8th Bihar Science Conference 2019

8वाँ बिहार विज्ञान सम्मेलन 2019

Date : 3rd to 5th December, 2020

Recreating Interest in Fundamental Science

Souvenir & Abstract

Organised by:

Patna University, Patna

in collaboration with

BBrains Development Society

Patna (Bihar), India

फागू चौहान
PHAGU CHAUHAN

सत्यमेव जयते

राज भवन
पटना–800022
RAJ BHAVAN
PATNA-800022

राज्यपाल, बिहार
GOVERNOR OF BIHAR

05 मार्च 2020

संदेश

यह जानकर हार्दिक प्रसन्नता हुई कि पटना विश्वविद्यालय द्वारा आगामी 26 से 28 मार्च, 2020 तक 'बिहार विज्ञान सम्मेलन–2019' का आयोजन बिहार ब्रेन विकास सोसाइटी से सहयोग प्राप्त करते हुए किए जा रहा है।

आशा है विज्ञान–सम्मेलन के आयोजन से शोधरत युवा वैज्ञानिकों का प्रर्याप्त उत्साहवर्द्धन होगा, साथी ही सम्मेलन के दौरान वरीय वैज्ञानिकों से प्राप्त मार्ग–दर्शन के आलोक में शिक्षकगण, शोधार्थी एवं विद्यार्थीगण प्रेरणा ग्रहण करते हुए व्यापक मानवीय कल्याण की दिशा में अग्रसर होंगे।

मैं 'बिहार विज्ञान सम्मेलन' की समग्र सफलता हेतु अपनी शुभकामनाएँ व्यक्त करता हूँ।

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Prof. (Dr.) Girish Kumar Choudhary
VICE CHANCELLOR
Patna University, Patna

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Ref. ..... *Date :.....*

Message

It gives me immense pleasure to inform that the 8th Science Conference 2019 (an International Conference on Science and Technology) is being organized by Patna University in collaboration with the 'BBrains Development Society', (known also as 'BIHAR BRAINS') on 3rd-5th of December on the theme "Recreating Interest in Fundamental Science". The soaring importance of the fundamental scientific concepts, notions and doctrines as well as the immense practically and basic use of such principles in the modern scientific society is established well and cannot be neglected. The theme, highlighting the utmost necessity to look at the fundamental science as the material source of modern technological civilization is fairly apt and timely, also because it brings together the history, science and the society for the better realization and understanding of the much needed "Science for Life".

I am sure that the three-day special e-lectures and e-deliberations will address the real issues for conjoint societal problems solving through the conglomeration of fundamental and the modern technology-based Science.

I congratulate the Organizers as well as the collaborating partners for choosing this topic for discussion. I further wish a grand success of the Conference and I also extend my good wishes to all participants on behalf of Patna University.

(Girish Kumar Choudhary)

Residence : V. C. Lodge, Patna College Campus, Patna - 800 005 (Bihar), Ph.: 0612-2678041 (R)

iVuk fo'ofo|ky;
PATNA UNIVERSITY
Accredited with 'B+" Grade by NAAC

Prof. (Dr.) A. K. Singh
Pro Vice - Chancellor

Ref. ..... *Date : .....*

Date : 27th Nov 2020

Message

I am immensely delighted to know that Patna University is hosting the 8th Bihar Science Conference 2019 (an International Conference on Science and Technology) in collaboration with the 'BBrains Development Society' on 3rd -of December 2020. The theme of the Conference, "Recreating Interest in Fundamental Science", Is highly relevant and crucial for the development of the modern society through conjoint routes of modern and historical scientific knowledge.

In today's technological-wave, we all are aware how important the study of the basic Sciences-is! The conference will provide an academic scaffold where eminent scientist attending the conference would enlighten our participants with new vistas of scientific progress and throught-provoking discussions among science-seeking brains.

I extend my warm greeting and felicitations to the academicians, delegates, participants and the persons with minds 'High-in-Science'.

I am sure that the three-day e-lectures and e-deliberations will concentrate on the issues for on-going societal problems through the gathering of the knowledge base from fundamental and the modern Science.

