

1st International Web Conference on “Advances in Materials Sciences & Applied Biology”
on 27-28th January 2022



Rajat Shikshan Sanstha's,

Dr. Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burla), Dist. Sangli (MS) India

Reaccredited by NAAC at "A" Grade with (CGPA of 3.02)

Affiliated to Shivaji University, Kolhapur

Organizes

1st International Web Conference on
"Advances in Materials Science & Applied Biology"
(ICAMSAB - 2022)



ABSTRACT BOOK

27th and 28th January, 2022

Google Meet Platform



ICAMSAB-2022



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PREFACE

It is our pleasure to welcome you to the 1st International Web Conference on Advances in Material Science and Applied Biology (ICAMSAB-2022) in Dr.Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burli). Aims and objectives of it is to bring academic scientists, researchers together to exchange and share their experiences and research results about most aspects of science and material science research, and discuss the practical challenges encountered and the solutions adopted.

We hope you will have a technically rewarding experience, and use this occasion to meet old friends and make many new ones. ICAMSAB 2022 promises to be both stimulating and informative with a wonderful array of keynote and invited speakers from all over the world. Delegates will have a wide range of sessions to choose from and will have a difficult decision in deciding which sessions to attend.

The program consists of invited sessions, and poster presentation, oral presentations and discussions with eminent speakers covering a wide range of topics in materials science and applied biology. This rich program provides all attendees with the opportunities to meet and interact virtually with one another. We hope your experience with ICAMSAB 2022 is a fruitful and long lasting one. With your support and participation, the conference will continue its success for a long time.

We would like to thank the organization staff, the members of the program committees and reviewers. They have worked very hard in reviewing papers and making valuable suggestions for the authors to improve their work. We also would like to express our gratitude to the external reviewers, for providing extra help in the review process, and the authors for contributing their research papers to the conference. Special thanks go to International Journal of Research and Analytical Reviews.

We wish all attendees of ICAMSAB-2022 an enjoyable scientific gathering in Dr.Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burli). We look forward to seeing all of you at the conference.

With regards

Editorial team
ICAMSAB 2022



*Education is the most powerful weapon which
you can use to change the world...*



*Padmabhushan Dr. Karmaveer Bhaurao Patil
Founder of Rayat Shikshan Sanstha*



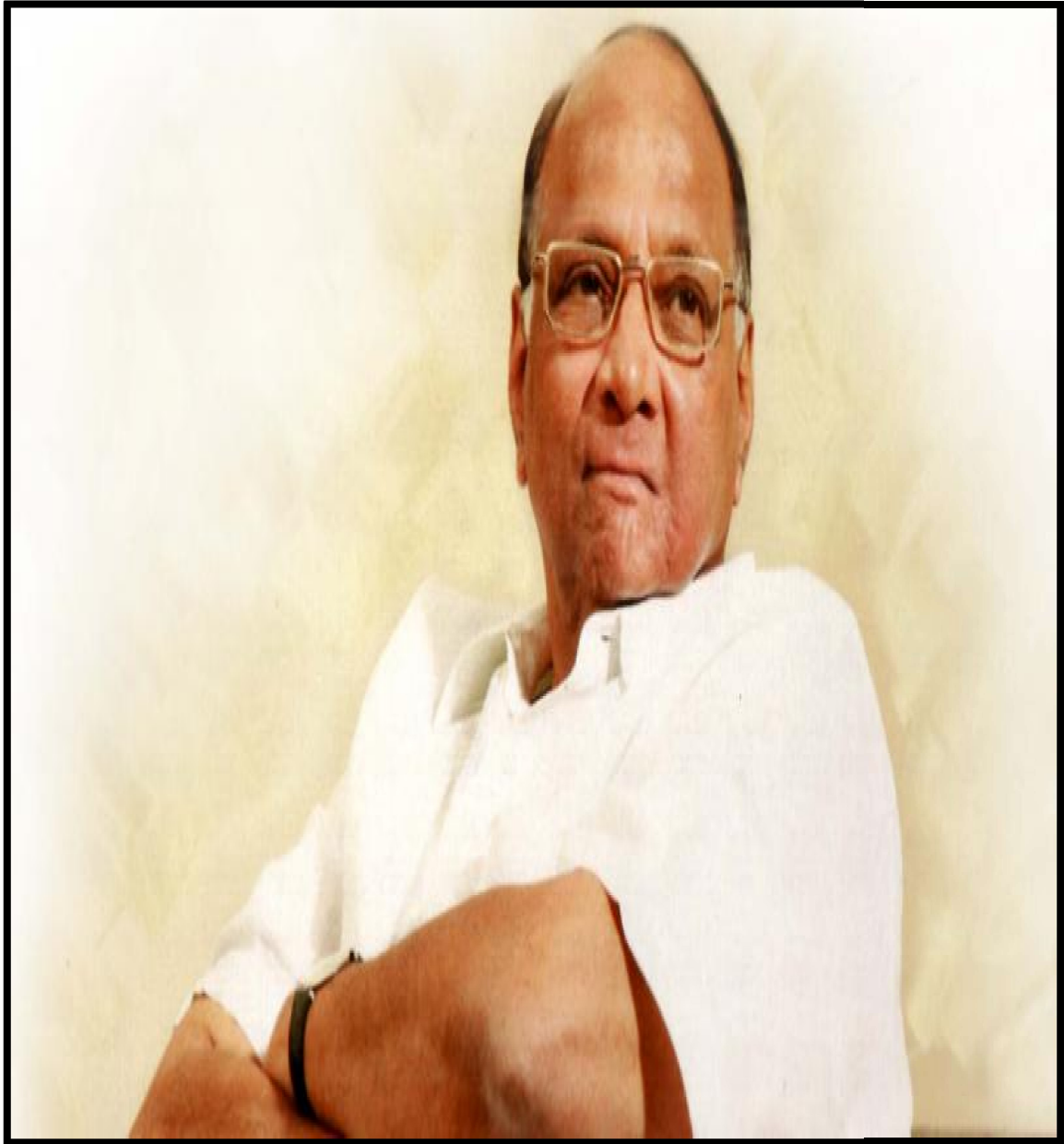
Tribute to

Hon. Padmabhushan, Karmaveer Dr. Bhaurao Patil

Founder, Rayat Shikshan Sanstha, Satara.

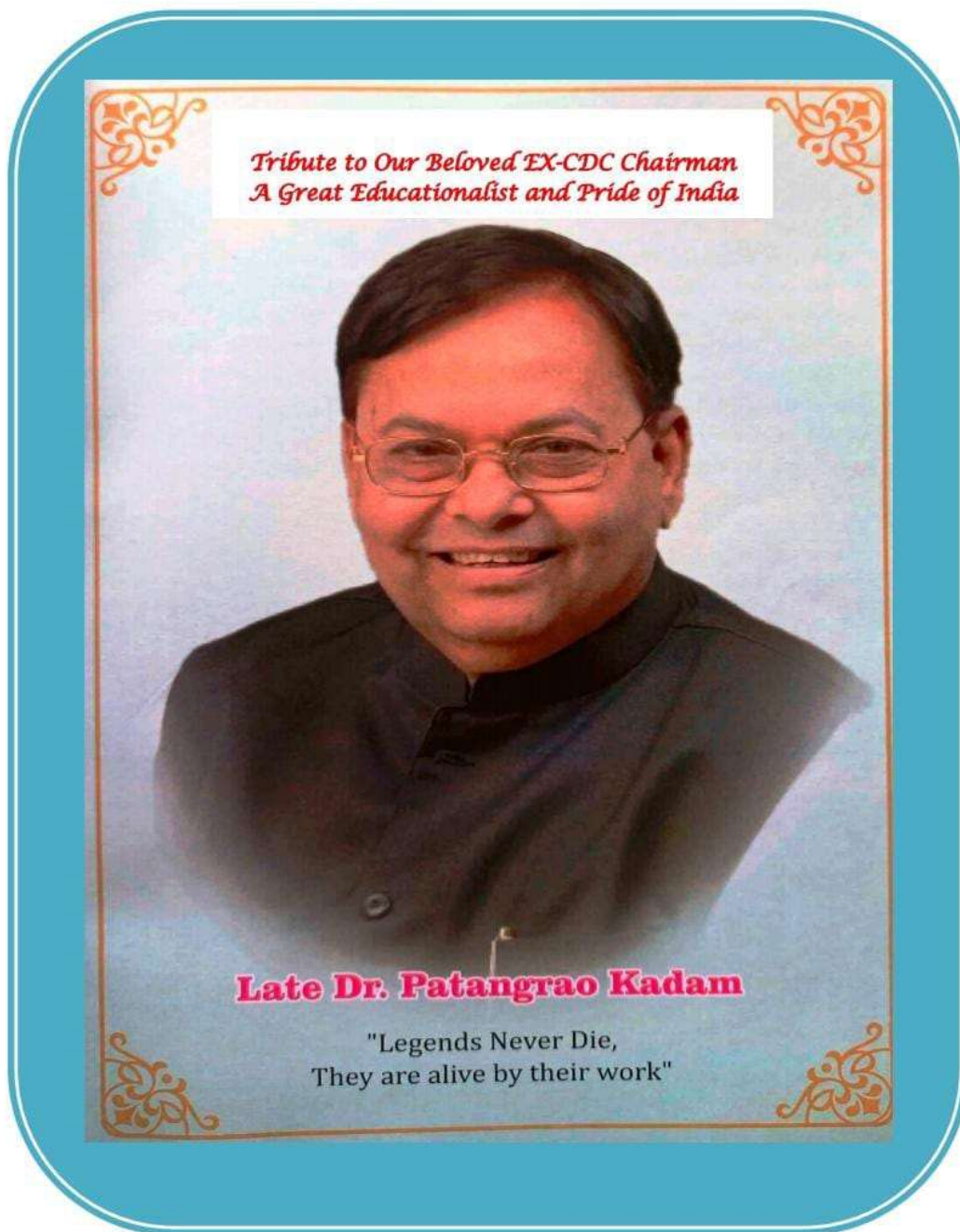


Our Beloved...



Hon. Mr. Sharadchandraji Pawar Sahel
President, Rayat Shikshan Sanstha, Satara





Tribute to

Hon. Late Dr. Patangraoji Kadam Sahel





Prof. Dr. Shivajirao Kadam
Chancellor M.Sc., Ph.D.

Prof. Dr. M. M. Salunkhe
Vice Chancellor M.Sc., Ph.D., F.R.S.C.

Bharati Vidyapeeth
(Deemed to be University)
Pune, India.

Founder Chancellor : Dr. Patangrao Kadam

★ Accredited with 'A⁺' Grade (2017) by NAAC ★
★ Category-I University Status by UGC ★
★ NIRF Ranking - 63 ★

"Social Transformation Through Dynamic Education"



Dr. Vishwajeet Kadam
Pro Vice Chancellor B.Tech., M.B.A., Ph.D.

G. Jayakumar
Registrar M.Com., Dip. Pub. Adm.

MESSAGE



I am indeed very happy to know that the Rayat Shikshan Sanstha's Dr. Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burla) is organizing its 1st Web International Conference on "Advances in Material Science and Applied Biology" on 27th - 28th January, 2022.

The theme identified for this Web Conference is very important. Currently a great deal of research is being done on it at both national and international levels.

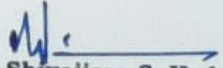
I am sure, the discussion and deliberations in this Web Conference in which the national and international experts are participating will stimulate further the research work and interest in the subject of both the participants and others.

This tool of Web Conference is very useful in the sense that it makes it possible to have involvement of scholars from different parts of the country, as well as from abroad.

I greatly appreciate the interest taken by the Principal, his fellow professors and the organizing committee of the Conference.


I am sure and I do hope that participants, as well as others will be immensely benefitted by the intellectually rich deliberations in the Conference.


My best wishes for the success of event.



Prof. Dr. Shivajirao S. Kadam
Chancellor



1st International Web Conference on “Advances in Materials Sciences & Applied Biology”
on 27-28th January 2022

Celebrating

and Beyond
BHARATI VIDYAPEETH
: SECRETARY
Dr. VISHWAJIT KADAM M.L.A.
B.E. (Comp), M.B.A., Ph.D.

“Social Transformation Through Dynamic Education”

Bharati Vidyapeeth
Bharati Vidyapeeth Bhavan, L. B. S. Marg, Pune - 411 030
(DONATIONS ARE EXEMPTED FROM INCOME-TAX VIDE NO. P 165/B-40)


: FOUNDER :
Dr. PATANGRAO KADAM
M.A., LL.B., Ph.D.

MESSAGE

Dr. Vishwajit Kadam
Secretary, Bharati Vidyapeeth
Pro Vice Chancellor,
Bharati Vidyapeeth (Deemed to be University)
Pune

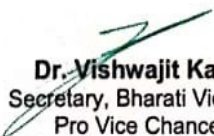


It is mandatory for the educational Institutions to provide a platform to the intellectuals to come together to discuss the issues concerning the society. I am happy to note that Dr. Patangrao Kadam Mahavidyalaya, Ramanandnagar, (Burli) makes constant endeavour to fulfill this mandate.

Every year, it organizes various academic events including conferences and seminars. It is in that tradition that this College is now organizing its first Web Conference on, “Advances in Materials Science and Applied Biology” (ICAMSAB – 2022) between 27th & 28th January, 2022. The theme for the web conference is innovative technologies in material science. I hope and trust that it would provide a forum for Scientists, researchers and students to present and discuss the achievements, share experiences and propose new and innovative ideas in the field of material sciences. I am sure that the main theme and sub themes will be widely discussed in the conference and this will be helpful to the delegates in upgrading their knowledge.

I congratulate the members of the Organizing Committee, the Principal, faculty and students for their initiative and striving efforts in organizing this event and wish the web Conference a grand success.

With best regards,


Dr. Vishwajit Kadam
Secretary, Bharati Vidyapeeth
Pro Vice Chancellor,
Bharati Vidyapeeth (Deemed to be University), Pune



ICAMSAB-2022



प्रा. (डॉ.) डी. टी. शिर्के
एम.एससी., पीएच.डी.
कुलगुरु
Prof. (Dr.) D.T. Shirke
M.Sc., Ph.D.
Vice-Chancellor



Estd. 1962
NAAC 'A++' Grade
शिवाजी विद्यापीठ,
विद्यानगर, कोल्हापूर - ४१६ ००४.
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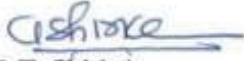
MESSAGE

It gives me immense pleasure to know that the 1st International Web Conference on "Advances in Material Science and Applied Biology" (ICAMSAB-2022) is being organized by Rayat Shikshan Sanstha's Dr. Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burla) on 27th and 28th January, 2022.

It is the need of hour to explore the new avenues of Research and Development through academics in the traditional and applied science subjects. To achieve this, one has to keep tap of the research going on at the global platforms. I am sure that this web conference will focus and succeed in achieving this goal and enrich the participants with the latest knowledge in the sector motivating them to explore the new areas of research.

I extend my heartiest greeting for the success of the conference and to the souvenir of abstracts as well.

18 JAN 2022


(D.T. Shirke)
Vice-Chancellor



प्रा. (डॉ.) पी. एस. पाटील

एम.एस्सी., पीएच्.डी.

प्र-कुलगुरू

Prof. (Dr.) P. S. Patil

M.Sc., Ph.D.

Pro-Vice-Chancellor



Estd. 1962
NAAC 'A++' Grade

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MESSAGE

I am very happy to know that the Rayat Shikshan Sanstha's Dr. Patangrao Kadam Mahavidyalaya, Ramanandagar (Burla), affiliated to Shivaji University, Kolhapur is organizing the 1st International Web Conference on “Advances in Materials Science and Applied Biology (ICAMSAB-2022)” during 27 - 28 January 2022. The scientific conferences are important because they provide opportunities to meet people, exchange or develop ideas, new strategies to approach your research, establish collaborations, getting suggestions about your work, and get inspired from the leading scientists working in important areas of research. In the international conference, various renowned scientists, academicians and researchers will present informative lectures on various leading topics on the theme of the conference. They will also exchange their excellent ideas for scientific collaboration in different disciplines connected with theme of the conference. I am sure that the conference will prove to be a rewarding experience for researchers, faculties as well as to the students. I congratulate the organizers for their efforts in organizing the International Conference and I wish the conference a grand success.

