain receptors in the GI tract, this process is painless. The prototype has been tested on pigs, where a needle-coated capsule containing insulin - the hormone required by diabetics that regulates blood sugar levels - was administered orally. The results showed that this insulin was successfully injected into the stomach lining, small intestine, and colon, and that there were no signs of tissue damage as the capsule moved through the digestive tract. Of particular interest was the fact the pigs' blood glucose levels decreased more rapidly after they were given insulin via the needle-coated capsule than when the drug was administered via subcutaneous injection, suggesting this new method may actually be more effective. The kinetics are much better, and much faster-onset, than those seen with traditional under-the-skin administration. This revolutionary form of drug delivery will be beneficial for vaccines, as well as antibodies required in cancer treatments and other autoimmune disorders such as Crohn's disease.

Keywords: biodegradable polymer, auto immune diseases, crohn's disease, lowered blood glucose level.

Stereolithography (STL) Machine used for 3D Printing Technology and it's Applications

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Abstract: Stereolithography (STL) machine is using for preparation of different types of 3D printing objectives and it's having wide range of new applications. Now we are going to discussing review on Stereolithography (STL) is an additive manufacturing 3D printing technology that converts liquid materials into solid parts, layer by layer, by selectively curing them using a light source. Stereolithography (STL) is preparing different types 3D materials, preparation method, speed, cost, and nature of objectives (degradable or not degradable in soil) and resolution of 3D printing for each specific application. However, 3D printing should never be seen as a standalone process, it is becoming an integral part of an integrated process of multiple systems to match the development of novel materials and new requirements of products. **Keywords:** Stereolithography (STL), 3D printing technology, liquid materials, solid parts, integrated process.

Graphical Abstract:



SLA and objective images



Mechanisam of curing materials

Synthesis, Characterization and Antimicrobial Activity of some Metal Complexes Derived from Thiazole Schiff Base (2, 5-Thiophene dicarboxylic acid-2-Thiophene Carboxylic amide)

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Abstract: As multidrug resistant pathogens are emerging, the search for novel potent drug candidates is ever going. Heterocycles are known by their broad spectrum of biological activities, so a search for a new drug from heterocycles can elevate the chance of success. The aim of this study was to obtain novel potent antimicrobial compounds. In line with this, 2, 6-Thiophene dicarboxylic acid-2-Thiophenecarboxamide and its complexes (Cu (II), Co (II), Zn (II), Pb (II) and Hg (II)) were synthesized, characterized, and evaluated against bacterial strains. The compounds were characterized by elemental analyses (C, H, N, and S), FT-IR, ¹H-NMR, ¹³C-NMR, UV-V, Mass spectra, and molar conductivity measurement. The results showed that the ligand is pentadendate, and the molar conductivity measurement indicates that complexes are electrolytic. Electronic spectral study showed octahedral and distorted octahedral geometry for the (Cu (II), Co (II), Zn (II), Pb (II) and Hg (II)) complex, respectively. The ligand and its complexes were screened against four bacterial strains using disk diffusion method. The result revealed that the Hg (II) complex showed more bioactivity than gentamicin against Staphylococcus aureus and Escherichia coli, while the Cu (II) complex is more active than the Zn (II) complex against Bacillus subtilis. Both (Cu (II), Co (II) Zn (II), Pb (II) and Hg (II)) complexes exhibit higher antibacterial activities than the free ligand.

Keywords: Schiff base, antimicrobial activity, 2, 5-thiophenedicarboxalic acid and 2-Thiophenecarboxamide, Metal complexes.