(Ajay Kumar Singh)

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L.N. Mithila University

Kameshwaranagara, Darbhanga- 846004 , Bihar, Ind

Professor Dolly Sinha, PhD (IIT Delhi)
Pro Vice Chancellor, L N Mithila University
Formerly Pro Vice Chancellor, Patna University
Formerly Head, Dept. of Physics, Patna University, Patna
Formerly Dean Students Welfare, Patna University, Patna
Email: *pvc@lnmu.ac.in, dspvclnmu@gmail.com*

Date: 27th Nov 2020

Message

*I am pleased to know that Patna University is organizing the **8th Bihar Science Conference 2019** in association with the '**BBrains Development Society**' from 3rd-5th December 2020 on the theme "**Recreating Interest in Fundamental Science**".*

The theme of the Conference assumes great significance in today's context when one consider the fact that the whole 'fount of knowledge' and the space for creativity of the modern technology dwells strictly in the cradle of fundamental scientific discoveries and innovations. As such, from the youngest of siblings to the nonagenarians, it is extremely desirable to re-visit the basics of science and strengthen the key elementary principles, notions and key-concepts of Science. Also this will help in fabricating a space for incubating the modern science and the associated technology driven by societal revamping, especially during the time of an ongoing pandemic.

I am sure that the conference will achieve its objective on such lines.

I further wish the organizers a huge success alongside extending my warm greetings and felicitations to the academicians, speakers, delegates, participants and those with minds 'High-in-Science'.

I am sure that the lectures, deliberations and discussions will bridge the gap amid fundamental and the applied avenues of science and contribute towards the development of human civilization.

(Dolly Sinha)

BBrains Development Society
(Registered Society under Indian Society Act 21, 1860)
(Regd No 128/2007-2008)
Malti Niwas, Road no-1, Dhelwa(Kankaragh), Patna-20
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In Search of Brains of Bihar Web: www.biharbrains.org Email: biharbrains@yahoo.com

Message

It gives me immense pleasure and great inner satisfaction that 8th series of Bihar Science Conference ,a*n International Conference on Science & Technology is now being organised by Patna University in collaboration with BBrains Development Society Coomonly known as "BiharBrains" from 3rd-5th December 2020 at Patna University on the focal theme "**Recreating Interest in Fundamental Science**". The conference which was earlier organised in standard mode, is now being orgnanised in Online mode because of the COVID19 Situation and UGC Regulations. I Sincerely thank Patna University for taking lead in organiing this mega event.*

Science and technology are the two wheels of a progressive society. While the research in basic science brings the growth of technology, the developments in technology add input to the diverse fields of science. Basic science is the source of technology. But it is a sorry state of affair that at present the interest in basic science courses such as physics, chemistry, mathematics and biology is dwindling the students. If the trend continues, it will hamper the growth of the nation and the world in all spheres, including the technological front too. Therefore, the different reasons for this trend and its future implications should be highlighted

In my view, **Basic science is** motivated by curiosity but **Applied science**- designed to answer specific questions. I shall argue that the search for fundamental knowledge, motivated by curiosity, is as useful as the search for solutions to specific problems. The reasons we have practical computers now, and did not have them 100 years ago, is **not** that meanwhile we have discovered the need for computers. It is because of discoveries in fundamental physics which underwrite modern electronics, developments in mathematical logic, and the need of nuclear physicists in the 1930s to develop ways of counting particles.

We can cite many examples which demonstrate the practical and economic importance of fundamental research. Most pure research is consequently funded by people or organizations who have no commercial interest in the results and the continuation of this kind of funding is essential for further advance.

I Feel, The struggle and joy of the great discoveries by great minds should reach to the young minds. This will kindle the interest in them towards Basic Science courses. In the long run the nation will be benefited. It is now the time for responsible men-teachers,parents,educatio nists,technocrats,media persons and the people in the helm of affairs to discuss the situation prevailing in the field of higher education of basic Science and look for the meaningful solution. I HOPE, these issues would be discussed in the delebration of this conference.

I further thank all who have directly or indirectly contributed in the different phases of organisng this mega event.

Bibhuti Bikramaditya
Chairman, BBrains Development Society

Message

It is quite gratifying to note that the Patna University is hosting '8th Bihar Science Conference 2019', in association with BBrain Development Society on 3rd-5th December, 2020.