Date: 21 /01/2022

(Prof.P.S.Patil)
Pro-Vice-Chancellor





Dr. Anil Appasaheb Patil

M. B. B. S.
Chairman, Rayat Shikshan Sanstha, Satara

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~Message~

It gives me an immense pleasure to know that the 1st “International web Conference on Advances in Materials Science and Applied Biology” (ICAMSAB- 2022) is being organised by Rayat Shikshan Sanstha's, Dr Patangrao Kadam Mahavidyalaya Ramanandnagar (Burla) on 27th and 28th January, 2022.

It is indeed a need of hour to explore this new avenues of Research and Development through Academics in the Traditional and Applied Sciences subject to achieve this one has to keep Tab on the research going on the Global platform. I am sure that this web conference will focus and succeed in achieving this goal and reached the participants with the latest knowledge in the sector motivating them to explore the new area of research. I congratulate the team for organizing such an International web Conference.

I extend my greatest greetings for the success of this conference.

Dr. Anil Patil,
Chairman,
Rayat Shikshan Sanstha, Satara

Satara
January 21st, 2022

Rayat Shikshan Sanstha, Ravivar Path, Poinaka, Satara





SECRETARY'S MESSAGE

I am very glad to know that Rayat Shikshan Sanstha's Dr. Patangrao Kadam Mahavidyalaya Ramanandnagar (Burla) going to organize 1st International web Conference on “Advance in Materials Science and Applied Biology” (**ICAMSAB-2022**) on 27th and 28th January, 2022.

I appreciate the efforts of organising committee for organizing such an international conference which is focused on innovation technologies in materials science. I hope that the conference would help to developing innovation and desire role shaping the young researchers mind.

I congratulate the organizers for their efforts to bring researchers together on this platform. I wish all the participants to actively take part in conference, and trust that they will have the opportunity to acquire knowledge and share their ideas.

I also congratulate and wish the organizers to make the event grand success.

Secretary,

Rayat Shikshan Sanstha, Satara.





JOINT SECRETARY'S MESSAGE

It gives me immense pleasure that The Rayat Shikshan Sanstha's Dr. Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burli) is organizing 1st International Web Conference entitled “Advances in Materials Science and Applied Biology” (ICAMSAB-2022)” from 27th to 28th January, 2022. I am sure that this conference will provide platform to have constructive deliberations between experts, participants and students. Research in Science and Technology is the most critical and important factor that contributes to the progress of the society. It can improve standard of living in multiple ways and help to promote research culture and development of scientific temper among budding researchers. I congratulate the Principal and Organizing Committee for their efforts in organizing this International Conference. I wish the International Conference all the success and offer my best wishes to the participants.

Dr. Pratibha Gayakwad

Joint Secretary,

Rayat Shikshan Sanstha, Satara





PRINCIPAL'S MESSAGE

Our college was established in 1968 to impart quality education to the rural, backward and downtrodden class of society with a well-equipped infrastructure. The college offers Program's leading to Bachelor of Arts, Science & Commerce and post graduate program in the subject of Analytical Chemistry, History and English. It give me a great pleasure to convey you that our college is hosting its 1 st International web Conference in the subject of “Advances in Materials Science and Applied Biology” (ICAMSAB-2022) on 27th & 28th Jan. 2022. This platform will bring together, academicians, eminent researchers from all over the globe for exchange of scientific ideas of Advances in Materials Science and Applied Biology. I am sure that this will motivate and encourage the young researchers present in this august gathering. On behalf of the organizing committee, I extend a very warm welcome to all the participants in this 1st International conference. I hope your virtual presence will be quite comfortable and I wish a grand success for the conference.

Dr. L. D. Kadam
Principal

Dr. Patangrao Kadam Mahavidyalaya,
Ramanandnagar (Burli)





ORGANIZING SECRETARY'S MESSAGE

Dear delegates,

Warm greetings!!!

On behalf of the organizing committee, I would like to cordially welcome you to the 1st International web conference on Advances in Materials Science and Applied Biology (ICAMSAB-2022). The purpose of ICAMSAB-2022 to bring together the researchers, scientists, faculty members and students to discuss the recent trends and future developments in the area of Materials Science and Applied Biology which is very much relevant to the present-day needs. This would create better awareness among the participants in the conference, motivating them to go for further research, development and innovations in advancing the technologies of interest. Material Science is expected to be a major field in near future. So, it is the need of hour to utilize all the available energies properly. At Present, most researches activities try to make solar cell with good efficiency, waste water treatment through photo catalytic activity, Bio sensors, dielectrics like Advanced Materials applications. So this Conference will help to be familiar with recent trends in the Material Science .The enlisted topics shall set up a platform of spreading light of the recent technologies and enable us to grow by way of learning from knowledge reserves and absorbing expertise from treasury of learned academicians.

A Souvenir will be published to commemorate the event. Souvenir containing the full text of keynote addresses, plenary talks and abstracts will be



**1st International Web Conference on “Advances in Materials Sciences & Applied Biology”
on 27-28th January 2022**

printed as special issue, and will be distributed to all registered delegates.

We are planning to have best exhibition with multi domain displays and poster presentation. The thematic talks and the plenary sessions will drive you through the multi sectoral emergence in the Conference. This could be the first conference of its kind in the region where everyone could have opportunity to showcase and present their ideas, thoughts, developments that could lead to a meaningful life in the community.

I thank each and every one of you who are contributing to the success of the conference and looking forward to seeing you all soon.

Best Wishes



Organising Secretary,
ICAMSAB-2022





CONVENORS'S MESSAGE

It is matter of great pleasure to welcome all the participants to the “International Conference on Advances in Materials Science and Applied Biology” (ICAMSAB-2022). I believe that ICAMSAB 2022 would serve as an excellent platform for leading international and national scientists to share advancements in scientific research and opening up the prospects of collaboration. Such international level events facilitate knowledge based innovation and mark the advancement in science and technology. Young minds in the field of Science and technology will also greatly benefit by learning cutting-edge scientific developments and cultivate better learning for the benefit of health and well-being. It is very much heartening to see the overwhelming response received for the conference from the research community.

The scientists and researchers from various countries are participating in ICAMSAB-2022. The conference will be dedicated to discuss on newer technologies in materials science and it's applications in biology will also try to provide a platform to young researcher for their futuristic academic achievements. We hope that you find the ICAMSAB- 2022 proceeding rewarding. I convey my best wishes to all the participants of the conference in all your future endeavors.

Convenor,
ICAMSAB-2022





CO-ORDINATORS'S MESSAGE

On Behalf of the Organizing Committee, It gives me immense pleasure to welcome you all Participants to this signature event of the year, 1st International web conference on "Advances in Materials Science and Applied Biology [ICAMSAB-2022]organized by Department of Physics, Chemistry and Zoology Dr. Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burli).

The main purpose behind organizing this International conferenceto promote the knowledge and the development of high-quality research in applications of other scientific fields and the modern technological trends that appear in the fields of Physics, Chemistry and Zoology.This two days International conference has been especially designed for renowned scientist, upcoming scientists and research students of, PhysicalScience, life scienceand chemicalscience and community leaders of nation.

I express my deep sense of gratitude to Principal Dr.L.D. Kadam for taking keen interest and strong moral support. I am confident that this conference will provide a concrete platform which will encourage and support scholars, researchers and faculty to carry and accomplish their research goals.Once again welcome to ICAMSAB-2022!!

Co-ordinator,

ICAMSAB-2022



1st International Web Conference on “Advances in Materials Sciences & Applied Biology”
on 27-28th January 2022



Rayat Shikshan Sanstha's

Dr. Patangrao Kadam Mahavidyalaya, Ramanandnagar (Burli)

(Reaccredited by NAAC at 'A' Grade with a CGPA of 3.02)

(Affiliated to Shivaji University, Kolhapur)

1st International Web Conference on “Advances in Materials Science & Applied Biology” (ICAMSAB- 2022)

TABLE PROGRAMME ICAMSAB-2022

Day 1 : Inaugural Function 27/01/2022

Time	Nature of Work	Name of Person
10:25 to 10:30 AM	Karmaveer Pratima Pujan	
Session-I		
10:30 to 10:35 AM	About the Conference	Prof. Dr. P.B. Piste
10:35 to 10:45 AM	Introductory and Welcome speech	Mr. Abhijit B. Mane
10:45 to 10:55 AM	Inaugural speech	Hon. Prof.Dr. P.S. Patil Pro-Vice Chancellor, S.U. Kolhapur.
10:55 to 11:05	Presidential Speech	Prin. Dr. L.D. Kadam
11:05 to 11:35 AM	Key Note Address	Prof. Dr. Abdel Rahman Al- Tawaha Full Professor in PlantScience, Al Hussin Bin Talal University, Jordan
11:35 to 11:40 AM	Vote of Thanks	Dr. Mrs. G.R. Patil



ICAMSAB-2022



Session-II		
11:45 to 11.50 AM	Introduction of Hon. Dr. Jaydeep Bharate	Mr. V.R. Bhosale
11:50 to 12:50 PM	Resource Person Speech	Hon. Dr. Jaydeep Bharate Senior Research Engineer, Umea University, Sweden
12:50 to 12.55	Vote of thanks	Mr. Umesh S. Shelke
Session-III		
12.55 to 01:00 PM	Introduction of Hon. Dr.P. Anushkkaran	Ms. Namrata J. Kamble
1.00 to 2.00 PM	Resource Person Speech	Hon. Dr.P. Anushkkaran Division of Biotechnology, South Korea
2.00 to 2.05 PM	Vote of Thanks	Mr. Dinesh A. Sasane
2.30 PM onwards	Poster Presentation	

Day 2 : 28/01/2022

Time	Nature of Work	Name of Person
9.00 to 11.00 AM	Oral Presentation	
Session-I		
11:00 to 11:05 AM	Introduction of Dr. Dong Hyung Kim	Mr. Dhanesh P. Gawari
11:05 to 12:05 AM	Resource Person Speech	Dr. Dong Hyung Kim, Hanyang University, SEOUL Republic of Korea
12:05 to 12.10 AM	Vote of Thanks	Mr. Yuvraj R. Sable
12:10 to 12:15 PM	Introduction of Prof. Dr. Ercan Burcel	Ms. Priyanka R. Ghorpade
12:15 to 1:15 PM	Resource Person Speech	Prof. Dr. Ercan Bursal, Department of Chemistry, Mus Alparslan University, Turkey.
1:15 to 1:20 PM	Vote of Thanks	Ms. Priyanka R. Ghodake



Session-II

1:20 to 1.25 PM	Introduction of Hon. Dr. Yogesh Gangarde	Ms.Varsha V Nalawade
1:25 to 2:25 PM	Resource Person Speech	Dr. Yogesh Gangarde Research Associate Oregon state University USA
2:25 to 2.30 PM	Vote of thanks	Ms.Prajakta.A.Patil

Valedictory Function

Time	Nature of Work	Name of Person
2:40 to 2:50 PM	Introduction and welcome	Mr.Abhijit B.Mane
2:50 to 3:20 PM	Valedictory speech	Dr. A.S. Jagnure Head, Department of Chemistry, K.L.E.S.G.I. Bagewadi, Nipani Karnataka, India.
3:20 to 3:35 PM	Presidential Speech	Prin. Dr. L.D. Kadam
3:35 to 3:45 PM	Vote of Thanks	Dr. T.S.Bhosale





Prof. (Dr) Abdel Rahman Al Tawaha

Department of Biological Sciences, Al Hussein bin Talal University

KEY NOTE ADDRESS

Topic: Plant adaptation to drought stress

ABSTRACT

Drought has a negative impact on plant development and productivity. The consequences of ascarcity of water on plant development, output, and crop quality have been intensivelyexplored. Drought-induced decreases in growth, yield, and crop quality are prevalent inagricultural settings. The four key strategic categories that describe plant adaptation to desertare as follows: lack of water-escaping plants, lack of water-evading plants, lack of water-enduring plants, and lack of water-resistant plants. Several policies, however, have beenrecommended to deal with drought stress, including crop and variety selection, tillage andwater conservation, moisture conservation through the use of tephra covers, planting date,seed priming, nutrient management, and water harvesting technologies.





Dr. Jaideep B. Bharate

Senior Research Engineer Department of Chemistry, Umea University, SE-90187,
Umea, Sweden

PLENARY TALK I

Topic: Drug Discovery on Kinase Inhibitors and Alzheimer's Disease

ABSTRACT:

FMS-like Tyrosine Kinase 3 (FLT3) is a clinically validated target for acute myeloid leukemia (AML). Inhibitors targeting FLT3 have been evaluated in clinical studies and have exhibited potential to treat FLT3-driven AML. A frequent, clinical limitation is FLT3 selectivity, as concomitant inhibition of FLT3 and c-KIT is thought to cause dose-limiting myelosuppression. Through a rational design approach, novel FLT3 inhibitors were synthesized employing a pyridine/pyrimidine warhead. The most potent compound identified from the studies is compound **13a**, which exhibited an IC_{50} value of 13.9 ± 6.5 nM against the FLT3 kinase with high selectivity over c-KIT. Mechanism of action studies suggested that **13a** is a Type-II kinase inhibitor, which was also supported through computer aided drug discovery (CADD) efforts. Cell-based assays identified that **13a** was potent on a variety of FLT3-driven cell lines with clinical relevance. We report herein the discovery and therapeutic evaluation of 4,6-diamino pyrimidine-based Type-II FLT3 inhibitors, which can serve as a FLT3-selective scaffold for further clinical development





Dr. Periyasamy Anushkaran, Ph.D

Division of Biotechnology, Jeonbuk National University,
Republic of Korea

PLENARY TALK II

Topic: Ti-ZnFe₂O₄/SiO_x/CoPi hierarchical nanocoral arrays for efficient photoelectrochemical water splitting: Effect of in-situ Ti doping and SiO_x hole transport channel.

ABSTRACT

Nowadays, due to unrivaled industrial progress forced the human life toward egregious dilemma of energy scarcity, global warming and other environmental degradation issues Solar energy has been proposed as one of the most attractive and important alternatives to fossil fuel sources. Photoelectrochemical water splitting, which is capable of effectively exploiting solar light to provide renewable hydrogen fuel and mitigate environmental pollution, is considered a green and successful approach to address this adversity. Recent research into iron-based oxide semiconductors has demonstrated the suitability of the materials for photocatalytic and photo-electrocatalytic applications, such as solar fuel generation. The spinel zinc ferrite (ZnFe₂O₄, ZFO) reported firstly by de Haart and Blasse projected as one of the favorable catalysts because of its high catalytic activity, narrow band gap (2.0 eV), suitable conduction band position for water reduction, good photochemical stability and its higher theoretical solar-to-hydrogen (STH) conversion efficiency (i.e. 20 %). However, the PEC capability of ZnFe₂O₄ single photoelectrode materials is mostly



restricted due to charge recombination in the bulk and electrode/electrolyte interfaces. Therefore, an intentional ion doping approach has been widely used to improve the conductivity and lifetime of photogenerated charge carriers to increase the PEC performance. Therefore, to fully activate the ZnFe₂O₄, the innovative tactics are essential to emphasize the synergistic combination of surface and bulk engineering to improve blockades in the bulk/surface as well as surface/electrolyte hole transfer kinetic to improve the PEC performance. Therefore, developing effective approaches to accelerate the photogenerated holes in spinel ZnFe₂O₄ is still one of the core issues. The incorporation of the hole transporting layers provide driving force to improve charge parting in the bulk as well as on the surface, by the built-in electric field, especially at lower potentials. Moreover, it is possible to effectively enhance the PEC performance of ZnFe₂O₄ through the application of oxygen evolution reaction (OER) catalyst on the surface of the photoanode to overcome from the sluggish water oxidation kinetics. As a consequence of in situ Ti ion doping and the SiO_x hole transport channel layer, the photocurrent density increased from 0.365 to 0.460 mA/cm² at 1.23 V vs. RHE, and after the Co- Pi modified Ti-ZFO/SiO_x photoanode, it further increases to 0.570 mA/cm². Furthermore, this work is the foundational pilot of Ti-ZFO nanocorals photoanodes, and offers a conceptual outline for the modular design for further improvement of the photoelectrochemical performance of ZFO-based photoanodes against photocorrosion during solar water splitting.