Synthesis, Characterization and Antimicrobial Activity of some Metal Complexes Derived from Thiazole Schiff Base (2-Thiophene Carboxamide-2, 6-DiaminoPyridine)

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Abstract: As multidrug resistant pathogens are emerging, the search for novel potent drug candidates is ever going. Heterocycles are known by their broad spectrum of biological activities, so a search for a new drug from heterocycles can elevate the chance of success. The aim of this study was to obtain novel potent antimicrobial compounds. In line with this 2-Thiophene Carboxamide-2,6-DiaminoPyridine and its complexes (Cu(II),Co(II) Zn(II), Pb(II) and Hg(II)) were synthesized, characterized, and evaluated against bacterial strains. The compounds were characterized by elemental analyses (C, H, N, and S), FT-IR, ¹H-NMR, ¹³C-NMR, MASS and UV-Vis spectra, and molar conductivity measurement. The results showed that the ligand is Hexa dendate, and the molar conductivity measurement indicates that complexes are electrolytic. Electronic spectral study showed octahedral and distorted octahedral geometry for the (Cu (II), Co (II) Zn (II), Pb (II) and Hg (II)) complex, respectively. The ligand and its complexes were screened against four bacterial strains using disk diffusion method. The result revealed that the Hg (II) complex showed more bioactivity than gentamicin against Staphylococcus aureus and Escherichia coli, while the Pb (II) complex is more active than the Zn (II) complex against Bacillus subtilis. Both (Cu (II), Co (II) Zn (II), Pb (II) and Hg (II)) complexes exhibit higher antibacterial activities than the free ligand.

Keywords: Schiff base, antimicrobial activity, 2-Thiophene Carboxamide-2, 6-DiaminoPyridine, Metal complexes.





Synthesis, Characterization and Antimicrobial Screening Studies of Some Metal Complexes of Novel Schiff Base of 2, 6-Diaminopyridine and 2, 5-Thiophenedicarboxalic Acid

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Abstract: Synthesis of Cu(II) ,Co(II), Zn(II), Pb(II) and Hg(II) complexes with Schiff base 2, 6-diaminopyridine and 2,5-thiophenedicarboxalic acid .Schiff base and its complexes were characterized by analytical data, elemental analysis, molar conductance, The structural investigation performed by UV-Vis, IR and ¹H NMR,¹³C ,Mass spectral techniques. Interpretation of elemental analysis shown 1:1 molar ratio of Schiff base with metal complexes. Molar conductance values indicate neutral nature of metal complexes. Antimicrobial activity Studied at different concentration (MIC method) by disc diffusion technique. Schiff base and the metal complexes found to be significant antibacterial and antifungal agents.

Keywords: Schiff base, antimicrobial activity, Metal complexes, 2, 6-diaminopyridine and 2, 5 thiophinedicarboxalic acid.



Antibacterial Effect of Indian Gooseberry (*Phyllanthusemblica L.*) Extract Against ESBL Producing Multi-Drug Resistant Bacteria

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Abstract: Indian gooseberry (Amla) is the most celebrating fruit in Ayurveda, Indian traditional medicine, for the prevention of numerous diseases. However, no reports on the prevention of multi-drug resistant (MDR) bacteria has lead us to design present study to evaluate phytochemical (total phenolics, flavonoids, tannins), antioxidant and antibacterial activities of methanolic extracts of seed and pulp parts of fresh and dried amla against MDR bacteria (Pseudomonas aeruginosa, Klebsiella pneumoniae, Staphylococcus aureus, Escherichia coli, Haemophilus influenza, Salmonella typhi) collected from tertiary care hospital. We observed higher levels of phenolics in amla with elevated levels of antioxidant activities. Amla scavenged the DPPH, -OH, H₂O₂, superoxide and nitric oxide radicals at very lower concentrations. Kirby-Bauer's disk diffusion used for antibacterial activities of extracts and observed moderate growth inhibitory activity against all multidrug resistant bacteria as compared with standard drug, cefotaxime. The minimum inhibitory concentration (MIC) and minimum bactericidal activity (MBC) values of fresh and dried amla were found to be 50 µg GAE/gm and 60 µg GAE/gm, respectively. The main compounds shown by LC-MS are trigonelline, naringin, kaempferol, embinin, epicatechin, isorhamnetin and quercetin. It is concluded that Indian gooseberry inhibited the growth ESBL produced multi-drug resistant bacteria with their high antioxidant potential.