Organizing such an event at this point of time reinforces our objective of developing an environment for the exchange of ideas towards ***"Recreating Interest in Fundamental Science"****. Fundamental scientific studies, also known as basic science, have paved the way to a society of knowledge by means of continuously evolving education systems, and have led to applied science and technological breakthroughs changing the World. Research in basic science brings the growth of technology. But it is a sorry state of affair that at present the interest in basic science courses such as physics, chemistry, mathematics and biology is dwindling the students. It is now the time for teachers, parents, technocrats, media persons to discuss the situation prevailing in the field of higher education of basic science and look for the meaningful solution.*

I wish the conference would be able to deliberate on current issues of national and international relevance, particularly in the field of physical, chemical and biological sciences. There have been large numbers of quality papers that are to be presented in the conference. I am sure that this occasion will provide an affable environment for the researchers and academicians to freely exchange the views and ideas with others during e-deliberations. I convey my warm greetings and felicitations to the key note speaker, plenary speakers and all participants and extend my best wishes for the success of the conference.

[Birendra Prasad]
Convener, 8th Bihar Science Conference

Editor Desk

सम्पादकीय

बिहार सायंस कांफ्रेंस वर्ष 2008 में बिहार के युवा वैज्ञानिकों, शिक्षाविदों के द्वारा शुरू की गयी थी, एवं बिहार के विभिन्न जगहों पर लगातार सात बिहार सायंस कांफ्रेंस आयोजित किये गए। आठवाँ सायंस कांफ्रेंस इस वर्ष मार्च में आयोजित होना था लेकिन कोविड महामारी (कोरोना) के कारण आयोजित नहीं हो पायाप् अभी भी यह संभव नहीं था, लेकिन आयोजकों एवं प्रतिभागियों के आग्रह एवं लगन के कारण इसे ऑनलाइन ही आयोजित करने पर विचार किया गया।

इस वर्ष के बिहार विज्ञान सम्मलेन का विषय है "मौलिक विज्ञान में रुचि पैदा करना" (Recreating interest in fundamental science). अर्थात इसका मतलब यह है कि देश के छात्र–छात्राओं में मौलिक विज्ञान के प्रति रुचि पैदा करना। यह तभी संभव है जब हम स्थानीय संसाधनों का वैज्ञानिकी तरीके से दोहन करें। आज देश में छात्र–छात्राओं में विज्ञान के प्रति आकर्षण कम रहा है जिसमें रुचि पैदा करने की आवश्यकता है। इसका मतलब यह हुआ कि शिक्षकों का दायित्व है कि विज्ञान को किताब व कक्षा से बाहर ले जाकर समाज तक पहुंचाएं। इसके तहत विज्ञान मेले भी आयोजित करें और स्थानीय परिवेश की जरूरतों पर आधारित उपकरणों व मॉडलों को बढ़ावा दें। जिसमें हम पीछे होते जा रहे हैं।

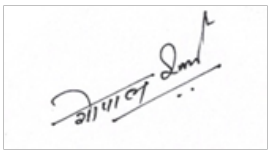
बिहार सायंस कांफ्रेंस बिहार, भारत एवं विदेशों के युवा वैज्ञानिकों के बीच ज्ञान के विभिन्न क्षेत्रों में शोध करने का अवसर प्रदान कर रहा है। इस सम्मेलन में शामिल होने वाले प्रख्यात वैज्ञानिक हमारे प्रतिभागियों को वैज्ञानिक प्रगति के नए–नए आयामों के बारे में बताते रहे हैं, साथ ही साथ यह भी बताते हैं कि इस तरह के सम्मेलनों के लिए अपना abstract कैसे लिखे। उनमें किन किन विषय वस्तु को डाला जाय। युवा वैज्ञानिकों एवं शोधकर्ताओं के द्वारा हर वर्ष लगभग 450–500 abstract प्राप्त होते है जिनमें लगभग 200 abstract को स्वीकृत किया जाता है, अन्य abstract को विषय वस्तु के भाव में तकनिकी कारणों से स्वीकार नहीं किया जाता है। इस वर्ष भी वैसा ही हुआ। कुछ abstract योगदानकर्ताओं को सलाह देकर अगले वर्ष के सम्मेलन में उन्हें जमा करने की सलाह दी गयी है।