Dr. Dong-Hyung Kim, Ph.D

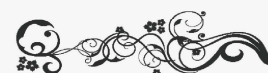
Department of Materials Science and Chemical Engineering, Hanyang
University, Seoul, Korea

PLENARY TALK III

Topic: Advanced High Energy And Rechargeable Zinc-Air Batteries

ABSTRACT

The fast-growing “Internet of Things” is creating ever-increasing demand for advanced batteries with high energy density, robustness, flexibility, and environmental benignity for emerging high-tech electronic technologies and electric vehicles. Zinc–air batteries (ZABs) are among the most promising alternative technologies for these applications because of their exceptional theoretical energy density, which is even comparable to that of gasoline; however, due to several critical challenges of intrinsic ZABs, such as cathode redox reactions, mechanical flexibility, and limited cycling stability, they are unable to satisfy the requirements of commercial applications. Therefore, precise fabrication of flexible, stable, and efficient electrocatalysts and superionic membrane electrolytes is of great importance. Here, we propose three approaches for integrated advanced ZABs: (1) highly efficient metal-based as redox-active robust bifunctional electrocatalysts with ultrahigh intrinsic electrical and structural properties, (2) a superionic functionalized bio-cellulose nanofibrous solid-state membrane electrolyte with outstanding flexibility and water retention, and a well-interfaced Zn anode. The flexible ZABs with the present constituents demonstrated a high cell-level energy densities of 460 Wh kg with a cycling stabilities of 6000 cycles with fast fading and exceptionally high rate capacities (5 and 200 mA cm⁻²), respectively, illustrating great perspectives for sustainable rechargeable ZABs in modern industries.





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PLENARY TALK IV

Topic: Propolis Samples From Different Regions Of Turkey; Antioxidant Activity And Bioactive Compound Analyses

ABSTRACT

Propolis is resinous material released from various plant sources, collected by honeybees and produced by bee secretions. Honeybees use propolis materials to seal holes and cracks in beehives for protecting them from microbial infection and extreme weather conditions. The plant sources and geographical conditions could change the biochemical content and activities of propolis samples. Biochemical properties of many propolis samples from different parts of the world have been studied and evaluated. Antioxidant, antimicrobial activities and phenolic contents of them have been investigated. The present study reports the total phenolic and flavonoid contents as well as antioxidant activities of different propolis samples. The propolis samples were obtained from Muş, Ordu, Manisa and Iğdır cities, located in different regions of Turkey. The effective antioxidant properties of ethanol and water extracts of propolis were determined by using five different in vitro bioanalytical methods including three reducing antioxidant methods (CUPRAC, FRAP, and Fe³⁺-TPTZ reducing assays) and two radical scavenging antioxidant methods (ABTS and DPPH). According to the results, the propolis sample gathered from Ordu city had highest total phenolic and flavonoid contents. Remarkably, the propolis sample gathered from Ordu city had highest antioxidant activity for all five antioxidant methods. In addition, the phenolic compounds of propolis samples were identified and quantified by LC/MS-MS technique. The propolis sample gathered from Ordu city had the highest amount of phenolic compounds. Kaemferol, quinic acid, acacetin, and quercetin were detected to be major phenolic compounds in the propolis samples. The results supported the



relation of phenolic compounds with antioxidant activity. Also, the results proved the high potential of propolis samples in the pharmacological industry.





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PLENARY TALK V

Topic: Synthesis and Evaluation of Functionalized Arylamide Scaffolds for Improved Drug Delivery and Protein Aggregation Inhibition

ABSTRACT

Polyamides based on aromatic scaffolds have been widely studied due to their interesting structural properties and biological activities. Depending on the specific functionalization, these molecules demonstrate new physicochemical properties, and show various biological activities such as biomolecular recognition, assembly formation, protein inhibition etc. We have employed N-substitution with long hydrophobic chains on an arylamide scaffold, which led to the formation of gemini type amphiphilic molecules. These molecules formed sub-micrometre sized non-covalent assembly in aqueous solution likely owing to their long hydrophobic chains. The nature of the assembly was characterized by NMR, DLS and TEM techniques. We utilized these assemblies to enhance the solubility and stability of the pharmacologically important hydrophobic molecule curcumin, which is practically insoluble in aqueous medium. The molecule with decyl chain also showed enhanced encapsulation of an anticancer agent doxorubicin. The in vitro pH dependent release and slow toxicity of the encapsulated doxorubicin inside cells over time can be utilized for selective targeting of cancer cells. We have further shown that derivatized arylamide scaffolds can be used for preventing the aggregation of insulin, which is a vital hormone essential in the management of diabetes. Insulin is known to form amyloid aggregates during production, and under aberrant physiological conditions that lead to the



reduction of its biological activity. We have synthesized several oligoamide molecules decorated with hydrophobic functionalities to inhibit insulin aggregation. These molecules were screened by thioflavin-T assay and resulted in identification of a few hit molecules that showed reduction in the insulin fibril formation. A second generation arylamide molecule (PAD-S) showed complete inhibition of insulin aggregation and preserved insulin in its native α -helical form. These results were further supported by TEM, NMR and CD analyses. The benign nature of PAD-S towards HEK293T cell lines, and the prevention of aggregation-induced toxicity by PAD-S treated insulin further highlight its potential in preventing aggregation of commercial insulin formulations.

Keywords: Arylamide, aqueous stability, encapsulation, aggregation, insulin, inhibitor.



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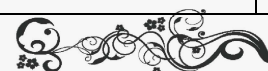
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Green synthesis of α -Fe₂O₃Nps for its photocatalytic & antimicrobial activities.

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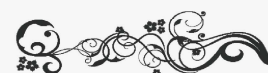
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ABSTRACT

Iron oxide (α -Fe₂O₃) nanoparticles were successfully synthesized using *Aspergillus oryzae* (NCIM no. 1212) culture mediated biogenic route. Synthesized specimen was determined to be in the hematite phase, as confirmed by both structural and optical characterization. The α -Fe₂O₃nanoparticles was screened for antimicrobial activity against bacterial strains *Staphylococcus aureus* (NCIM -2654), *Pseudomonas aeruginosa* (NCIM - 5032) and fungal strain *Candida albicans* (MTCC -3017). The α -Fe₂O₃ nanoparticles exhibit excellent antimicrobial activity under visible light. The samples were more effective for photocatalytic degradation of basic fuchsine dye. By using α -Fe₂O₃ Nps the basic fuchsine dye degradation was 96% which improved considerably. The present study disclose that the α -Fe₂O₃ nanoparticles are efficient photocatalysts and highly active antimicrobial agent, could possibly used for the degradation of dyes in textile wastewater.

Keywords: *Aspergillusoryzae* (NCIM-1212),Hematite,Photocatalysis, Antimicrobial activity



Diversity of aquatic macrophytes of Sankarbeel (wetland) of Golaghat district of Assam with special reference to physicochemical water quality parameters

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ABSTRACT:

The SankarBeel (wetland) (N 26^o31'57.0936 and E 93^o53'0.0006) is considered to be one of the main wetlands of the district Golaghat serving as home to a wide range of plant and animal species. The aquatic macrophytes found in the Beel are the chief source of food, fodder in the Beel of aquatic ecosystem because of their diversity and abundance. Most of the aquatic macrophytes are naturally occurring, well adopted for their surroundings and play an important role in balancing the ecosystem of the wetland. The aquatic macrophytes which are available have the capacity to improve the quality of water by absorbing nutrients with their effective root systems and thus controls the pollution level of water. Moreover the wetland may be a good habitat for migratory birds also. But the rapidly increasing human population, large scale change in land cover; various urban developments led to the wetland degradation and are considered to be a big challenge to the entire human community. Therefore necessary actions like conservation, preservation of the aquatic species, and development of the wetland are utmost necessary to solve the problems. Considering all these things the following objectives have been taken for the present study.

Keywords: aquatic macrophytes, Sankarbeel, ecosystem, water quality, Golaghat



Applicative properties of $\text{Ni}_{0.7}\text{Cu}_{0.1}\text{Zn}_{0.2}\text{Y}_x\text{Fe}_{2-x}\text{O}_4$ ($0 < x < 0.035$) system:

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ABSTRACT

The ferrite nanoparticles having chemical composition $\text{Ni}_{0.7}\text{Cu}_{0.1}\text{Zn}_{0.2}\text{Fe}_{2-x}\text{Y}_x\text{O}_4$ (where $0 < x < 0.035$) has been synthesized by oxalate co-precipitation process. The structural parameters of nanoferrites were characterized by TG-DTA, EDAX, XRD, FTIR, FESEM tools whereas magnetic, electric, dielectric and optical parameters are investigated using VSM, LCR-Q meter, two probe resistivity set-up and UV-VIS photo-spectrometer techniques. The completion of thermal decomposition process of an oxalate powders were analyzed using thermogravimetric and differential temperature analysis. Preparation of required stoichiometric material with appearance of an appropriate peak of metal ions was observed through Energy dispersive x-ray analysis. X-ray diffractometer investigation shows that, material under investigation possesses single-phase cubic spinel structure. Lattice constant of an investigated nanoferrite increases with increasing substitution of Y^{3+} ions. Formation of well spinel ferrite was confirmed from Fourier-transform infrared microscopy. Field emission scanning electron microscopy micrographs approve the formation of nanoferrites. Hysteresis curve analysis shows that, the saturation magnetization of Ni-Cu-Zn (NCZ) nanoferrites decreases with Y^{3+} content. An initial permeability and DC resistivity of NCZ ferrites decreases with Y^{3+} substitution. The dielectric investigation confirms, un-substituted NCZ nanoferrite shows higher dielectric constant than that of Y^{3+} substituted NCZ nanoferrites. The bandgap energy in the range from 1.69 to 1.48 eV confirms, material under investigation shows semiconducting nature.

Keywords: -Ni-Cu-Zn-Y nanoferrites; permeability; DC resistivity; AC resistivity; bandgap energy



Efficient synthesis of quinoxaline derivatives using a camforsulfonic acid as an organocatalyst

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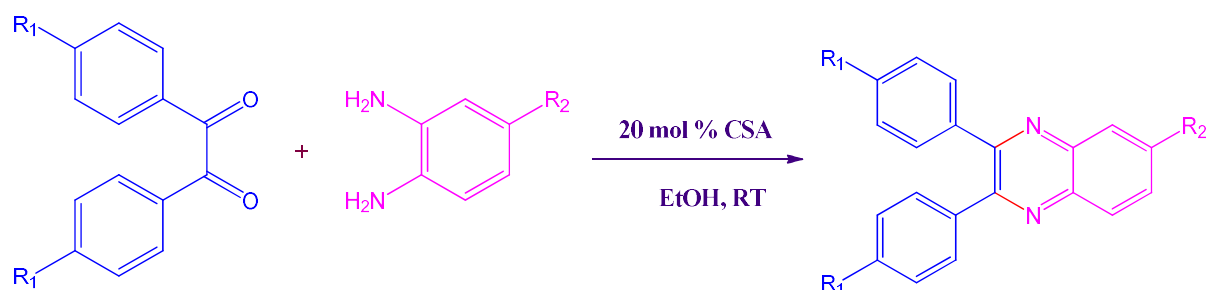
Author 2 E-mail: cdbhenki@gmail.com

ABSTRACT:

Camforsulfonic acid is an efficient organocatalyst for a one pot synthesis of quinoxaline derivatives in ethanol at ambient temperature. A series of quinoxaline derivatives were efficiently synthesized in excellent yields by the reaction of 1,2-diamines and 1,2-dicarbonyl compounds catalyzed by camforsulfonic acid in ethanol as green solvent at room temperature under aerobic conditions. The main advantages of this protocol include practical simplicity, high yields, metal free recyclable catalysts, green solvent and ambient temperature.

Keywords: Organocatalyst, ambient temperature, quinoxaline, green solvent etc.

Graphical ABSTRACT:



Nano In₂O₃-SiO₂ catalyst utilized for one pot three component synthesis of 1H-pyrazolo[1,2-b]phthalazine-dione

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ABSTRACT:

A convenient, one pot synthesis of heterocyclic nucleous 1H-pyrazolo [1,2-b]phthalazine-dione derivative compound has been achieved those are having very much attention in medicinal chemistry because of their extensive application in biology. The mixture of aromatic benzaldehyde, pathalhydrazide and malanonitrile catalyzed by efficient nano In₂O₃-SiO₂ heterogeneous reusable catalyst in ethanol-water (2:1) to obtain the desired 1H-pyrazolo [1,2-b]phthalazine-dione derivatives with good yield. The hydrothermal method used to synthesize nano In₂O₃-SiO₂ catalytic material. This catalytic material was characterized by using X-ray diffraction spectroscopy (XRD), scanning electron microscopy (SEM), Energy dispersive spectroscopy (EDS), Fourier transform infrared spectroscopy (FT-IR), Temperature-programmed desorption (NH₃-TPD) and Brunauer-Emmett-Teller (BET). Present method offers remarkable advantages such as non-toxic, noncorrosive and an inexpensive reaction conditions. Easy recovery and reusability of the catalyst makes the reaction successful under environmental benign conditions.

Keywords: Nano, In₂O₃-SiO₂, Hydrothermal method, 1H-pyrazolo [1,2-b]phthalazine-dione.



**Identification, documentation and utilization of wild green leafy vegetables
from tribal region of Nashik District**

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ABSTRACT:

From many years ago the tribal peoples commonly used numbers of wild leafy vegetables all over the world. Peth and Surgana are well known tribal region from Nashik district. The tribal community from that region was partially or fully dependent on the wild green leafy vegetables to complete their nutritional need. In present study from selected tribal region of Nashik district, a total 61 traditionally used wild green leafy vegetables was identified. Among 61 species, with respect to families Amaranthaceae, Fabaceae and Asteraceae were found to be largest family of wild leafy vegetables with 22 species. Presently because of modernization in agricultural practices, negligence of uncultivated plants, less awareness, illiteracy, and sudden environmental changes the naturally grown wild leafy vegetables source was limited. So present study was focused on the identification and conservation of these species for future need.

Keywords: Wild leafy vegetables, Nashik District, Tribal community, Traditionally, Nutritional need, Amaranthaceae, Fabaceae and Asteraceae.



Effect Of *Nomuraea Rileyi* On Proteins And Proteases Activity During Larval Development Of *Helicoverpa Armigera* (Hubner)

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ABSTRACT:

The *Helicoverpa armigera* is one of the most serious polyphagous pest of many economically important crops. An extensive and unplanned excess chemical pesticides application has led to adverse effects on human and insecticide resistance. Entomological pests are controlled by entomopathogenic fungi (EPF) as an alternative, biological, safe tool. *Nomuraea rileyi* is an effective entomopathogenic fungus for the control of *H. armigera* has several advantages over other synthetic insecticide. Protein is complex biomolecule present in all viable cells that play indispensable roles in all life processes. Proteases have many diverse roles in insect physiology and biochemistry. The LC₅₀ of *N. rileyi* was applied to the 4th larval instars of *H. armigera* to investigate their impacts on the total protein and protease activity of body homogenate. Moreover, qualitative analysis of proteins in healthy developmental stages of *H. armigera* larvae and in *N. rileyi* treated larvae was detected using SDS-PAGE. *N. rileyi* produced significant decrease ($p < 0.05$) in the total protein content of larval body homogenate. The proteases activity increased significantly in *N. rileyi* treated larvae than the control larvae. The present investigation reported that there were differences between control and treated larvae in SDS-protein bands. The protein patterns in *N. rileyi* treated larvae showed less number of proteins as compared with control. The data of present findings help to understand a part how *N. rileyi* be effective in controlling most serious pest *H. armigera*.