Keywords: Indian Gooseberry, *Phyllanthusemblica L.*, Bacteria, Multi-Drug Resistant, MIC.

Spectrophotometric Determination of Heavy Metal Impurities in Ayurvedic and Pharmaceutical Medicines

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Abstract: Heavy metals like Hg, Cd, Pb, Cu, Ni etc., are significantly toxic. Though heavy metals are toxic they are used as catalysts to produce the medications. In the formulation of ayurvedic medicine the metals are used as their bhasma, churna etc. So the determination of heavy metals in some ayurvedic medicines is considered as an important activity using simple analytical method like Spectrophotometry. 2-Acetylthiophene benzoylhydrazone (ATBH) is described as a chromogenic reagent. A new spectrophotometric method is developed for the determination of mercury using ATBH in aqueous medium. ATBH gives an yellow coloured complex with mercury in sodium acetate, acetic acid buffer medium (pH 6). The molar absorptivity and Sandell's sensitivity are 1.5 x 10^4 Lmol⁻¹ cm⁻¹ and 0.134 µg cm⁻² respectively and composition of the complex is 1:2 (M:L), stability constant is found to be 2.1 x 10^{13} . The new method is successfully employed for the determination of mercury in ayurvedic medicines viz. Sidhamakaradhwaj, panchabanaras, vasanthakusumakaram and in greens and vegetables. The results are compared with standard dithizone method.

Keywords: Avurvedic medicines, Mercury(II), Spectrophotometry, 2-Acetylthiophene benzoylhydrazone.



Removal of Rhodamine 6 G Dye Using Litchi Peel

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Abstract: Litchi chinensis peel was used as an adsorbent to remove Rhodamine 6 G. The characteristics of the adsorbent were characterized by Scanning Electron Microscope, Energy Dispersive X- ray Spectroscopy, XRD and Fourier Transform Infrared techniques. Adsorption of Rhodamine 6 G was studied using various parameters such as initial concentration, contact time, dosage of biosorbents, temperature, initial pH value and synthetic waste water treatment were investigated to find out the optimum adsorption conditions. Equilibrium adsorption data followed Langmuir isotherm and second order rate kinetics. The Langmuir adsorption capacity (Q_o) was found to be 6.666 mg/g of the adsorbent. From the Dubinin-Radushkevich isotherm model the mean free energy (Ea) was found to be 50 kJ/mol and Qm 26.703 mg/g. Thermodynamic parameters such as ΔG° , ΔH° , and ΔS° were calculated and found that the Rhodamine 6 G adsorption on to *Litchi chinensis* peel was exothermic and spontaneous in nature.

Keywords: Rhodamine, Litchi chinensis, waste water, Adsorption Isotherm and Kinetics

Geen Synthesis of Silver Nanocomposite Cotton Fabrics Using Achyranthes Aspera Leaf Extract as a Reducing Agent by In Situ Generation Method

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Abstract: The green route biological synthesis of metal nanoparticles (MNPs) and metal nanocomposite materials have been attracted with wide scope of interest owing to its intrinsic features such as simple, low cost and ecofriendly nature. Generally, the synthesis of nonbiodegradable composite polymers is leading to many environmental problems. So, the present day researchers are shifting towards environmentally benign methods for the synthesis of MNPs such as biomolecular reduction methods utilizing botanical plant species parts like leaves, stem, peel and root etc. The earlier methods employed for the synthesis of polymer matrices are leading to environmental problems and inferior properties. To overcome this, now, the researchers are utilizing in situ generation method. Hence, the authors in the present work synthesized silver nanoparticles (AgNPs) in cellulose cotton fabrics using Achyranthes aspera (A. aspera) leaf extract as a reductant by in situ generation method. The synthesized silver nanocomposite cotton fabrics (Ag-NCFs) were characterized by Scanning electron microscopy (SEM) along with Energy dispersive X-ray (EDX), X-ray diffractometer (XRD), Fourier transform infrared spectra (FTIR), Thermogravimetric (TG) Derivative thermogravimetric (TG) and Differential Scanning Calorimetry (DSC) analysis. The SEM analysis revealed that the average size of formed AgNPs was found to be 87nm. The FTIR spectra revealed that hydroxyl functional group present in A. aspera leaf extract constituents involved in bioreduction. The Face centered cubic lattice crystalline structure of the formed AgNPs was confirmed by XRD. TG-DTG & DSC analysis was carried out to study the catalytic effect of generated Ag-NCFs on thermal degradation. The Ag-NCFs exhibited good mechanical properties such as tensile stress and strain. The Ag-NCFs inhibited the growth of pathogenic bacteria i.e., Staphylococcus aureus and *Klebsiella pneumonia*. The *in situ* generated Ag-NCFs can be considered in medicine for making bandage cloths, napkins, hospital beds etc., and packing applications.