इस सोवेनीयर में जितने भी abstract प्रकाशित हुए हैं वे सब किसी न किसी विश्वस्तरीय समीक्षक (World Renound Reviewer) द्वारा सावधानी पूर्वक Review किया गया है, जिसे साइंटिफिक कमिटी ने स्वीकार कर इस सोवेनीयर में प्रकाशित करने का निर्णय लिया है। इसके माध्यम से सभी शोधकर्ताओं एवं वैज्ञानिको को सलाह है कि कृपया आयोजकों के द्वारा दिए गए मापदंडों को भली भाँती समझकर ही abstract लिखें, जिससे उनके abstract में गुणवत्ता प्रकट हो। कई ऐसे भी abstract आये जो कहीं न कहीं से कॉपी किये गये थे या पिछले वर्ष प्रकाशित हो गए थे। Abstract लिखने के नियमों को भली भांति पढ़े एवं उन निर्देशों का पालन अवश्य करें तो अच्छे abstract लिखे जा सकते हैं। इस तरह के सम्मेलनों के आयोजन पर abstract लिखने की जल्दीबाजी न हो तथा अपने शोध का abstract में प्रकटीकरण जरुर करे न कि सिर्फ परिकल्पना।

मैं उन सभी समीक्षकों का धन्यवाद ज्ञापन करना चाहता हूँ जिन्होंने बिना कोई परिश्रमिक लिए लगभग 400 abstract का समय से समीक्षा किया और सही सलाह दिया। उनके सलाह पर ही सही पाए गए abstract को इस सोवेनीयर में शामिल किया गया है।

मैं उन सभी साइंटिफिक कमीटी के सदस्यों को धन्यवाद करना चाहता हूँ, जिन्होंने मुझे बिहार सायंस कांफ्रेंस 2019 के सोवेनीयर प्रकाशन का सम्पादकीय का कार्य सौपा।

मैं सभी प्रतिभागियों को उज्जवल भविष्य की कामना करता हूँ।



(डॉ. गोपाल शर्मा)
वैज्ञानिक ई एवं प्रभारी अधिकारी
भारतीय प्राणी सर्वेक्षण, गंगा समभूमि प्रादेशिक केन्द्र, पटना
पर्यावरण वन एव जलवायु परिवर्तन मंत्रालय

Date: 27th November, 2020

Message

It is a matter of immense pride and pleasure that Patna University is hosting the 8th Bihar Science Conference, 2019 in collaboration with 'BBrains Development Society' from 3rd to 5th of December, 2020. This three day International Conference on Science and Technology aims to unravel and explore the functionality and practicality of basic sciences in the present era through a deliberation involving some brilliant scientific minds.

The theme of the Conference, "Recreating Interest in Fundamental Science", is self-explanatory and highly pertinent in today's scientific scenario. When most of the young and budding talents are attracted towards the promising glimmer of Applied Science and Technology, the responsibility of making them aware of the avenues of basic sciences has to be undoubtedly borne by the experienced intellectual generation. These basic sciences provide the firm foundation on which the sky-scraper of applied sciences and technology stands tall in its full glory and keeps reaching new heights.They are the strong propellers that provide the much required thrust for scientific advancements.

I extend my best wishes to all the scientists, the academicians and the participants who most certainly will come together to make the online conference a fruitful experience for everyone. I am sure that the views put forward by the esteemed keynote speakers and eminent scientific personalities will help in the intertwining of the fibres of both basic and applied sciences to put together a strong yarn that would be used to knit the bright and beautiful future of scientific studies.

(Parimal Kumar Khan)
Organizing Secretary
8th Bihar Science Conference, 2019

8th Bihar Science Conference, 2019

Our Sincere thanks to :

Chief Guest of Inauguration Ceremony
His Excellency Governor of Bihar & Chancellor of Universities, Bihar

Shri Phagu Chauhan

Inaugural Keynote Speaker

Padma Vibhushan Dr. Anil Kakodkar

Chairman, Rajiv Gandhi Science & Technology Commission
Former Chairman, Atomic Energy, Commission, Govt. of India

INAUGURAL KEY NOTE SPEAKERS

(BSC2008 @ Dept. of Physics, Patna Univ., Patna)

Prof. S.E. Hasnain
Vice Chancellor Jamia Hamdard University, New Delhi
&
Former Member, Scientific Advisory Council of Prime Minister of India

(BSC 2009@ College of Commerce, Arts& Science, Patna, Magadh Univ, Bodhgaya

Dr. Upendra Nath Singh,

Chief Technologist, NASA Langley Research Center, NASA, USA

(BSC 2010 @ Gaya College, Gaya, Magadh University, Boadg Gaya)

Dr. A.P.J Abul Kalam,

Former President of India

(BSC 2011@LS College, BRA Bihar University, Muzaffarpur)