Keywords: *Helicoverpa armigera*, *Nomuraea rileyi*, SDS-PAGE, Proteases, Protein profile, Entomopathogenic fungi



Conventional and Ultrasonic synthesis of metal complexes of β -diketone and its antimicrobial screening

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ABSTRACT:

β -diketones and its complexes are clinically important molecules since they exhibits some biological activities such as antiviral, insecticidal, antimalarial, antioxidant, antitumor, anticancer and anti-inflammatory. β -diketones are key intermediates for the synthesis of core heterocycles such as isoxazole, pyrazole, flavones, triazole, pyrimidine and benzodiazepines. Synthesized beta-diketone shows keto-enol tautomerism by hydrogen bonding, hence acts as a chelating agent in the preparation of metal complexes. The ligand and its metal complexes were synthesized by conventional and ultrasonic methods using Baker-Venkatraman rearrangement and characterized by physical, spectral and analytical data. The ratio of the metal complexes was found to be 1:2 (metal:ligand) and the analytical data suggested that octahedral geometry for the all complexes. The synthesized compounds have also been screened for in vitro antibacterial activity against *Bacillus subtilis*, *E. Coli* and *Staphyloc. aureus* and antifungal activity against *A. niger* and *F. Oxysporum* using streptomycin as a reference drug. The findings revealed that complexes were found to be more potent that inhibits all the pathogenic bacteria and fungi as compare to ligand. This study illustrate that β -diketones and it's transition metal complexes could be a potent source of antimicrobial agents and further characterization of active metabolites and evaluation of their pharmacological potentials are also needed.

Keywords: β -diketone, metal complexes, antimicrobial activity, NMR



Recapitulation Of Gerontology And Frailty; Discovering A Current Review

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ABSTRACT:

Gerontology is the study of the social, cultural, psychological, cognitive, and biological aspects of ageing. Due to the advancements in technology the studies concerning ageing has grown impressively. One of the most important fields of study under ageing is frailty, which is the main highlight of this article. Frailty is a dynamic syndrome which affects an individual not just physically but also mentally, socially and psychologically. Each of the mentioned domains has copious factors which lead to frailty. Finding out these factors in an individual can be helpful as it will aid in recognizing the correct interventions with the help of which frailty can be somewhat reversed and prevented. According to the several amount of research it has been found that the onset of frailty is not just because of ageing but also due to several environmental factors, chronic diseases and genetics, which further tells us that frailty is not just common to old adults but can be developed at a younger age as well. Some well-known models for instance, Phenotype and Cumulative deficit model and various other assessment tools have been developed in order to identify frailty in old individuals. Frailty also had a major impact on Covid-19 patients. Frail individuals were more severely harmed by the Corona Virus, similar rise in Cluster of Differentiation molecules can be observed in both frail and Covid-19 patients. Also, several biomarkers have been recognized that occur in an increased level in majority of frail individuals. According to a study it was found that not all old adults who are frail will identify themselves as frail, and for almost every individual the



definition of frailty was different. So, with the help of this article, a complete understanding of frailty which includes the domains of frailty, factors of frailty, models and tools for identifying frailty, developing interventions, types of important biomarkers, impact of Covid-19, perspective of old adults, etc., can be gained.

Keywords: Biomarkers, comorbidity, frailty, gerontology, multimorbidities.



Seralite Src-120 Resin Catalyzed Solvent-Free One-Pot Rapid Synthesis Of Amidoalkyl Naphthols Under Microwave Irradiation

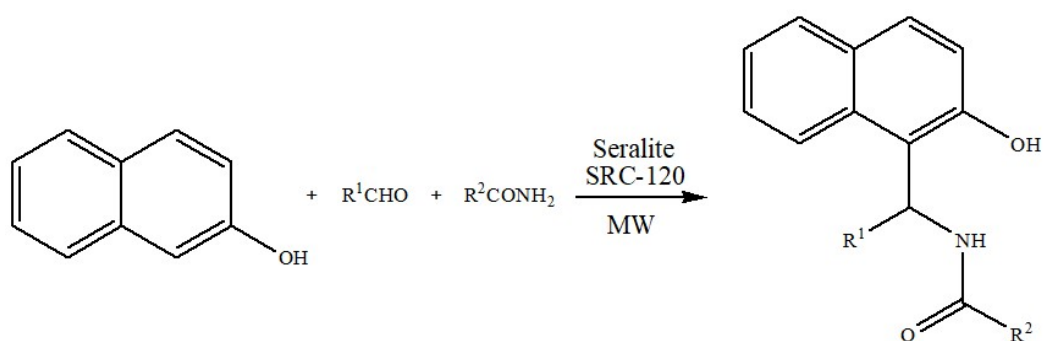
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ABSTRACT

Compounds bearing 1,3-amino oxygenated functional moiety are common in a variety of biologically important natural products and potent drugs, including a number of nucleoside antibiotics and HIV protease inhibitors, such as ritonavir and lipinavir.

An efficient method for one-pot rapid synthesis of amidoalkyl naphthols by the multi-component condensation of 2-naphthols, aryl aldehydes and amides or urea in the presence of Seralite SEC-120 resin as catalyst under solvent-free condition (Scheme 1). The remarkable advantages offered by this method are solvent-free reaction, higher yields, easy synthetic procedure and recyclability of catalyst.



Scheme 1

Keywords: amidoalkyl naphthols, microwave assisted reactions, solvent free, Seralite SRC-120 resin.



Synthesis, Characterization & Antimicrobial activity of nano-size Oxo 1,2-Naphthoquinone-2-Oximates of V(IV)&Zr(IV)

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ABSTRACT:

Metal chelates of Oxo 1,2-Naphthoquinone-2-Oxime with Vanadium (IV) & Zirconium (IV) were prepared by mixing an equimolar aqueous solution of vanadylsulfate hydrate & zirconyloxchloride octahydrate and methanolic solution of 1,2-Naphthoquinone-2-Oxime with an excess of the ligand solution. The resultant chelates were isolated through filtration. Their chemical composition which corresponds to M:L=1:2 was established through elemental analysis and thermogravimetry. The structural investigations of chelate were carried out with the help of IR and XRD as well as solid-state electronic spectroscopy. The activity of the ligands as well as the metal complexes is obtained against selected organisms.

Keywords: 1,2-Naphthoquinone-2-Oxime, Ligand, Chelate, Vanadyl, Zirconyl



An Advanced Study on UGCs of AlGa_N/AlN in Emerging Nanotechnologies

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ABSTRACT:

This elemental research work has been objective to investigate an enhanced study on UGCs (Ultraviolet Gain Characteristics) of AlGa_N/AlN heterointerface nanostructure for various applications of purification and sterilization in emerging nanotechnologies. In this elemental research work, with the help of theory of effective masses of SM (Single and Multi) bands, the various appropriate UGPs (Ultraviolet Gain Parameters) have been computed simulatively. The behaviors of spectral performances of intensities of UV gain (in cm⁻¹) with wavelengths (in nm) for AlGa_N/AlN have been investigated by optimized techniques. This type research work also provides the proper information about the modal confinement value of UV gain intensities (in cm⁻¹) with several values of densities of carriers per unit volume (in cm⁻³) have been simulated and calculated systematically. In appropriate computational results, the crest value of UV gain intensities (~ 1751 cm⁻¹) has been achieved at the specific wavelength ~ 254 nm. Hence, the utilities of these UV-light of wavelength ~ 254 nm have played a substantial role in the purification and sterilization applications in today's life. Moreover, the UV-lights of wavelength ~ 254 nm have also extensively been used in better purification to disinfect the surfaces, air and water by eliminating the various types of viruses, bacterias and harmful contaminants.

Keywords: UV gain, Modal confinement UV gain, UGCs, UGPs, AlGa_N, AlN



**Changes In Protein During Larval Development Of *HellulaUndalis*
(Fabricius)**

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ABSTRACT

Changes in protein content during larval development of *Hellullaundalis*(F.) have been studied. The *H. undalis* is a pest of ok cabbage. The larval developmental period was found to be 16 days. The changes in protein revealed maximum protein content in 10 day larvae and minimum protein content was noted in 16th day larvae of *H. undalis*. The physiological role of protein was discussed during larval development of *H. undalis*. The protein content of 5th day larvae was 22.23 % less than the 10 day larvae and Protein content 16th day larvae is 18.52 % less than the 10 day larvae.

Keywords: Protein, insect, larva, *Hellulaundalis*(Fab.)



Hydrobiology Of The Shelf Waters Off Karnataka Coast, India

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ABSTRACT

Results of a comprehensive hydrological sampling programme of the shelf waters off Karnataka coast was conducted on the R.V. Gaveshani Cruise No. 208. Eight transects across the shelf, covering 25 stations were studied. Depth of stations varied from 17 to 1650 m. Findings of study described the hydrographical parameters as temperature, salinity, pH, dissolved oxygen, phosphate, nitrate, nitrite of surface and bottom waters.

Results presented were on the basis of a sampling trip conducted during the end of Post-monsoon period, thus providing information on the spatial pattern of various parameters. Information on temporal (seasonal) variation is essential in order to define the hydrographic dynamics of shelf waters of the region over the temporal sequence.

Key words: Salinity, pH, oxygen, phosphate, nitrate and nitrite.



**Dissolution And Reformation Of Crystalline Style of The
Edible oysters *saccostreacucullata* from Sindhudurg district, Maharashtra State**

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ABSTRACT

Two geographically separated estuarine localities at Deogad (16^o 23' N ; 73^o 23' E) and Achra (16^o 15' N; 78^o 26' E) in Sindhudurg district of Maharashtra State, India were selected on the basis of the differences in habitat, topography, vegetation and local market value to study the dissolution and reformation of the crystalline style of the oyster *Saccostreacucullata*. The maximum sizes observed by *S.cucullata* in the estuaries at Deogad and Achra were 44-45 mm shell length. Comparatively large sized oysters are found round the year in the estuary at Deogad than at Achra.

The environmental parameters such as pH, temperature, dissolved oxygen and salinity existing on the oyster beds in Deogad and Achra were recorded at the time of the experiment. The oyster beds in Deogad gets exposed to atmospheric air for comparatively a long time than those at Achra and with the commencement of high tide oyster bed at Achra gets reimmersed to the sea water earlier than the bed at Deogad. The time required for dissolution of crystalline style from the oysters of estuary at Achra is less than those from the estuary at Deogad. Further, time required for the reformation of style after immersion in sea water was less in the oysters from the estuary at Achra than at Deogad.

Key words: Deogad, Achra, estuary, oyster, dissolution and reformation.



Review On Recent Advances In Triazine Amine Derivatives And Their Biological Significance

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ABSTRACT:

This review summaries the biological significance and synthesis of numerous types of triazine amine derivatives from many heterocyclic and drugs containing triazine moiety. Our several years working with this potent moiety allow us to discuss its wide activity spectrum (antiproliferative, antibacterial activity against MDR clinical isolates, anticancer, antimicrobial activity, antileishmanial agent, and use as drug nano delivery system). The triazine ring structure is also found in obviously occurring antibiotics like fervenulin, reumycin and toxoflavin. 1,3,5-Triazine isomer or s-triazine is an first known organic compound, largely used as a lead structure in ammeline, aceto-guanide, acetoguanamine, cyanuric acid and melamine. Certain s-triazine containing drugs are altretamine, 2-amino-4-morpholino-s-triazine, hydroxymethyl-pentamethyl melamine, tretamine, dioxadet, irsogladine, cycloguanil, almitrine. Triazines have a great consequence in the field of pharmaceutical chemistry with wide-spectrum of pharmacological activities so useful for design and formation of novel drugs.

Keywords: cyanuric chloride, heterocyclic, triazine, heterocyclic compounds, biological activity.



Partial Characterization Of Larval Lipase Of *MarucaVitrata* (Fabricius)

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ABSTRACT

Partial characterization during larval development of *Marucavitrata* has been attempted. The larval developmental period was 13 days. The maximum activity was observed in 8th day larvae of *M. vitrata*. Partial characterization of *M. vitrata* revealed at pH 7.9, temperature 37°C, incubation time 25 minutes, substrate concentration 5%, enzyme concentration 1%. And K_m value 9.56 mM. The gradual increase in lipase activity noted from 4 to 8 day larvae of *M. vitrata*. The maximum activity was observed in 8-day larvae. The standard deviation of larval lipase was 0.01430 respectively. The lipase activity of 4-day larva was 16.8% less than that of 8-day larva. The physiological importance of lipase during larval development of *M. vitrata* is discussed.

Keywords: Partial characterization, lipase, larvae, *M. vitrata*(F.).



Morphological Changes In Chick Embryo Neural Tissue Associated With Warfarin Use During Prenatal Development

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ABSTRACT:

Warfarin is generally called as blood thinner that inhibits the clotting of blood by reducing the production of factors by the liver that promotes clotting. It is anticoagulant drug due to this it helps to keep blood flowing smoothly in our body. The liver is dependent on a good enough amount of vitamin K due to the production of these factors by the liver. Warfarin is responsible for reducing the production of the factors. The aim of this study was to determine the effect of prenatal warfarin exposure on cell viability and cell morphology in chick embryonic neurons; specifically to identify areas of the hindbrain that may be affected, to an extent contributing to Dandy-Walker Syndrome (DWS). histological staining technique namely Haematoxylin and Eosin (H&E) staining was used to evaluate chick embryonic neural tissue exposed to 4.865mM and 5.838mM warfarin on day 5 (Carnegie stage 17) and day 7 (Carnegie stage 20) of development. For further analysis of cell viability, primary chick embryonic Neuronal Cultures were prepared and increasing concentrations of warfarin (1.625mM, 2.435mM, 3.25mM, 4.865mM, and 5.838mM) were added. The percentage of cell viability was determined by the MTT assay method. We observed that warfarin indicated neurotoxicity at high concentrations of exposure.

Although cell death could be detected, the exact mechanism needs to be yet investigated. Since the developing brain is so susceptible to chemical toxicity, care must be taken while administering warfarin to pregnant mothers or young children.

Key words: Warfarin, Atrial, Fibrillation, AF and Anticoagulation.



Structural And Optical Studies Of Electrodeposited Yttrium Chalcogenide Films

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ABSTRACT:

Various deposition techniques are used to prepare thin films of different materials and their electrical, optical and structural properties are studied. In this paper yttrium chalcogenide films were deposited on to a variety of substrates by electrodeposition technique using non-aqueous bath. Yttrium nitrate was used as yttrium ion source. Sulphur, selenide and telluride were taken as chalcogenide elements. All solutions were prepared in formaldehyde. Sodium acetate was used as a complexing agent for all non-aqueous baths. Corning glass vessel was used as a bath container. High purity graphite plate was used as a counterelectrode. In order to hold substrate and counterelectrode at appropriate distance a bakelite holder was used. Saturated calomel electrode (SCE) was used as a reference electrode in composite bath. Substrate, temperature, chemical composition, terminal thickness etc., has been optimized for desired deposition potential for individual bath. For structural properties, all films were deposited on to a stainless steel substrate and for optical properties; they were deposited on to an ITO coated glass. The structural property of film was studied by X-ray diffraction and optical property by optical absorption technique, which confirms the deposited material and the band gap energy of a respective compound.

Key words: Electrosynthesis, chalcogenides, substrates, non-aqueous, counter electrode, and band gap energy.



Study Of Reproductive Biology Of A Moth *Eligma Narcissus*

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ABSTRACT:

Eligmanarcissus Lepidopteran moth, is the forest pest acts as defoliator of *Ailanthus excelsa* which is commonly called as tree of heaven. Biology of the *Eligmanarcissus* have been studied. In ten individuals, preoviposition period ranges from 4.0 to 6.0 days with an average of 5.0 ± 0.67 days and post oviposition period ranged from 1.0 to 2.0 days with an average of 1.5 ± 0.53 days. Maximum eggs hatched on 3rd day. Average egg hatching percentage was 75 ± 10 . The developmental period of larval instars ranged from 21 to 24 days with average of 22.15 ± 0.93 days. Instars of *E. narcissus* showed increased head capsule, body width and body length.

KEY WORDS: *Eligma, narcissus*, preoviposition, oviposition and postoviposition.