Keywords: Geen Synthesis, Silver Nanocomposite, Cotton Fabrics, Achyranthes Aspera Extract.

Synthesis and Biological Evaluation of Certain Pyrazoline Clubbed 1,3-Thiazolone Derivatives Bearing Thieno[2,3-d] Pyrimidin Core Unit

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Abstract: A series of new substituted fused Thiazolo-pyrazoline scaffold derivatives containing Thieno [2, 3-*d*] Pyrimidine Nucleus derivatives were synthesized. The newly synthesized compounds were characterized by IR, ¹H NMR, ¹³C NMR and mass spectral data. The targeted compounds were synthesized in good to excellent yield (75-88%). All the newly synthesized derivatives were screened for antibacterial activity against Staphylococcus aureus, Bacillus subtilis (gram positive bacteria), Escherichia coli, Pseudomonas aeruginosa (gram negative bacteria) and antifungal activity was carried out against Candida albicans and Aspergillus niger.. **Keywords:** Thieno [2, 3-*d*] Pyrimidine, pyrazoline; thiazolone; Biological evaluation



R = -Phenyl, -4 Methyl phenyl, -4 Methoxy phenyl, -4 tri fluoro methoxy phenyl, -4 Tri fluoro phenyl, -4 Nitro phenyl, - pyrazin-2-yl, - pyridin-4-yl, Thiophene 2-yl, Furan-2-yl acetyl groups. Scheme: Synthetic path way of preparation of Novel Thiazolo-pyrazoline scaffold derivatives containing Thieno [2, 3-d] Pyrimidine Nucleus (6 a-j). Reagents and Reaction conditions: (a) *DMF*,*POCl*₃,80^oC,4hrs (b) *NaOH*, *Ethanol*, *RT*, 24 hrs (c)Thio semi carbazide , *Ethanol*, *NaOH*, *Reflux*, 2hrs (d) *Ethyl bromo acetate*, *Ethanol*, reflux.



A New Bilayer Thin Film Counter Electrode for Efficient Dye Sensitized Solar Cells

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Abstract: In this paper, we propose an efficient and new bilayer thin film CE, PEDOT:PSS/SWCNH and investigated their electro-catalytic ability for dye sensitized solar cells (DSSCs). The bilayer thin film CE was prepared using simple spin coating process. The electrocatalytic ability of spin coated bilayer CE's, PEDOT:PSS/SWCNH, was analyzed using atomic force microscopy (AFM), cyclic-voltammetry (C-V), electrochemical impedance spectrophotometer (EIS) and Tafel tools. The results revealed faster catalytic reduction of Γ_3 to Γ with improved electrolyte-catalytic performance and low charge transfer resistance at interface of electrolyte/CE for PEDOT:PSS/SWCNH CE. The DSSC's fabricated using bilayer thin film PEDOT:PSS/SWCNH CE's showed an improved efficiency of 5.1 % and is comparable with standard Pt CE (5.53 %).