Dr. R.K.Pachauri
Former Director General, TERI, New Delhi

(BSC2013 @ Arvind Mahila College, Patna **)**

Prof. Yashpal

Former Chairman, University Grant Commission, Govt. of India

(BSC2014 @ Magadh Mahila College, Patna University, Patna)

Dr. Sourav Pal

Former Director, National Chemical Laboratory, CSIR , Govt. of India, Pune

BSC2018@ College of Commerce, Arts & Science, Patna (Patliputra University, Patna

Dr. Vijay Bhatkar

Hon'ble Chancelor, Nalanda University, Nalanda & Father India's First Super Computer PARAM

BSC2018@ College of Commerce, Arts & Science, Patna (Patliputra University, Patna

Prof. M. S. Swaminathan

Former DG-CSIR, Govt. of India & Father India's Green Revolution.
(Video Message)

Keynote Speaker - 2019

Keynote Speakers: 8th Bihar Science Conference 2019

S.N	Name with Designation	Session/Topic	
1.	**Dr. Anil Kakodkar** Chairman, Rajiv Gandhi Science & Technology Commission. Former Chairman, Atomic Energy Commission, Govt. of India Former Secretary, Govt. of India www.anilkakodkar.in	Inaugural Session Chief Guest "Getting Ready for Knowledge Era"	
2.	**Prof. Prabhat Ranjan,** Ph.D.(UC Berkeley), Vice Chancellor, D Y Patil International University, Akurdi, Pune (Former Executive Director, TIFAC, New Delhi) Web page: http://dypiu.ac.in/	Plenary Session "Nuclear Fusion In India: Past, Present and Future"	
3.	**Dr.Vipin Kumar** CEO/Director, National Innovation Foundation Dept. of Science & Technology, Govt.of India	Plenary Session	
4.	**Jae-chun Lee,Ph.D** Principal Researcher / Adjunct Professor Mineral Resources Research Div., Korea Institute of Geoscience and Mineral Resources (KIGAM) Resources Recycling,Korea University of Science and Technology	Plenary Session	
5.	**Rudra Pratap**, PhD, FNAE, FNSc Deputy Director Indian Institute of Science, Bangalore Professor, Center for Nano Science and Engineering, IISC,Bangalore http://www.cense.iisc.ac.in/rudra-pratap	Plenary Session	
6.	Shri Vijay Prakash, IAS Chairman Cum CEO, Atal Incubation Centre Bihar Vidyapith		
6.	**Rajesh Kumar Jyothi** Sr. Scie Korea Institute of Geoscience & Mineral Resources (KIGAM), Daejeon, Korea	Plenary Session	

7	**Dr. Jitendra Kumar** Managing Director Bangalore Bio-Innovation Center Dept. of IT, BT and S & T, Govt. of Karnataka, Bangaluru	Plenary Session	
8.	**Dr. Ajay Kumar Jha** Founder, INNOP- Innovative Preneurship Founder President & CEO, Institute for Global Agriculture and Technology Transfer, Colorado, USA Formerly Professor of Agri Biotechnology, Colorado State University, Colorado Colorado, USA	Plenary Session "Youth Career and Entrepreneurship"	
9.	**Dr. Manis Kumar Jha** Senior Principal Scientist/Deputy Director Metal Extraction and Recycling Division CSIR-National Metallurgical Laboratory Govt. of India, Jamshedpur	Technical session (Chemical Sciences)	
10	**Dr. Sanjeev Kumar Sharma** CEO & Co-Founder, Exceldot.AB Sweden	Technical Session (Electronics & Electrical Engineering)	
11	**Dr. Mukesh Kumar Gupta** Associate Professor Biotechnology and Medical Engineering, National Institute of Technology Rourkela, Odisha,India	Technical Session Biotechnology & Bioinformatics	
12.	**Dr. Santosh Kumar,** Assistant Professor, Division of Chemical Engineering, Konkuk University, Seoul, South Korea	Technical Session (Chemical Science)	
13	**Anjali Gautam** Planning Analyst, Flipkart, Bangalore	Special Session on Innovation and Entrepreneurship	
14	**Ajit Kumar** Director, Khushigram, New Delhi	Special Session on Innovation and Enterpreneurship	