“Analysis of Water Using Physicochemical Parameters”

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ABSTRACT

Present paper deals with the study of Physicochemical parameters of water of Karad Tehasil located in Satara District of Maharashtra State. Monthly variations in the physical and chemical parameters such as temperature, pH (7.4 to 8.4), dissolved oxygen (0.008-9.79 mg/L), total alkalinity (48-248 mg/L), total hardness (132 to 628 mg/L), chlorides (19.88 to 45.44 mg/L), Phosphate (0.001 to 0.010 mg/L) and Free carbon dioxide (8.8 to 88 mg/L) were investigated. To ensure the continuous supply of clean and safe drinking water for the public health protection. In this regard, a detailed physical and chemical analysis of drinking water samples was carried out in different residential and commercial areas of the state. A number of parameters such as pH, turbidity, conductivity, total suspended solids (TSS), total dissolved solids (TDS), and heavy metals such as Cu, Zn, Mg, Fe, Cd, Pb, Cr, As, Hg, and Sn were analysed for each water sample collected during winter and summer periods. The obtained values of each parameter were compared with the standard values set by the World Health Organization (WHO) and local standards such as National Drinking Water Quality Standard (NDWQS). The values of each parameter were found to be within the safe limits set by the WHO and NDWQS. Overall, the water from all the locations was found to be safe as drinking water. However, it is also important to investigate other potential water contaminations such as chemicals and microbial and radiological materials for a longer period of time, including human body fluids, in order to assess the overall water quality of Karad Tahasil.

Key words: Physicochemical parameters, Water, Salinity, Hardness, Alkalinity, etc.



Synthesis of MnO₂ Thin Film for Supercapacitor Application

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ABSTRACT :

MnO₂ thin films were grown on stainless steel mesh via a facile Sol-gel method. The structural properties revealed the formation of delta MnO₂. The capacitive routine of the as-obtained MnO₂ electrode was estimated by galvanostatic charge–discharge measurements and cyclic voltammetry (CV). The synthesized electrode showed a high specific capacitance of 321 F g⁻¹ at 5 A g⁻¹. The admirable electrochemical performance detects the MnO₂ as a promising electrode material for advanced -generation energy storage devices.

Keywords: Sol-gel method, cyclic voltammetry and thin film etc.



Synthetic use of Schiff bases of Cu(II) and Zn(II) complexes for N-alkylation of heterocycles

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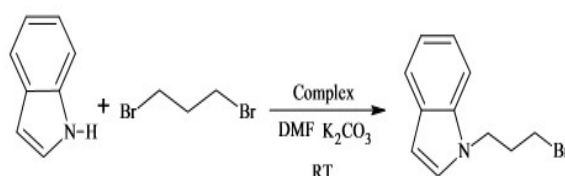
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ABSTRACT:

Under the mild conditions N-alkylation of heterocycles with 1,3-dibromopropane using Schiff base of Cu(II) and Zn(II) transition metal complexes as a catalyst was studied. It was observed that all the complexes worked as efficient catalyst with excellent product yield for coupling reactions. All the N-alkylation products were characterized by NMR, FT-IR spectroscopy and Mass spectrometry

Keywords: transition metal complexes, Schiff base; N-alkylation of heterocycles; 1,3-dibromopropane



Ionic Liquid Catalyzed Organic Reactions Under Solvent Free Conditions

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ABSTRACT

Ionic liquids (IL) generally defined as compounds completely composed of ions with melting point below 100°C. They are typically organic salts or eutectic mixtures of an organic salt and an inorganic salt. Amino acid based ionic liquid proline sulphate is synthesized by using simple acid base neutralization reaction where proline which is an amino acid used as a cation and sulphate used as anion. This amino acid based ionic acid can be used as a catalyst in Biginelli reaction. Which is totally green chemistry solvent free reaction, solid state product is formed without any by product. This is a simple one step reaction, easy reaction work up and catalyst also can be recycled. Proline sulphate is clean, operationally simple, non-volatile, thermally stable, non-toxic and recyclable catalysts can be used for the synthesis of 3,4-dihydropyrimidin-2-(1H)-ones/thiones.

Keywords : Ionic Liquids, IL, Liquid Proline, Ionic, Biginelli Reaction



**Record of Phipson’sShieldtail snake *Uropeltishipsonii* (Mason 1888) in Palus
Tehsil Sangli District, Western Maharashtra.**

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ABSTRACT:

Three of Phipson’sShieldtail snake *Uropeltishipsonii* were observed in Palus (17.0976° N, 74.4496° E)DistrictSangli, Maharashtra, India. The Head is narrow than the neck. The tail is very short, appearing to be cut slant-wise at the end. Body is Cylindrical and smooth scaled. There is a broad yellow strip on each side of the tail. The snout is obtusely pointed. All the three specimens were observed on the narrow road among the irrigated agricultural lands having grape and sugarcane cultivations during rainy season between July to September. As per the IUCN Red list of threatened species *U. phipsonii* listed as vulnerable VU. Generally most of the herpetofauna were under threats like conversion of forest tracts to the agriculture, commercial plantation, human dwellings, tourism related infrastructure development and heavy vehicular traffic. There is urgent need to determine the impact of these threats on the existing population in the study area.

Key words: Phipson’sshieldtail snake, Palus, Threats, Conservation.



First Record of Freshwater Prawn *Macrobrachium rosenbergii* from the Yerla River, Sangli District

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ABSTRACT:

Freshwater prawn *Macrobrachium rosenbergii* was recorded first time in the Yerla River, Sangli District, Maharashtra. *M. rosenbergii* is the biggest freshwater prawn in the world and it is widely cultivated for food. For commercial development of prawn farming has now become widespread, especially in South-Asian region. In the present study different body sized freshwater prawns were collected from various locations of Yerla River. We were recorded maximum number of post larval stage individuals (5 to 5.6 cm in length) in the month of February and medium to large sized adults in the month of April 2021, near Vadiye-Raibag and Wazar Village. The recorded size with chelate leg for adult male and female was 58.5 cm and 39.0 cm respectively. Generally freshwater prawns were reproduced in low saline waters which are needed for larval and post larval development after incubation. Recently this species is cultured in both natural and artificial pods in Maharashtra because of its faster growth rate, larger size and good market demand. Detailed study is necessary to know the exact breeding season and distribution of freshwater prawn in Yerla River; and also know the whether they may come from the surrounding culture ponds during rainy season; or someone releasing post larval stage individuals for natural culture in the river.

Keywords: Freshwater, Prawn, *Macrobrachium rosenbergii*, Yerla River



Diversity Of Pteridophytes At Higher Altitudes Of Northern Western Ghats Of Maharashtra

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ABSTRACT:

A survey on pteridophytic diversity at higher altitude of some regions of Northern Western Ghats of Maharashtra has been carried out and a total of 41 species of ferns and fern-allies belonging to 28 genera and 17 families have been collected species belonging to family Pteridaceae were found maximum and in good number of population where as species *Anogramma leptophylla*, *Isoetes dextitii*, *Hypodematium crenatum*, *Parahemionitis arifolia* was observed to be at high risk while the populations of species like *Pteris vittata*, *Adiantum philippense*, *Selaginella delicatula* were found in most of the localities. The species compositions were depending upon the altitude, biotic and abiotic factors of that region.

Keywords: Pteridophytic diversity, higher altitude, Northern Western Ghats



Crosslinked Chitosan-Polyvinyl Alcohol Blend Beads Of Pb(II) From Wastewater For Removal And Recovery

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ABSTRACT

Crosslinked chitosan/poly (vinyl alcohol) (PVA) blend aqueous solution was suspended in toluene-chlorobenzene to form droplets. Some of the water then distilled out as azeotropes with the aromatic hydrocarbons to reduce the water content of the suspension droplets. Glutaraldehyde was finally added to the suspension to result in the cross linked chitosan/PVA beads with low water content and high mechanical strength. In addition, prepared crosslinked beads were characterized by FTIR, X-ray diffraction (XRD), Scanning electron microscopy (SEM), and thermogravimetric analysis (TGA) the efficiency of crosslinked chitosan/PVA bended bead as an adsorbent for the removal of Pb(II) from water was studied. It was found to exhibit substantial adsorption capacity over a wide range of initial Pb(II) ion concentration. Effect of time, temperature pH, adsorbent dose and the concentration of adsorption of Pb(II) were investigated by batch process. Pseudo-first-order and pseudo-second-order model were evaluated. The kinetics data for the adsorption process follow the second order rate equation. The equilibrium studies data could be described well by the Langmuir and Freundlich isotherms. The thermodynamic parameters such as ΔG^0 , ΔH^0 , ΔS^0 , are calculated. It was found that the values ΔH^0 and ΔS^0 increase while the values ΔG^0 decline with rise in temperature. Thus the adsorption process was found to be endothermic and spontaneous. The maximum adsorption Pb(II) ion (76.51%) in pH range 5-6 indicated that material could be effectively utilized for the removal of Pb(II) ion from waste water. The adsorption study showed 62% recovery of Cu (II), when 0.1 EDTA solutions were used as an effluent.

Keywords: chitosan/PVA beads, Adsorption, Pb(II) ion, Langmuir and Freundlich isotherms



Modulatory Effect Of Curcumin Nanoparticles On Islets Of Langerhans Of Alloxan Induced Diabetic Mice

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ABSTRACT:

Over the past few years, nanotechnology has emerged in the field of medical science. Nanoparticles are used in targeted drug delivery systems. Curcumin, active principle of *Curcuma longa*, is used in many diseases due to its potential health benefits. However, it has poor bioavailability, poor solubility and low absorption. To overcome these problems, curcumin nanoparticles *i.e.* nanocurcumin was prepared by double emulsion solvent evaporation method. The present study revealed the effects of nanocurcumin on blood glucose level and histology of islets of Langerhans of pancreas in alloxan induced diabetic mice. 20 albino male mice were divided into 4 groups. (n=5): Control, Diabetic, Recovery I and Recovery II group. Control group was given subcutaneous injection of 0.15 M acetate buffer for 15 days. Subcutaneous injection of alloxan -150 mg/kg body weight was given to induce diabetes. Diabetic mice were given intraperitoneal injection of curcumin-150 mg/kg/day for 15 days in Recovery I group. Diabetic mice were given intraperitoneal injection of nanocurcumin-150 mg/kg/day for 15 days in Recovery II group. At the end of experimentation, blood glucose level and histology of pancreas was studied. In diabetic mice, blood glucose level was significantly increased, but after nanocurcumin administration, blood glucose level was decreased near to normal. Histological assessment of islets of Langerhans showed complete recovery of damaged cells and the restoration of the original size of the islets of Langerhans after nanocurcumin administration. This study showed that nanocurcumin had more curative effects than curcumin. Thus, nanocurcumin reduces blood sugar level and modulates the degenerative changes in islets of Langerhans of diabetic mice.

Keywords: Nanocurcumin, Islets of Langerhans, alloxan, histology



Double Exposure Digital Holographic Interferometry For Biological Systems

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ABSTRACT

In the past decade three-dimensional optical imaging has emerged as a leading tool for scientific discovery in many different fields. Now a day's digital holographic interferometry is emerging as a viable tool to study the non destructive testing of the various materials. This paper describes the applications of holographic interferometry to study the various systems for 3D imaging in the biological systems which can be further improved by using high resolution cameras. A brief method is described to study digital microscopy. The system is tested with measurement of the diffusion coefficient of sodium nitrates with distilled water and studied the scattering of colloidal particles using holographic microscopy.

Key words: optical imaging, digital holographic interferometry, non destructive testing, holographic microscopy



Gastrin/ Cholecystokinin 8 Immunoreactivity In The Central Nervous System Of The Freshwater Bivalve *L. Corianus* After Exposure To Heavy Metal

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ABSTRACT:

The distribution of Gastrin/CCK 8 was analyzed in neurons of different regions, specifically from cerebral ganglia (procerebrum (pro-c), mesocerebrum (meso-c) and metacerebrum (meta-c) following acute treatment with mercuric chloride (HgCl₂) in freshwater bivalve. In the control group, neurons of cerebral ganglia showed positive immunoreactivity using vertebrate antiserum against gastrin/CCK 8. Gastrin/CCK 8 immunoreactivity was also seen in the fibers and neuropil region of the ganglia. In the pro-c 12.7% gastrin / CCK 8 neurons were immunostained with the antibody, while 14.72% form meso-c and 9.88% form meta-c respectively. The immunostaining was increased in neurons after HgCl₂ treatment. Exposure to HgCl₂ enhanced gastrin immunoreactivity in the neurons and this increased with time.

Keywords: Freshwater bivalve *L. corrianus*, HgCl₂, Neurons, Gastrin/CCK 8- Immunohistochemistry



Morphological changes In Chick Embryo Neural Tissue Associated With Warfarin Use During Prenatal Development

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ABSTRACT:

Warfarin is generally called as blood thinner that inhibits the clotting of blood by reducing the production of factors by the liver that promotes clotting. It is anticoagulant drug due to this it helps to keep blood flowing smoothly in our body. The liver is dependent on a good enough amount of vitamin K due to the production of these factors by the liver. Warfarin is responsible for reducing the production of the factors. The aim of this study was to determine the effect of prenatal warfarin exposure on cell viability and cell morphology in chick embryonic neurons; specifically to identify areas of the hindbrain that may be affected, to an extent contributing to Dandy-Walker Syndrome (DWS). histological staining technique namely Haematoxylin and Eosin (H&E) staining was used to evaluate chick embryonic neural tissue exposed to 4.865mM and 5.838mM warfarin on day 5 (Carnegie stage 17) and day 7 (Carnegie stage 20) of development. For further analysis of cell viability, primary chick embryonic Neuronal Cultures were prepared and increasing concentrations of warfarin (1.625mM, 2.435mM, 3.25mM, 4.865mM, and 5.838mM) were added. The percentage of cell viability was determined by the MTT assay method. We observed that warfarin indicated neurotoxicity at high concentrations of exposure. Although cell death could be detected, the exact mechanism needs to be yet investigated. Since the developing brain is so susceptible to chemical toxicity, care must be taken while administering warfarin to pregnant mothers or young children.

Key words: Warfarin, Atrial, Fibrillation, AF and Anticoagulation



Hypoglycemic and Hepatoprotective activity of *Elettaria cardamomum* extract in HFD/STZ induced Diabetic mice.

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ABSTRACT:

Chronic hyperglycemia affects metabolism of carbohydrates, protein, lipid and it can leads to various organ dysfunction. The present study examined the effect of ethanolic extract of *Elettaria cardamomum* (ECE) on hepatocytes of HFD/STZ induced diabetic mice. In this study male mice were divided into three groups (n=7 per group): Control, Diabetic and Recovery group. Diabetes was induced by feeding high fat diet (HFD) for two weeks followed by an injection of streptozotocin (STZ) (40 mg/kg body weight, intraperitoneally). In recovery group, diabetic mice were fed ECE at a dose of 200mg/kg for 28 days. Blood glucose and histology of liver in all experimental groups were examined. The blood glucose level significantly increased in diabetic mice as compared to the control. In recovery group, administration of ECE for 28 days significantly decreased the elevated blood glucose near to normal. Histopathological studies in liver tissue showed that ECE has reduced necrotic changes in hepatocytes in diabetes mice. This study revealed ECE has hypoglycemic and hepatoprotective effects.

Keywords: Hyperglycemia, *Elettaria cardamomum* extract (ECE), Hepatoprotective, Streptozotocin



To Study Antimicrobial Activity For Synthesized Silver Nanoparticles By Using Fresh Leaves Of Allium Sativum

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ABSTRACT

Green synthesis of nanomaterials has gaining popularity because of cost effective and eco friendly nature. Allium Sativum is used as traditional medicine today. Garlic is wonderful antibiotic having number of applications.

In present study we synthesize silver nanoparticles by using allium sativum fresh leaves. Characterisation of nano particles was done using Different methods which include uv visible spectroscopy, FTIR and antibacterial activity. From UV-analysis with absorbance peak at 421 nm, formation of Ag nanoparticles is confirmed. FTIR showed that the functional groups such as C-O, C=O, N-HCN were responsible for the reduction and capping material of Ag nanoparticles.