Keywords: Solar Cells, PEDOT, DSSC, Cyclic-voltammetry

Synthesis and Antibacterial Activity of Novel (4-Fluorophenyl) (4-(Naphthalen-2-yl)-6-Aryl-2-Thioxo-2,3-Dihydropyrimidin-1(6*H*)-yl) Methanone Derivatives

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Abstract: Pyrimidine-based organic materials represent a significant class of compounds, which acquired special attention in heterocyclic chemistry. Pyrimidine occupies an important position in the field of medicinal chemistry due to a variety of pharmacological and biological activity of its derivatives. On one hand, pyrimidine and its derivatives possess significant antibacterial, antifungal, anthelmintic, anticancer, and antitumor activity. Pyrimidine is another important nitrogen containing heterocycles, which has various drug-related properties and have attracted extensive investigation for small molecule drug discovery.

A novel series of (4-fluorophenyl)(4-(naphthalen-2-yl)-6-aryl-2-thioxo-2,3dihydropyrimidin-1(6*H*)-yl) methanone derivatives were synthesized from reaction of 6-(naphthalen-2-yl)-4-aryl-3,4- dihydropyrimidine-2(1*H*)-thiones with 4-fluorobenzoylchloride in dichloromethane in the presence of triethylamine. The synthesized compounds were screened for antibacterial activity against Gram positive bacteria, namely, *Staphylococcus aureus* ATCC25923 and *Listeria monocytogenes* MTCC657, and Gramnegative bacteria, namely, *Escherichia coli* ATCC25922 and *Klebsiella pneumoniae* ATCC700603, respectively. Some of the tested compounds showed significant antimicrobial activity.

Keywords: Synthesis, Antibacterial Activity, Pyrimidine, Medicinal Chemistry



Design and Synthesis of Cyanoacetamide Derivatives of *Aloe*-Emodin, A Biologically Privileged Natural Product

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Abstract: Natural products continue to provide useful drugs or templates for the development of medicinally important compounds¹. *Aloe*-emodin is the major anthraquinone in plants and possesses antibacterial, antiviral, hepatoprotective, anticancer, laxative, and anti-inflammatory activities². *Aloe*-emodin is also reported to have weak AChE inhibition activity³. Hence, in search of new rationally designed inhibitors for the treatment of AD, we designed and synthesized a series of *aloe*-emodin and cyanoacetamide hybrids to assess as multifunctional agents against AD. A series of fifteen *aloe*-emodin derivatives were synthesized starting from *aloe*-emodin and ethylcyanoacetate. The alcoholic hydroxyl of *aloe*-emodin (1) was first oxidised into formyl group (2) in anhydrous DCM under the catalytic action of PCC at RT. As required, N-substituted cyanoacetamide derivatives (**5a-o**) were prepared by treating ethylcyanoacetate (**3**) in EtOH with alkyl/benzyl amines (**4a-o**) at RT. Finally, the substituted cyanoacetamides (**5a-o**) were reacted with **2** via Knoevenagel type condensation in refluxing EtOH using Et₃N as base to obtain target compounds (**6a-o**) in fair yields.



Biological evaluation of target compounds to prove as MTDLs against AD is under progress. **Keywords:** Cyanoacetamide, Aloe-Emodin, Natural Product, AChE inhibition activity **References**

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Isolated Natural Products of *Cassia Occidentalis:* as Inhibitors of α-Glucosidase

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Abstract: Diabetes Mellitus is a group of diseases marked by high levels of blood glucose resulting from defects in insulin production, insulin action, or both. The disease is often associated with obesity, hypertension, and increased risk of cardiovascular disease. Globally, diabetes is the fourth leading cause of death by disease. Indians are more prone for diabetes than almost any other population in the world, Calling India the diabetes capital of the world. One intriguing approach to control diabetes could be its prevention and treatment by phytochemicals that improve postprandial glycemic control and reduce postprandial hyperglycemia. Many plants Species are reported to have α -glucosidase inhibitory activities. Synthetic and naturally derived compounds are also known to reduce postprandial hyperglycemia by inhibiting α -glucosidase.