15	**Dr. Sujit Kumar** Sr. Asst. Professor Amity Institute of Technoloy Amity University, Mumbai	Technical Session (Chemical Science)	
16	**Dr. Sriparna Saha** Associate Dean, Research and Development Associate Professor, Department of Computer Science and Engineering IIT Patna, Patna, India-801106	**Special Session(Panel Discussion)** on Theme "Recreating Interest in Fundamental Science"	
17	**Sri Prashant Priyadarshi** Co-founder, India Startup factory, New Delhi Mentor, All my Craft, New Delhi	Special Session on Innovation and Entrepreneurship	
18	**Dr. Mahesh H. Kolekar** Associate Professor,Dept.of Electrical Enginering, IIT Patna	Electronics Engineering	
19	**Prof. Pradhan Parth Sarthi**, Department of Environmental Science, School of Earth, Biological and Environmental Science Central University of South Bihar (CUSB) Gaya- India	Earth and Environmental Science	
20.	**Dr. Naveen Kumar Nischal** Associate Professor, Dept. of Physics IIT Patna Profile: https://www.iitp.ac.in/index.php/en-us/people-phy-menu/faculty/2-uncategorised/277-view-profile-74	Technical Session (Physical Science)	
21.	**Dr. Mohammad Jamali** MS; MBA;PhD;CSci;FIBMS Program Leader-Health & Medical Sciences/ Ass. Professor **Khawarizmi International College** Abu Dhabi University Al Ain, Abu Dhabi, United Arab Emirates	Technical Session (Health Science)	
23.	**Talit Roy Choudhary** Director, School of Environmental Science, Jadavpur University, Kolkata	Technical Session	

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Program and Schedule
Inaugural Session: December 3, 2020

Time		Item	Name of the speaker/Presenter	Theme/Remark
Starts at	Ends at			
10.30	11.00	Delegates Occupation		
11.00	11.05	Welcome Song		
11.05	11.15	Welcome Address	**Prof. Dolly Sinha** Pro Vice Chancellor, L.N.Mithila University & Chairperson, 8th Bihar Science Conference 2019	
11.15	11.20	Lightening of Lamp/ Video show on Bihar Science Conference		Sanskrit Sloka
11.20	11.25	Release of Abstract	By all guests	
11.25	11.30	About Conference and Introducing theme	**Bibhuti Bikramditya** Chairman, BBrains Development Society	
11.30	11.50	Conference Inauguration	**Sri Phagu Chouhan** Hon'ble Governor, Bihar	
11.50	12.00	Presidential Address	Prof. Girish Kumar Choudhary Hon'ble Vice Chancellor, Patna University, Patna	
12.00	12.05	Vote of Thanks	**Prof. Ajay Kumar Singh** Pro Vice Chancellor, Patna University, Patna	
12.05	12.06	Rashtra Gaan		
12.15	1.00	Inaugural Keynote By Chief Guest	**Dr. Anil Kakodkar** A noted Nuclear Scientist, Former Chairman, Atomic Energy Commission and Former Secretary Govt. of India	**Getting Ready for Knowledge Era**

December 3, 2019: Afternoon Session

Time		Item	Name of the speaker/Presenter	Theme/Remark
Starts at	Ends at			
1.00	1.30	Plenary Session	**Prof. Prabhat Ranjan** Vice Chancellor, D.Y.Patil International University	
2.00	4.30	PARALLEL TECHNICAL SESSION		
Biotechnology & Bioinformatics (BB)		Earth & Environmental Science(EES)	Sub Theme (ST) NANOTECHNOLOGY Home Science & others	Health Science (HS)

Invited Keynote Address by **Prof. Mukesh Gupta,** Department of Biotechnology & Medical Engineering, NIT , Rourkela, Odisha	Invited Keynote Address by **Prof. Pradhan Parth Sarthi** Department of Environmental Science, School of Earth, Biological and Environmental Science,Central University of South Bihar (CUSB)	Invited Keynote Address by **Abhigyan Satyam, Ph.D.** Faculty and Instructor in Medicine Beth Israel Deaconess Medical Center Harvard Medical School, Harvard University CLS.928, Center for Life Science 3 Blackfan Circle Boston, MA, 02115	Invited Keynote Address by Dr Rajay Narain MRCP (U.K.) Founder and Director of Global Health Alliance UK Research Cardiologist St George's University of London. UK **Dr.MohammadJamali** Program Leader-Health & Medical Sciences/ Ass. Professor **Khawarizmi International College** Abu Dhabi University Al Ain, Abu Dhabi, United Arab Emirates
Time limit : Max 25min +5 min Q&A	Time limit : Max 25min +5 min Q&A	Time limit : Max 25min +5 min Q&A	Time limit : Max 25min +5 min Q&A
Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A