Antibacterial activity of Ag NPS against generally found bacteria was assessed to find their potential use in silver containing antibacterial products. The present paper includes the study of synthesis of silver nanoparticles and study antibacterial activity.

Keywords: Silver nanoparticles, ecofriendly, allium sativum, Antibacterial activity, UV analysis.



**Life tables and intrinsic rate of increase in *Dolichogenidea mythimna* S. & B.,
a larval parasitoid of *Mythimna separata* Walker.**

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ABSTRACT

The longevity of ovipositing females of *Dolichogenideamythimna* S. & B., a larval parasitoid of *Mythimnaseparata* Walker ranged from 7 to 8 days (mean 7.8 days). The number of progeny produced averaged 48.4 (range 44 – 54) individuals. The male: female offsprings averaged 1: 1.401 (range 1: 1.120 - 1: 1.611). The first adult mortality was on the fourth day. Average length of immature stages of parasitoid was 17 days. The maximum progeny production per day, (m_x) was 34.20 on first day and reproduction stopped on fourth day. The intrinsic rate of increase (r_m) per female per day was 0.217 (Fig. 1) and population multiplied 48.4 times in mean generation time ‘T’ of 17.87 days.

Key Words: Life table, *Dolichogenidea mythimna*, larval parasitoid, *Mythimna separata*.



**Biology Of *Xanthopimpla Paddae* C. & S. (Hymenoptera: Ichneumonidae) A
Parasitoid Of *Thiocidas Postica* (Walk)**

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ABSTRACT

Xanthopimpla paddae C. & S. is potential biocontrol agent of *Thiocida postica* (Walk) a horticultural pest in Kolhapur district. It attacks caterpillars of *T. postica* as host for completing its life cycle as parasitoid. In the present paper biology, life stages with their biometric measurements are studied in detail. The life cycle of the parasitoid egg to adult emergence have been completed within 24 days. Egg hatching period was 3 days, larval period was 18-20 days and pupal period was 5 days. Single egg was oviposited by female in the host which was oval and elongated. First instar cream coloured with 13 post cephalic segments. Second instar larger in size with reduced tail & more sclerotized head. Third instar was opaque white with well developed tracheal system. Fourth instar was elongated and hymenopteriform and fifth instar was with clear and distinct segments. The results are useful for mass rearing of the above parasitoids.

Key words: *Xanthopimpla paddae*, biocontrol agent, *Thiocidas postica*, pest, biology



Synergistic Effect Of Agrochemicals (Insecticides) On Development Of Streptocycline Resistance In *Xanthomonas Axonopodis*.

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ABSTRACT:

In India, Maharashtra is the leading producer of Pomegranate in the country and accounts for 66.2% of the total production of pomegranate in the country. Pomegranate plant having various economic important but it get infected due to the various fungal and bacterial diseases. Large scale infestation of Bacterial Blight disease caused due to *Xanthomonas axonopodis* pv. *Punicae* has resulted in considerable damage to the crop from 2006-07. The studies on the effect of streptocycline with different agrochemicals will help in the management of the disease.

Keywords: Pomegranate, Bacterial Blight, *Xanthomonas axonopodis*



Hydrothermal Synthesis Of Vanadium Pentoxide For NO₂ Gas Sensing

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ABSTRACT

In present work, vanadium pentoxide (V₂O₅) thin film was successfully synthesized by simple and low cost hydrothermal method for NO₂ gas sensing. Orthorhombic crystal structure of prepared V₂O₅ was confirmed with the help of X- Ray Diffraction (XRD) technique and Raman Spectroscopy. Nano stick like morphology was confirmed with the help of Scanning Electron Microscopy (SEM). Optical band gap was calculated using UV Visible spectrophotometer and it is about 2.7 eV. In order to identify presence of defects or disorders, Photoluminescence (PL) spectroscopy was used. Eventually gas sensing performance of V₂O₅ towards oxidising gas NO₂ was measured and results shows good results at relatively low working temperature. Observed gas response is 3.43% at 100°C, while response/ recovery time is 44 and 399 sec respectively. Thus it is possible to fabricate V₂O₅ based gas sensor working at relatively low temperature.

Keywords: Vanadium Pentoxide, Gas Sensor, Hydrothermal Method, NO₂ gas, etc



pH Varied Molybdenum Disulfide Nanosheets for Supercapacitor Application

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ABSTRACT:

The present study focuses on synthesis of MoS₂ by facile and inexpensive hydrothermal method. The effect of pH value of precursors on structural and electrochemical properties was investigated in detail. XRD analysis confirms the formation of hexagonal crystal structure. The Raman analysis was performed to study the modes of vibrations of MoS₂. BET analysis reveals that maximum surface area is exhibited by MoS₂ prepared in acidic pH conditions. The electrochemical analysis performed in 1 M KOH electrolyte shows that maximum specific capacitance of 857 F/g at 5 mV/s scan rate was achieved for MoS₂ prepared in acidic media. MoS₂ electrode exhibited low charge transfer resistance with good cyclic stability of 80% over 1000 cycles. These results suggest that hydrothermally synthesized MoS₂ nanosheets can serve as potential candidate for supercapacitor application.

Keywords: MoS₂, Hydrothermal, pH, Supercapacitor, Specific Capacitance.



Study Of Lead-Free Tin Based Perovskite Solar Cells From Simulation Approach

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ABSTRACT:

Perovskite solar cells have fascinated the enormous interest of researchers. Because of high compositional flexibility, perovskite materials became the part of emerging technology. Most commonly used lead based perovskite absorber layer methyl ammonium lead tri-iodide (MAPbI_3) seeking the attention due to its high power conversion efficiency. But there are some limitations on that material as lead is toxic in nature. During this work, we are going to find a good alternative for lead in order to synthesize lead free perovskite solar cell. Thus, we have replaced lead by Sn or Ge material as they are not harmful. While doing study theoretically, we have used the simulation software SCAPS-1D (Solar Cell Capacitance Simulator) which is used for one-dimensional thin film solar cell. In prescribed study, we studied the material methyl ammonium tin tri-iodide (MASnI_3) based solar cell by simulation method. We have optimised the parameters like thickness of Electron Transport Layer (ETL), Hole Transport Layer (HTL) and also of perovskite absorber layer. Also, we varied Electron Transport Material (ETM) and Hole Transport Material (HTM) in order to enhance the power conversion efficiency.

Keywords: Solar cell, efficiency, ETL, HTL, MASnI_3 , SCAPS-1D.



In Vitro Nitric Oxide Scavenging Activity Of Two Plants Of Amaranthus Family.

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ABSTRACT:

Oxidative stress resulting from the accumulation of reactive oxygen species can cause many diseases such as cancer, liver injury, and cardiovascular disorders, whereby antioxidants with free radical scavenging activity play an important role in protecting damage by reactive oxygen species. Plant-derived antioxidants reduce the risk of development of such chronic diseases, serve as an alternative for synthetic antioxidants, and can be used as food additives to prevent food deterioration, also. Amaranthus Tricolor and Amaranthus Viridis of the Amaranthaceae family, are widely cultivated leafy vegetables in India and many countries across the world. The objective of the study was to perform the comparative antioxidant potential of these two plants by nitrite radical scavenging assay. The ethanol and acetone extracts of the leaves of these two plants were used to determine their nitrite radical scavenging ability by studying their possible regulatory effect on nitric oxide (NO) levels using sodium nitroprusside as a NO donor in vitro. All the extracts of these two plants tested demonstrated direct scavenging of NO and exhibited a dose dependent NO scavenging activity and suggest that these plants might be potent and novel therapeutic agents for scavenging of NO and the regulation of pathological conditions caused by excessive generation of NO and its oxidation product.

Keywords: Amaranthaceae, Amaranthus *Tricolor*, Amaranthus *Viridis*, Antioxidant activity, nitric oxide scavenging activity.



Synthesis and Characterization of Nickel Cobalt Layered Double Hydroxide (NiCo-LDH) for Water Splitting Application.

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ABSTRACT:

Electrochemical water splitting is one of the finest method for hydrogen (H₂) generation and 2-Dimensional (2D) layered materials are now in trend for their latest structural features in catalysis and the energy storage property. The Layered double hydroxide is also 2D layered material which is low cost and environment friendly in nature. Development of the nanostructured architectures using low-cost, first-row transition metals with high electrocatalytic activity to replace noble-metal-based electrocatalysts has recently gained considerable attention in the field of clean and sustainable energy generation technology. In this study highly effective, binder-free Nickel Cobalt Layered Double Hydroxide (NiCo-LDH) nanosheets on Nickel foam (NF) substrates were synthesised via simple hydrothermal synthesis method for the electrochemical water splitting application. For the synthesis of NiCo-LDH, CoCl₂.6H₂O and NiCl₂.6H₂O precursor material and distilled water was used. The reaction was carried out at 120⁰C for 8 hour. The structural, morphological, optical and functional group properties of synthesized Nickel foam were investigated by X-ray diffraction, SEM, UV-visible, and FT-IR spectroscopy respectively. The band gap of synthesized material is 2.1eV. The electrochemical water splitting measurement of the as-prepared film was carried out by using Linear Sweep Voltametry (LSV) and Electrochemical Active Surface Area (ECSA).

Keywords: Water splitting, Layered double hydroxide, NiCo-LDH.



Structural, Morphological, And Magnetic Properties Of $Zn_xCo_{1-x}Fe_2O_4$ ($0 \leq x \leq 1$) Prepared Using A Chemical Co-Precipitation Method

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ABSTRACT:

In the present study, the chemical co-precipitation technique was adopted to synthesize $Zn_xCo_{1-x}Fe_2O_4$ (ZCF) ($0 \leq x \leq 1$) ferrites. The thermo gravimetric-differential thermal analysis results revealed that above 405 °C, the precursor had decomposed and ferrite formation had occurred. The structure and morphology of the prepared ferrite nanoparticles were investigated using X-ray diffraction, Fourier transform infrared spectroscopy, and field emission scanning electron microscopy (FE-SEM). The synthesized polycrystalline nanoparticles had a cubic spinel structure and the crystallite size was in the range of 6.09–12.98 nm. The prepared ferrites appeared as nearly spherical nanoparticles with a particle size in between 0.13 and 0.23 μm , as confirmed using FE-SEM. The elemental composition was determined using the energy-dispersive X-ray spectroscopy technique. The influence of the Zn-substituted cobalt ferrites (ZCF) on the structural, morphological, and magnetic properties were studied. The magnetic properties of the ZCF samples such as saturation magnetization, remanence magnetization, and coercivity measured at room temperature were 0.387–2.065 emu/g, 0.057–1.282 emu/g, and 60–1834 Oe, respectively. It was confirmed from the nature of the hysteresis loops that the given ZCF samples can be considered as a soft magnetic material.



Preparation Of Carbon Quantum Dots From Bio-Waste Material For Energy Storage Device.

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ABSTRACT:

The promising materials for nanotechnology include new class of carbon nanomaterials composed of fluorescent carbon quantum dots (CQDs) of size below 10 nm. Due to their small in size, the CQDs have gained much more attention in fields of energy storage devices. The CQDs have excellent properties like photoluminescence, biocompatibility, tunable surface functionalities, water solubility and low toxicity. Hence researchers have attracted much interest to improve the CQDS based composite material properties for efficient energy storage devices. Here, we discuss in details the various synthesis parameters for ecofriendly and cost-effective hydrothermal route. The resulting synthesis of CQDs from bio-waste material will improve the properties of CQDs applicable for energy devices.

Keywords: CQDs, parameters, hydrothermal route, energy device etc



Green Synthesis Of Silver Nanoparticle By Using Aloe Vera Extract

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ABSTRACT

The present work synthesized silver nanoparticles using Aloe Vera leaf extract. Synthesis of silver nanoparticles carried out without using any toxic chemicals. Silver nanoparticles have been the most investigated nanoparticles due to their good antifungal and antimicrobial properties. Experiments have been carried out in two ways with and without sunlight mediation. The characterization of green synthesized silver nanoparticles was done using of UV-Visible and Infra-red spectroscopy. The formation of silver nanoparticles monitored by UV-Vis Spectroscopy at different time intervals. The size of silver nanoparticles confirmed by Scanning Electron Microscopy (SEM). The antifungal and antimicrobial activity as prepared silver nanoparticles was investigated.

Keywords: Green synthesis, silver nitrate, Aloe Vera extract



Effect of Calcination temperature on morphology of Mixed oxides prepared by Sol-gel method

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ABSTRACT:

Solid acid catalysts are significant for the simplicity and diversity of process engineering and catalyst regeneration, as well as for decreasing reactor, plant, and environmental corrosion concerns, as well as for industrially relevant reactions. They're non-corrosive, safe for the environment, and simple to separate from the reaction.

In this work, Fe/Mo/SiO₂ mixed oxides were prepared with different concentrations of iron oxides on molybdenum and silica by using sol-gel method. Supported molybdenum oxide catalysts are widely used in various catalytic processes. molybdenum promoted silica exhibits strong acidity and excellent catalytic properties for various organic synthesis and transformation reactions in the liquid phase. Various methods have been reported for the synthesis of mixed oxides. The synthesized materials were calcined at different temperature such as 400 °C, 500 °C and 600 °C. XRD were recorded to study the changes in morphology of the mixed oxides which confirmed the size and phase of the mixed oxides.

Keywords: Mixed oxides, calcination, catalysts, molybdenum, XRD



Modulatory Effect Of Curcumin Nanoparticles On Islets Of Langerhans Of Alloxan Induced Diabetic Mice

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ABSTRACT:

Over the past few years, nanotechnology has emerged in the field of medical science. Nanoparticles are used in targeted drug delivery systems. Curcumin, active principle of *Curcuma longa*, is used in many diseases due to its potential health benefits. However, it has poor bioavailability, poor solubility and low absorption. To overcome these problems, curcumin nanoparticles *i. e.* nanocurcumin was prepared by double emulsion solvent evaporation method. The present study revealed the effects of nanocurcumin on blood glucose level and histology of islets of Langerhans of pancreas in alloxan induced diabetic mice. 20 albino male mice were divided into 4 groups. (n=5): Control, Diabetic, Recovery I and Recovery II group. Control group was given subcutaneous injection of 0.15 M acetate buffer for 15 days. Subcutaneous injection of alloxan -150 mg/kg body weight was given to induce diabetes. Diabetic mice were given intraperitoneal injection of curcumin-150 mg/kg/day for 15 days in Recovery I group. Diabetic mice were given intraperitoneal injection of nanocurcumin-150 mg/kg/day for 15 days in Recovery II group. At the end of experimentation, blood glucose level and histology of pancreas was studied. In diabetic mice, blood glucose level was significantly increased, but after nanocurcumin administration, blood glucose level was decreased near to normal. Histological assessment of islets of Langerhans showed complete recovery of damaged cells and the restoration of the original size of the islets of Langerhans after nanocurcumin administration. This study showed that nanocurcumin had more curative effects than curcumin. Thus, nanocurcumin reduces blood sugar level and modulates the degenerative changes in islets of Langerhans of diabetic mice.

Keywords: Nanocurcumin, Islets of Langerhans, alloxan, histology



Supercapacitor Performance of NiCo₂O₄ Electrode Prepared by Chemical Bath Deposition Method

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ABSTRACT

Super capacitor with better capacitance and reasonably high energy densities are becoming a perfect solution towards the recent demand of various energy storage applications. High-performance, cost-effective and environmentally-friendly electrode materials play an important role in the development of more effective electrochemical energy storage solutions. Synthesis of different nanostructures, chemical modification and assimilation with conductive nano architectures are the enormous strategies in the development of recent high performance NiCo₂O₄-based electrodes for supercapacitors. In the present work, Nickel-cobalt oxide is synthesized by using chemical bath deposition method on nickel foam as super capacitor material. The morphology, composition and structure of the composites were studied by scanning electron microscopy (SEM), X-ray diffraction (XRD), UV- Vis Spectroscopy and Infrared spectroscopy. SEM images showed that the composite material presented a nanosheets like morphology. The nanosheets having width ranges from 50 nm to 90 nm for concentration of 0.1M Ni- precursor and 0.2M Co- precursor. 1M urea used as complexing agent and 0.025M ammonium fluoride used as surfactant for the reaction. The reaction accomplished at temperature 80 for 2Hrs.