Nowadays, despite remarkable advances in synthetic pharmaceutical chemistry, natural products continue to play a highly significant role in drug discovery. Within the most successful drugs on the market, small molecules of natural origin have occupied a prominent position. In this context, the following compounds are isolated from the Cassia occidentalis using simple chromatographic techniques to test as inhibitors of α -glucosidase as potential treatment of Diabetes Mellitus.

Keywords: Diabetes Mellitus, α-glucosidase, Cassia occidentalis

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Renewable Energy Production by the Study of Acoustical Properties in Liquid Mixtures of Arenes at Different Temperatures

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Abstract: The wafer film of organic liquid mixture of arenes (aniline with mesitylene) laid on the solar panel generates energy in solar cells, which are widely using renewable energy resources. Acoustical studies have been made in aniline liquid mixtures at temperatures T= (303.15, 308.15, 313.15 and 318.15 K) over the entire mole fraction range. Aniline is useful in the production of intrinsically semiconducting materials. The results arrived at in the comparison are discussed in terms of intermolecular interactions.

Keywords: Liquid Mixtures, Acoustical studies, Aniline, Arenes.

Sustainable Natural Adsorbents for the Removal of Heavy Metals from Wastewater

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Abstrat: Environmental and global changes especially with the onset of industrialization and urbanization, mankind has been witnessed various environmental issues in the society. This progress in industrialization and urbanization have not only brought development but eventually threatened the ecosystem. One such problem is discharging wastes containing heavy metals into the water resources. Heavy metals, unlike organic pollutants are not susceptible to biological degradation. Effluents from large number of industries viz., leather, electroplating, paint, textile, pigment & dyes, mining, smelting, petroleum refining, wood processing, photographic film production etc., contains significant amount of heavy metals in their wastewater. The presence of heavy metals such as copper, nickel, chromium, lead, zinc, arsenic, cadmium, selenium and uranium is of major concern due to their toxicity to humans and other living systems. So far, a number of conventional methods have been utilized for the removal of heavy metals such as chemical precipitation, ion exchange, membrane separation, coagulation, ultrafiltration etc. However these methods have several disadvantages like high reagent requirement, incomplete metal removal, highly expensive, generation of toxic sludge and energy extensive etc. Adsorption process being very simple, cost effective, sustainable and versatile has been preferable method for the abatement of heavy metal pollution from waste water. This paper reviews the use of various readily available low cost natural materials as adsorbents of heavy metals from waste water. Various natural adsorbent materials include zeolites, activated carbon, chitosan are found to be effective for the removal of heavy metals. Besides, agricultural wastes like tea leaves, rice husk, fruit peels, nut shells, red mud etc have been explored for their potent removal of toxic heavy metals from waste water. The recent developments and the future scope for adsorption as a wastewater treatment option are discussed.

Keywords: waste water, heavy metal removal, adsorbents, low cost, natural material

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Reduced graphene supported Au_{core}-Pd_{shell} bimetallic nanoparticles (Au@Pd BMNPs/rGO) catalyzed Suzuki reaction in WEPA

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Abstract: Biaryls (**3**) are the constituent units of several natural, pharmaceutical, energy based, paints and special chemical compounds. Despite the difficulty in their construction, we have recently observed the synthesis of biaryls from aryl bromides/aryl iodides (**1**) and arylboronic acids (**2**) (Suzuki reaction) using reduced graphene supported Au_{core}-Pd_{shell} bimetallic nanoparticles (Au@Pd BMNPs/rGO) as heterogeneous catalyst in water extract of pomegranate ash (WEPA) (**Scheme**). This method uses the agro-waste derived media with an absence of toxic ligands like phosphenes. The wide substrate scope, reusability of the catalyst (up to three cycles), utilization of waste, exploration of aqueous media, high to nearly quantitative yields of biaryls, easy separation of products and feasibility to conduct the reaction at ambient aerobic conditions are noteworthy developments of this study.

Keywords: Reduced Graphene, Au_{core}-Pd_{shell}, Suzuki Reaction, Water Extract of Pomegranate Ash



Scheme: Au@Pd BMNPs/rGO catalyzed Suzuki reaction in WEPA.