4th December 2020: Morning Session

Time		Item	Name of the speaker/Presenter	Theme/Remark
Starts at	Ends at			
10.00	10.30	Plenary Session	**Prof. Ajay Kumar Jha** President,Institute for Global Agriculture & Technology Transfer, Fort Collins, CO, 80524	Youth Career and Entrepreneurship
11.00	1.30	PARALLEL TECHNICAL SESSION		
Physical Science (PS)		**Chemical Science(CS)**	**Animal Science(AS)**	**Plant Science(PLS)**
Invited Keynote Address by **Prof. N.K. Pandey** Department of Physics University of Lucknow, Lucknow		Invited Keynote Address by **Dr. Manis Kumar Jha** DY. Director(metal extracton) National Metallurgical laboratory, Jamshedpur	Invited Keynote Address by **Dr. Yasmin Ahmad** Senior Scientist D, Defence Institute of Physiological and Allied Science (DIPAS), DRDO, TIMARPUR, Delhi 110054	Invited Keynote Address by **Prof. Tarit Roychowdhury, Ph.D** School of Environmental Studies Faculty of Interdisciplinary Studies, Jadavpur University, Kolkata, INDIA
Time limit : Max 25min +5 min Q&A		Time limit : Max 25min +5 min Q&A	Time limit : Max 25min +5 min Q&A	Time limit : Max 25min +5 min Q&A
Oral/poster Paper Presentation (10 Mx) + 2 min Q&A		Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A

December4,2020: Afternoon Session

Time		Item	Nameof the speaker/Presenter	Theme/Remark
Starts at	Ends at			
2.00	2.30	Plenary Session	**Dr. Jyothi Rajesh Kumar** Principal Researcher & Professor Korea Institute of Geoscience and Mineral Resources (KIGAM), Resources Recycling Korea University of Science and Technology	
2.30	5.00	PARALLEL TECHNICAL SESSION		
Physical Science (PS)		Chemical Science(CS)	Animal Science(AS)	Plant Science(PLS)
Invited Keynote Address by **Prof. Navin Nischal** Dept. of Physics, IIT Patna Time limit : Max 25min +5 min Q&A		Invited Keynote Address by **Dr. Santosh Kumar** Dept. of Chemical Engineering Konkuk University, Seoul. SOUTH KOREA Time limit : Max 25min +5 min Q&A	Invited Keynote Address by **Dr. Surabhi Sonam** Head of the Department, Department of Bioengineering School of Biosciences and Bioengineering D Y Patil International University Akurdi, Pune Time limit : Max 25min +5 min Q&A	Invited Keynote Address by Time limit : Max 25min +5 min Q&A
Oral/ poster Paper Presentation (10 Mx) + 2 min Q&A		Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A

December5, 2020: Morning Session

Time		Item	Name of the speaker/Presenter	Theme/Remark
Starts at	Ends at			
10.00	10.30	Plenary Session	**Dr. Jitendra Kumar** Managing Director Bangalore Bio-innovation Center Dept. of IT, BT and S & T, Govt. of Karnataka, Bengaluru	
11.00	1.30	PARALLEL TECHNICAL SESSION		

Special Session (Panel Discussion on **"Innovation and Enterprise Creation"** **Speakers** **Dr.Vipin Kumar** CEO/Director, National Innovation Foundation Dept. of Science & Technology, Govt.of India **Anjali Gautam** Planning Analyst, Flipkart, Bangalore **Ajit Kumar** Director, Khushi Gram, New Delhi **Sri Prashant Priyadarshi** Co-founder, India Startup factory, New Delhi Mentor, All my Craft, New Delhi Moderated by Bibhuti Bikramaditya Invited Keynote Address by **Prof.(Dr.) Bhaskar Choubey** , Head of Microelectronics Intelligence, Fraunhofer Institute Duisburg and Chair of Analogue Circuits, Siegen University, Germany Invited Keynote Address by **Prof. H.K.Nigam** Dept. of Mathematics Central University of South Bihar		Electronics & Electrical Engg.(ET) And Computer Science & IT (CSIT)	Mathematical Science (MS)
		Time limit : Max 25min +5 min Q&A	Time limit : Max 25min +5 min Q&A
		Oral/poster Paper Presentation (10 Mx) + 2 min Q&A	Oral/poster Paper Presentation (10 Mx) + 2 min Q&A