Keywords: supercapacitor, NiCo₂O₄, nanofiber, Chemical Bath Deposition (CBD)



Hydrothermally Synthesized Nickel Cobalt Metal Organic Framework Based Electrode Material in Supercapacitor Application

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ABSTRACT:

Nickel cobalt metal organic frameworks (Ni-Co MOFs) are outstanding materials for electrochemical energy storage devices. Hydrothermally synthesized Ni-Co MOF materials are characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), fourier transform infrared spectroscopic (FT-IR) technique and raman spectroscopy etc. Considerably, enhanced performance of energy storage is observed for the Ni-Co MOF material having ratio 2:1. It shows the specific capacitance of value 1497 F/g at current density 8A/g. For Ni-Co MOF material the energy and power densities are found to be 40.25Wh/kg and 174.58 W/kg respectively which are outstanding results supercapacitor application.

Keywords: Ni-Co MOF; Supercapacitor; SEM; XRD; FT-IR



Preparation of MoO₃ Film by Spray Pyrolysis Method and its Characterization

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ABSTRACT:

The spray pyrolysis method has been used for synthesis of MoO₃ thin films. Ammonium molybdate was used as a precursor and distilled water as solvent for synthesis of MoO₃ material. During the synthesis 25 ml of 0.05 M solution was sprayed on glass substrate at 350°C. The crystal structure and surface morphology of MoO₃ films were studied via X-ray diffraction and scanning electron microscopy techniques respectively. The XRD pattern of MoO₃ films shows polycrystalline nature and more intensive peak at $2\theta = 25.41^\circ$ having hkl plane (610). The SEM images show nanorods like morphology. The UV visible absorption spectra show absorption in the visible region. The estimated bandgap is around 2.05 eV.

Keywords: MoO₃; XRD; SEM; UV-Visible; Crystalline size.



Nickel Iron Layered Double Hydroxide for Efficient Water Splitting

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ABSTRACT:

Water splitting is the key factor of clean, carbon emission free, attractive alternative technique to produce pure oxygen and hydrogen gas. Within last two decades researchers are taking efforts to prepare noble-metal-free electrochemical water splitting electrodes, which is very promising approach towards evolution of O₂ and H₂. It is important to construct robust and stable multifunctional material for renewable energy. The layered doubled hydroxide based on transition metals having prominent attention in energy field due to its efficiency and binder free nature. In the present work, Nickel Iron Layered Doubled Hydroxide (NiFe-LDH) nanosheets thin films were deposited on nickel foam by using ecofriendly and inexpensive hydrothermal technique for electrochemical water splitting application. Here we used Ni (NO₃)₂ and Fe (NO₃)₃ as precursors with DI water for synthesis of NiFe-LDH nanostructure. This reaction was carried out at 120°C for 12hrs. The band gap of synthesized NiFe-LDH is 2.01eV. The structural, morphological, optical and functional group property of synthesized nickel film was investigated by X-ray diffraction, SEM, UV-visible, and FT-IR spectroscopy respectively. The electrochemical measurement of the as-prepared film was carried out by using cyclic voltammetry and Electrochemical Active Surface Area (ESCA).

Keywords – NiFe-LDH, Hydrothermal Technique, Water splitting.



Toxicological Effect Of Insecticide Pirimicarb On Glycogen Content Of Freshwater Fish *Cirrhinus mrigala*

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ABSTRACT

Pirimicarb is a carbamate pesticide and selective insecticide commonly used to control aphids on crop plants. The mechanism of action is to inhibit the enzyme acetylcholinesterase. Most of the insecticides have been known to be highly toxic to non-target organisms that inhibit natural environments close to the agriculture field. Glycogen is glucose polysaccharides present in animals and act as a major energy source and also energy storage. In the present study, Fingerlings of freshwater fish *Cirrhinus mrigala* were acclimatized in a glass aquarium for fifteen days. After acclimatization, they were exposed to predetermined LC₀ and LC₅₀ concentrations of insecticide Pirimicarb for 96 hours. It was observed that the total glycogen content in liver, muscle, brain and gill tissue was significantly decreased in LC₀ and LC₅₀ concentration groups as compared to the control group, which in turn infers that the selected insecticide Pirimicarb interferes in normal carbohydrate metabolism glycogen storage and utilization.

Keywords: Pirimicarb, Glycogen, Carbamate, Acute Toxicity, *Cirrhinus mrigala*.



Synthesis and Characterization of Nickel Oxide Nanoparticles for Degradation of Malachite Green Dye

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ABSTRACT:

The Nickel oxide (NiO) nanoparticles (NPs) used as semiconducting photocatalyst for degradation of malachite green dye. The NiO NPs were synthesized by chemical bath deposition (CBD) method, this method is usually used for synthesis materials and conducted in low temperature ($<100^{\circ}\text{C}$). We prepared Nickel Hydroxide $\text{Ni}(\text{OH})_2$ by using Nickel sulphate (NiSO_4) as precursor and mixture of double distilled water and Ammonia Solution (NH_4OH) as solvent. For getting pure NiO material, samples were annealed. The powder of NiO NPs were synthesized by varying different molar concentration of Nickel Sulphate and holding Ammonia Solution constant. The Reaction is carried out constantly at 80°C for one hour with continuous stirring. This synthesized material of Nickel Oxide (NiO) is characterized by X-Ray diffraction (XRD), Scanning electron microscopy (SEM), Infra-Red (IR) and Uv-Visible spectroscopy. In the presence of Visible light irradiation NiO NPs were subsequently used for the photocatalytic degradation of malachite green dye. Among the metal oxides, NiO has a wide band gap ($E_g = 3.6$ to 4.0 eV). Photocatalytic proficiency evaluation done by parameters like Initial dye concentration, pH of dye solution, Irradiation time and amount of the catalyst.

Keywords:

Nickel oxide NPs; Ammonia solution; Malachite green; Chemical Bath Deposition; Degradation



Synthesis and Characterization of Tin di-sulfide (SnS₂) Nanoparticles by Hydrothermal Method for Photocatalysis.

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ABSTRACT:

The present study is focused on tin di-sulfide nanoparticles and its application for dye degradation. Tin di-sulfide [SnS₂] is attracting attention due to its unique crystalline composition and its excellent properties. In the paper work SnS₂ Nanoparticles were synthesized by hydrothermal method at 150°C. For synthesis 0.1M of Tin chloride pentahydrate (SnCl₄·5H₂O) and 0.02M Thioacetamide (C₂H₅N₂S) used as precursors in isopropyl alcohol and distilled water is 50:50% in 80 ml. As Prepared [SnS₂] nanoparticles characterized by XRD for structural analysis, SEM for morphological analysis. Molecular study is done by IR spectroscopy. UV-Visible measurements were carried for band gap estimation. Photocatalytic dye degradation of MB dye is studied

Keywords:

SnS₂, Hydrothermal method, Nanoparticles; photocatalysis good response.



Titanium Dioxide (TiO₂) Nanoparticles Synthesized By Sol Gel Method .

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ABSTRACT

Photoactivation of TiO₂ has acquired expansive curiosity from researchers over the last few decades. This attentiveness has been give rise as a consequence of convergence of several marvellous evolution. Titanium Dioxide (TiO₂) nanoparticles synthesized by sol-gel technique. For the preparation of TiO₂ nanoparticles titanium isopropoxide (C₁₂ H₂₈ O₄ Ti) is used as precursor and concentrated HCl is used as acid catalyst. Synthesized nanoparticles annealed at various temperature . Due its antireflective property it will applicable in solar cell fabrication.

Keywords : TiO₂ , photoactivation, sol-gel technique



Solvothermal Synthesized Zinc Oxide Thin Films for Gas Sensing Application

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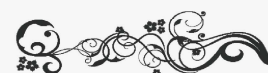
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ABSTRACT:

In recent years [semiconducting metal oxides](#) like SnO₂, ZnO, CuO, Co₃O₄, V₂O₅, α-Fe₂O₃, NiO and WO₃ metal oxides showing promising performance for gas sensing application. Among them Zinc Oxide (ZnO) is considered as the promising candidate for resistive type gas sensing due to its morphology. In this study, we synthesized Zinc Oxide nanorods for gas sensing application by solvothermal method. ZnO nanorods were deposited on seed layer substrates of Zinc Oxide (ZnO) which were prepared by spray pyrolysis method. ZnO is a n-type semiconductor material having band gap nearly equal to 3.37 eV. Zinc nitrate [Zn(NO₃)₂] and Hexamethylenetetramine (HMTA) is used as a precursor material and distilled water as a solvent. Hexamethylenetetramine (HMTA) was used as a directing agent. The solvothermal reaction for Zinc Oxide was carried out at temperature 90° for 4 hour for 0.05 M concentration of Zinc Nitrate. As deposited and annealed ZnO thin films were investigated for gas sensing performance. Further structural, morphological, optical and functional group property of synthesized ZnO films were characterized by X-ray diffraction, SEM, UV-visible, and FT-IR spectroscopy respectively.

Keywords: - Semiconducting metal oxides, Zinc Oxide, gas sensing, solvothermal method, Thin films, environmentally hazardous gases.



Synthesis and Characterization of Tungsten Oxide nano particles by hydrothermal method for Gas Sensing Application

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ABSTRACT:

Tungsten oxide (WO₃) nanoparticles were successfully prepared by hydrothermal method at 180°C for 24 hours with Sodium Tungstet, Hydrochloric acid and Oxalic acid precursors and subsequently material confirmation was done by X-ray diffraction technique, XRD confirms monoclinic structure of WO₃ nanoparticles, surface morphological study of the prepared material were done by Scanning Electron Microscopy, SEM reflects nanoflake like appearance of prepared material, optical band gap of the prepared material was checked by UV-Visible spectroscopy. The metal oxide semiconductors at nanoscale show interesting gas sensing properties. In the present work, NO₂ gas sensing performance of tungsten oxide nanoparticles was studied. The extended study of prepared material for NO₂ gas sensing was done successfully. Present work reflects superior response of tungsten oxide nanocomposite towards NO₂ gas sensing. The selectivity and sensitivity of tungsten oxide nanoparticles towards NO₂ gas reveals that tungsten oxide nanoparticles are strong candidate for NO₂ gas sensor.

Keywords: Tungsten oxide nanocomposite, hydrothermal method, NO₂ gas sensor.



Facile Fabrication Of Durable Candle Soot -Wax Composite Coated Superhydrophobic Stainless Steel Mesh For Oil-Water Separation Application

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ABSTRACT:

Nowadays, the Lotus leaf-inspired superhydrophobic coating has been used in various industrial applications. Among them, the use of superhydrophobic materials for potential application prospects such as oil-water separation has gained growing interests. However, a simple and low cost strategy for fabrication of durable superhydrophobic materials remains a major challenge. The separation of oil-water mixture is one of the most important applications of superhydrophobic coating. Herein, the superhydrophobic coated stainless steel mesh can be separate easily oil from oil-water mixture. The candle soot has the advantages of cost-effectiveness and production scalability over other carbons (i.e. graphene, carbon nano-tubes, etc.) in the synthesis. The superhydrophobic coated mesh can be separate easily oil from oil-water mixture. The present work describes facile fabrication method of preparation of superhydrophobic stainless steel mesh. The layer of candle soot particles deposited on mesh by holding in the middle part of candle flame and thereafter wax deposited using dip-coating method to form the candle soot-wax composite coating. The water contact angle was 155° and oil contact angle nearly 0° reveals formation of superhydrophobic stainless steel mesh that efficiently separate oil-water mixture. So, these superhydrophobic mesh can be applicable to use in industries for oil-water separation.

Keywords: Candle soot, superhydrophobic, stainless steel mesh, dip-coating method and oil-water separation.



A comparative study of commercial samples of *Shauktik Bhasma*

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ABSTRACT

Shauktik Bhasma is a traditional ayurvedic medicine which is claimed to be excellent remedy for a number of stomach disorders, high per acidity and ulcers. To get a worldwide recognition to such supreme ancient medicine, it is necessary to reinvestigate it on basis of modern analytical techniques. In the present work a comparative study of some commercial samples of shauktik bhasma is undertaken to understand the current status of this bhasma. Samples from renown pharmacies are collected and chemical and structural investigations of the samples is done using analytical techniques like XRD, IR and UV. Antacid activity of the samples is also reported for these samples using standard method.

Key words: Shauktik Bhasma, Structural investigations Antacid activity



**Numerical study on eco-friendly Cs₂TiBr₆ inorganic perovskite solar cell by
using SCAPS -1D.**

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ABSTRACT

Perovskite solar cell is a new emerging era in photovoltaic applications. The lead-based perovskite solar cell faces major problem due to stability and toxicity issue. Therefore, here we propose a theoretical study of lead free, eco-friendly, and stable Cs₂TiBr₆ based all inorganic n-i-p structured perovskite solar cell. Cs₂TiBr₆ is a promising material as an absorber layer of solar cell. Further studies optimise that perovskite solar cell with good power conversion efficiency. The Cs₂TiBr₆ Perovskite acts as an absorber layer with band gap 1.8 eV and Cu₂O and TiO₂ as hole transport layer (HTL) and electron transport layer (ETL) respectively. Investigation shows that as the thickness of absorber layer increases, the power conversion efficiency also increases up to the certain limit. The temperature range for the device performance is around 270K to 280K. The compound shows more stability and appropriate efficiency. The compound is simulated in this work by using the solar cell capacitance simulator (SCAPS 1D) and measure the efficiency by varying thickness.

Keyword- Perovskite solar cell, Cs₂TiBr₆, HTL, ETL, SCAPS 1D.



Optimization of Sintering Temperature for Mg-Mn Ferrite by using Co-precipitation Method.

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ABSTRACT -

In the present work, nanocrystalline Mn ferrite is prepared by low-cost oxalate co-precipitation method. These prepared samples were sintered at different temperatures viz., 300K, 450K and 650K for 3h, 2h and 1h respectively. These samples were characterized by x-ray diffraction (XRD), SEM, FT-IR. The XRD study shows formation of single phase cubic spinel structure of Mn ferrite sintered at 650K for 1h temperature. The crystallite size was calculated by using Debye-scherrer formula. FT-IR technique were used to final confirmation of ferrite.

Keyword-Nanocrystalline, Co-precipitation method, Sintering temperature.



**Eco-benign synthesis of Benzotriazepine Spirooxindoles by using *p*-TSA as
efficient catalyst**

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ABSTRACT

p-toluenesulfonic acid as efficient catalyst for the synthesis of benzotriazepine spirooxindoles by one-pot reaction of isatoic anhydride, hydrazine hydrate and isatin in ethanol at reflux condition. The benefits of this method is novelty, multicomponent strategy, high yields, shorter reaction times, operational simplicity, mild reaction conditions, simple precursors, employment of green solvent ethanol as well as an inexpensive, nontoxic and commercially available catalyst at low cost.

Keywords: novelty, multicomponent strategy, high yields, shorter reaction times etc.



Infrared ion spectroscopy: an analytical tool for the study of metabolites

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ABSTRACT

Vibrational ion spectroscopy techniques coupled with mass spectrometry are applied to standard metabolites as a proof-of-principle demonstration for the structural identification of unknown metabolites. The traditional room temperature infrared multiple photon dissociation (IRMPD) spectroscopy technique is shown to differentiate chemical moieties in isobaric and isomeric variants. These results are compared to infrared spectra of cryogenically cooled analyte ions, showing enhanced spectral resolution, and thus also improved differentiation between closely related molecules, such as isomers. The cryogenic spectroscopy is effected in a recently developed mass-selective cryogenic linear ion trap, which is capable of high sensitivity and the ability to measure the IR spectra of multiple analytics simultaneously.

Keywords: Isomers, Mass Spectroscopy, IR Spectroscopy.



Classifications, properties, recent synthesis and applications of azo dyes

Aniket Jotiram More

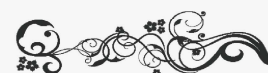
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ABSTRACT

In this work, we have presented a very detailed review of the different classification of azo dyes as a function of the number of azo groups and the appropriate functional groups. Then we pointed out some chemical properties of these dyes such as reactivity, isomerization and tautomerism and listed. In the following, we have summarized some recent syntheses of azo dyes and the mechanism of azo dye/polymer conjugation. Finally, we indicate the principle of Gewald's reaction and its application to the synthesis of new azo dyes.

Keywords: Azo dye, Polymer dyes, Gewald reaction, Textile industry



Hollow-cathode discharges-the construction and characteristics of sealed-off tubes for use as spectroscopic light sources

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ABSTRACT

The difficulties generally associated with the construction of sealed-off hollow-cathode discharge tubes are shown to have been exaggerated, and various designs of tube having lifetimes upwards of 30 A hr are described. The lifetime of such tubes is limited by clean-up and not by outgassing.



Oil Extract From Local Leaves - An Alternative To Synthetic Mosquito Repellants

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ABSTRACT

Apart from the fact that chemical based (synthetic) repellents have been discovered to have unfavourable effects on man and livestock, they are expensive, non-biodegradable and no longer efficient due to adaptation of mosquitoes to them. With these shortcomings, an eco-friendly plant based insecticide as an alternative is urgently needed. This study was based on using the oil extracts from local leaves namely: *HyptisSauveolens*, *Mentha spicata*, and *Cymbopogon citratus* leaves as mosquito repellent. The leaves' oil extracts were screened for the presence of phytochemicals (secondary metabolites only). The phytochemical screening result showed that leaves' oil extracts contained flavonoids, tannins, phenols, steroids, terpenoids, saponins, glycosides and anthraquinones. Different concentrations of the oil extracts were incorporated into the formulated body lotion/body cream. The lotion with the highest concentration of the oil extract (0.6 ml) had the highest repellence time lasting up to about eight (8) hours. The leaves' oil extract was analysed using Gas chromatography- Mass spectroscopy (GC-MS) to identify the chemical composition, and only major chemical components were reported in this work.

Keywords:

Mentha spicata, *HyptisSauveolens*, *Cymbopogon citratus*, Oil Extract, Efficacy



The Determination Of Platinum In Biological Materials By Electrothermal Atomic Absorption Spectroscopy

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ABSTRACT

Methods for determination of platinum in body tissues and fluids by electrothermal atomic absorption spectroscopy are described. Serum and urine could be analyzed without pretreatment or dilution. Wet and dry ashing techniques for tissue digestion were compared. Dry ashing tissues in a furnace resulted in significant and unexplained losses of analyte, whereas there was complete recovery of platinum added to the tissues when the tissues were wet ashed. The wet ashing technique is fast and convenient and requires minimal sample treatment.



The Vibrational Spectra Of Organic Isothiocyanates

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ABSTRACT

The Raman and infra-red spectra of a series of aliphatic and aromatic isothiocyanates (mustard oils) have been measured. Analysis of the spectra enables two frequencies to be identified for each compound which are characteristic of an aliphatic or an aromatic NCS grouping. It is shown why the complex structure of the strong band near 2100 cm^{-1} is peculiar to the isothiocyanates and why its contour is different for the aliphatic and aromatic isothiocyanates. Infra-red intensity measurements on this band are also reported.



**Rotational, vibrational and electronic excitation of a neutral nitrogen
molecule in the ICP**

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ABSTRACT

Diagnostics of nitrogen molecules in the inductively coupled argon plasma (ICP) have been evaluated with respect to collisional processes with electrons, argon atoms and nitrogen molecules. Based on reaction probabilities, defined as the product of the rate coefficient and number density of colliding species, argon collisions were proposed as the dominant excitation mechanism for rotational transitions of N₂, while vibrational transitions showed complex behavior depending upon the vibrational quantum number. Furthermore, the excitation mechanism for electronic levels was considered by applying the collisional-radiative model including heavy particle collisions, such as mutual N₂ impact and Penning processes.



A Study Of Pneumatic Nebulization With Helium

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ABSTRACT

A study is conducted in order to characterize pneumatic nebulization with helium for helium plasma systems. Comparisons are made of: argon and helium as nebulization gases, various spray chambers and nebulizers, sample solution introduction rates and sample gas flow rates. Correlations with signal intensities and these parameters are made.



Green Synthesis Of Titanium Oxide (TiO₂) Nanoparticles By TrigonellaFoenum-Graceium Extract And Its Antimicrobial Activities

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ABSTRACT

In recent years, biosynthesis of nanoparticles has received considerable attention due to the growing need to develop clean and nontoxic chemicals, low-cost approaches, eco - friendly solvents and renewable materials. In the current study, the biosynthesis of TiO₂ nanoparticles (TiO₂NPs) was attained by a chemical and biosynthesized method by using the aqueous leaf extract of *Trigonellafoenum-graecum* (TF-TiO₂NP). TiO₂ NPs were characterized by FTIR, UV, XRD, HR-TEM and HR-SEM methods. The X-ray diffraction displayed the existence of TF-TiO₂NPs which is confirmed by the incidence of peaks at 25.28 corresponds to 101 anatase form. HR-SEM perceptions revealed that synthesized TiO₂NPs were spherical in shape and the size of individual nanoparticles as well as a few aggregates was found to be 20–90 nm. The antimicrobial activities of biosynthesized nanoparticles (TF-TiO₂NPs) were examined using Kirby-Bauer method. The TF-TiO₂ nanoparticles showed significant antimicrobial activity against all the tested microorganisms.

Keywords

Trigonellafoenum-graecum Titanium nanoparticles TiO₂NP Antimicrobial XRD



The Manufacture Of Biodiesel From The Used Vegetable Oil

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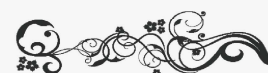
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ABSTRACT

The objective of this master thesis is the manufacturing of biodiesel from the used vegetable oil . This study aims to define the requirements for biodiesel production by the esterification process testing its quality by determining some parameters such as density kinematies viscosity, high heating value cetane number flash point cloud pint and pour point and comparing it to diesel fuel.

Keywords: Biodiesel from Used Vegetable Oil



A Review Of Infrared Spectroscopy In Microarchaeology: Methods, Applications, And Recent Trends

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ABSTRACT

Infrared (IR) spectroscopy has emerged as one of the most powerful analytical tools available to archaeologists. It has been used to document site formation processes and understand the preservation of organic remains within sites; to investigate pyrotechnology including control of fire, heat treatment of stone, and plaster manufacture; to assess the preservation of charcoal and bone prior to dating or isotope analyses; and, to identify unknown substances inside containers or on artifact surfaces such as stone tools. Most importantly, IR spectroscopy has become an essential tool in the field of microarchaeology, the analysis of the portion of the archaeological record which cannot be seen with the naked eye, yet which contains a wealth of data to address the research areas listed above. IR spectroscopy, long a workhorse of analytical chemistry, is particularly suited to archaeology because it is applicable to many kinds of materials - organic as well as inorganic - and can therefore be used to address a wide range of questions. Sample preparation is rapid and, since minute quantities of a substance are necessary, the technique is ‘microdestructive’. It can also be performed on-site, yielding results in real time that help guide excavation and sampling strategies. The purpose of this review is to detail the basic principles and instrumentation of IR spectroscopy as it has been applied in microarchaeology and related fields of research. The discussion centers on major archaeological applications to date, methodological issues, and recent trends. A special focus is placed on new reflectance techniques.



Gas Chromatography ; A Mini Review

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ABSTRACT

Gas chromatography is a term used to describe the group of analytical separation techniques used to analyze volatile substances in the gas phase. In gas chromatography, the components of a sample are dissolved in a solvent and vaporized in order to separate the analytes by distributing the sample between two phases: a stationary phase and a mobile phase. The mobile phase is a chemically inert gas that serves to carry the molecules of the analyte through the heated column. Gas chromatography is one of the sole forms of chromatography that does not utilize the mobile phase for interacting with the analyte. The stationary phase is either a solid adsorbant, termed gas-solid chromatography (GSC), or a liquid on an inert support, termed gas-liquid chromatography (GLC). Gas chromatography is an instrumental technique used forensically in drug analysis, arson, toxicology analyses of other organic compounds.



**The determination of metals in blood serum by atomic absorption
spectroscopy—I: Calcium**

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ABSTRACT

The calcium content of blood serum can be accurately determined on 0.1–0.25 ml samples by atomic absorption measurements in an air-acetylene flame after removal of the proteins by coagulation and centrifuging. A fairly accurate value can be obtained more quickly from direct measurements on serum diluted with water, which may with advantage contain about 1 per cent of the disodium salt of ethylenediaminetetracetic acid.

Serum calcium values obtained by atomic absorption spectroscopy are significantly higher than those obtained by the standard oxalate-permanganate procedure and support the conclusions of MACINTYRE on the shortcomings of the chemical method.



Natural catalysed Synthesis of Chalcones by grindstone chemistry as an intermediate in Organic Synthesis

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ABSTRACT:

Chalcones are promising synthons and bioactive scaffolds of great medicinal interest due to their numerous pharmacological and biological activities. They possess antimicrobial, anticancer, antitubercular, antioxidant, anti-inflammatory, antileishmanial, and other significant biological activities so we have synthesized 1, 3-diphenylprop-2-en-1-one (I-IX) by the condensation of Aromatic and aliphatic ketone with various substituted aromatic aldehydes through intramolecular aldol condensation using various Natural catalyst by grinding technique. All synthesized compounds were characterized on the basis of IR, NMR and UV spectroscopic data and elemental analysis.

Key words: Chalcone, Antimicrobial activities, Aromatic aldehydes, Natural Catalyst, Grinding Technique



**The Determination Of Metals In Blood Serum By Atomic Absorption
Spectroscopy—II: Magnesium**

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ABSTRACT

The magnesium content of blood serum may be accurately determined by atomic absorption measurements. Analysis can be carried out on as little as 0.05 ml of serum and the only preliminary treatment necessary is dilution of the sample with water containing about 1 per cent of ethylenediaminetetracetic acid or of strontium chloride.



A Review on High Performance Liquid Chromatography (HPLC)

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ABSTRACT

Chromatography is defined as a set of techniques which is used for the separation of constituents in a mixture. This technique involves 2 phases stationary and mobile phases. The separation of constituents is based on the difference between partition coefficients of the two phases. The chromatography term is derived from the greek words namely chroma (colour) and graphein (to write). The chromatography is very popular technique and it is mostly used analytically. There are different types of chromatographic techniques namely Paper Chromatography, Gas Chromatography, Liquid Chromatography, Thin Layer Chromatography (TLC), Ion exchange Chromatography and lastly High Performance Liquid Chromatography (HPLC). This review mainly focuses on the HPLC technique its principle, types, instrumentation and applications.



Potential Application Of Silver Nanoparticles In Medicine

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ABSTRACT-

Nanoparticles offer targeted delivery of drugs, enhancing bioavailability, sustaining drug or gene effect in target tissues, and enhancing the stability. Silver nanoparticles have played a main role in the field of nanotechnology and nanomedicine. Silver nanoparticles (AgNPs) (1-100 nm in size) are produced by chemical reduction from silver nitrate using different organic compounds (Tri-ethyl-amine, Alpha-Terpineol) and organic bases (as reaction promoter). Plant extracts of Carob plant and Rumexhymenosepalu plant have also been used for the synthesis. These are made up of large amount of silver oxide due to huge ratio of surface to bulk silver atoms. Silver ions have been normally used in medicine and biology for years, but silver particles altered with nano-technological methods offers new possibilities. Silver nanoparticles account for greater than 23% of all nanoproducts and have been widely used for diagnostic and therapeutic applications (e.g. in wound healing, arthritic disease, etc.). These have been widely known for their antibacterial, antifungal, and antiviral effects. Nanosilver form has been applied in various advanced technological applications (e.g. conductive coatings). These are also employed in textile fabrics, added into cosmetic products as antiseptic as well as preservative to treat dermal problems. Thus, Silver nanoparticles (AgNPs) have been developed as a superior product in the field of nanotechnology.

Keywords: Antibacterial effect; atomic absorption spectroscopy; green synthesis; nanosilver; silver nitrate



Gas Chromatography -A Brief Review

Shubham Kumar Suryawanshi

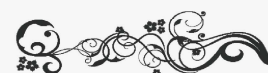
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ABSTRACT

Gas chromatography is a term used to describe the group of analytical separation techniques used to analyze volatile substances in the gas phase. In gas chromatography, the components of a sample are dissolved in a solvent and vaporized in order to separate the analytes by distributing the sample between two phases: a stationary phase and a mobile phase. The mobile phase is a chemically inert gas that serves to carry the molecules of the analyte through the heated column. Gas chromatography is one of the sole forms of chromatography that does not utilize the mobile phase for interacting with the analyte. The stationary phase is either a solid adsorbant, termed gas-solid chromatography (GSC), or a liquid on an inert support, termed gas-liquid chromatography (GLC). Gas chromatography is an instrumental technique used forensically in drug analysis, arson, toxicology analyses of other organic compounds.



Nanoparticles For Drug Delivery In Cancer Treatment

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ABSTRACT

Nanoparticles (size in nanometer range) provide a new mode of cancer drug delivery functioning as a carrier for entry through fenestrations in tumor vasculature allowing direct cell access. These particles allow exquisite modification for binding to cancer cell membranes, the microenvironment, or to cytoplasmic or nuclear receptor sites. This results in delivery of high drug concentrations to the targeted cancer cell, with reduced toxicity of normal tissue. Several such engineered drugs are in clinical practice, including liposomal doxorubicin and albumin conjugate paclitaxel. The carrier mediated paclitaxel has already shown significant efficacy in taxane resistant cancers, an approach highly relevant in prostate cancer, where taxanes are the treatment of choice. Other modifications including transferrin receptor and folate receptor targeted drug delivery molecules are in study. This new technology provides many exciting therapeutic approaches for targeted high concentration drug delivery to cancer cells with reduced injury of normal cells.

Keywords- Nanoparticles Urologic cancer Drug delivery



Synthesis Spectral Characterization And Biological Activity Of 3,5-Ditert-Butyl 2-Hydroxy Benzylidene 4-Amino Benzhydrazide And Its Cu-II Complexes

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ABSTRACT

The hydrazone Schiff base ligand having ONO as donar groups are prepared by the reaction of 3,5-di-tert.butyl 2-hydroxy benzaldehyde with 4-amino benzhydrazide. It is characterized by FT-IR, $^1\text{H-NMR}$, $^{13}\text{C-NMR}$, LC-MS, UV-Visible and elemental analysis. The Cu-II complexes of these ligands were synthesized by treatment of methanolic solution of ligand with equimolar amount of methanolic solution of copper chloride dihydrate, copper nitrate trihydrate and copper sulphate pentahydrate to form $[\text{Cu}(\text{H}_2\text{L}^1)\text{Cl}_2\text{H}_2\text{O}]\cdot 2\text{H}_2\text{O}$, $[\text{Cu}(\text{H}_2\text{L}^1)(\text{NO}_3)]$, $[\{\text{Cu}(\text{H}_2\text{L}^1)\}_2(\mu\text{-SO}_4)]$. All these complexes were characterized by spectral techniques. The powder XRD study is carried out to show the crystalline nature of complexes. The TGA analysis is performed in order to determine the lattice water molecules. The stiochiometry of the complexes from analytical data has been found to be 1:1 (metal: ligand) for chloro and nitrate complex and 1:2 for sulphato complex. The chloro complex shows octahedral geometry while nitrate and sulphato complex shows square planar geometry, supported by electronic spectra. The results of elemental analysis also support the proposed structures of complexes. The antibacterial activity of all complexes was measured against two pathogenic bacteria. All complexes shows excellent antibacterial activity.

key words: antibacterial activity ,benzhydrazide, stiochiometry, hydrazone, geometry





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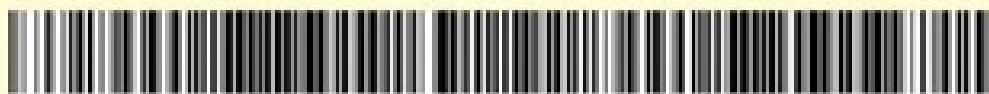
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