December 5, 2020: Concluding Session

Time		Item	Name of the speaker/Presenter	Theme/Remark
Starts at	Ends at			
2	2.3	Plenary Session	**Prof. Rudra Pratap** Centre for Nano Science and Engineering Indian Institute of Science, Bangalore, India	
2.30	4.00	Panel Discussion On Theme **"Recreating Interest in Fundamental Science"** **Name of Panelist:** **Prof. A.K.Ghosh**, Chairman, Bihar State Pollution Control Board, Patna **Prof. Ajay Kumar Singh**, Pro Vice Chancellor, Patna University, Patna	**Prof. Dolly Sinha**, Pro Vice Chancellor, L.N. Mithila University, Darbhanga **Prof. Prabhat Ranjan**, Vice Chancellor, D.Y.Patil International University, Pune **Prof. Amarendra Mishra**, Former Dean, Faculty of Science, Patba University	**Dr. Sriparna Saha** Associate Dean (R&D), IIT Patna
4.00	4.30	Keynote Address by **Prof. Rashbihari Prasad Singh,** Former VC, Patna University		
4.00	4.15	Announcement of Best Presentation Awards		
4.15	5.30	Concluding Session	Moderator **Prof. Parimal K.Khan** Organising secretary 8th Bihar Science Conference 2019	
		Address by Hon'ble Vice Chancellor **Prof. Girish Kumar Chaudhary**		Vote of thanks by **Prof. Birendra Prasad**, Convenor 8th Bihar Science Conference 2019 & Director, IQAC, Patna University

Awardees and Best Presenters: 7th BSC 2018
YOUNG SCIENTIST AWARDS

S. N	NAME	Ref ID	Designation/Affiliation	TOPIC	
1	**Archana Kumari**	BSC18-CS-RI-220	Senior Researcher, CSIR-Nationaal Metalurgical Laboratory, Jamshedpur	Rare earth metals (REMs) recovery from waste materials	
2	**Rekha Panda**	BSC18-CS-RI-221	CSIR-Senior Research Fellow, CSIR-Nationaal Metalurgical Laboratory, Jamshedpur	Hydrometallurgical processing of E-waste to recover precious metals	
3	**Areeba Fatima**	BSC18-PS-RI-402	Research Scholar, Dept. of Physics, Indian Institute of Technolgy, Patna	Image encryption by phase and polarization modulation of light	
4	**Isha Guarav**	BSC18-PLS-RI-269	Research Scholar, Magadh University, Bodh Gaya	Phytochemical screening and boisynthesis of silver nano particles using natural product of phyllanthus niruriand their anti microbial activities	
5	**Pankaj Kumar Pandey**	BSC18-MS-RI-159	Research Scholar Gaya College, Gaya	Effects of Radiation on MHD Natural Convection Flow From a Porpus Vertical Plats	
6	**Aparna Das**	BSC18-PSY-RI-195	Research Scholar Dept. of Psychology, L.N Mithila University, Darbhanga	Effect of Gender on Depression among Students	

Special Award for presentation

7	**Ayesha Fatima**	BSC18-PLS-RI-108		Ethnomedico Plants Used to Cure From Jaundice Disease - A Study	

Best Oral Presenter Awards

S.N	NAME	Ref ID	Designation/Affiliation	TOPIC	
1	**Pushpa Kumari Sharma**	BSC18-EES-RI-340	Research Scholar, Aryabhatta Centre For Nanoscience & Nanotechnology, Aryabhatta Knowledge University Patna	Study of arsenic in drinking water and food in three different districts of Bihar, India	
2	**Dr. Anuradha Lakshmi**	BSC18-HS-SI-275	PG Student Rasashastra Govt. Ayurvedic College and Hosptial, Aryabhatta Knowledge University	Evolution, Adoption and globalization of Ayurveda- An Analysis	
3.	**Naman Kumar Naik**	bsc18-hs-ri-341	Research Scholar, Aryabhatta Centre For Nanoscience & Nanotechnology, Aryabhatta Knowledge University Patna	Study of genetic alterations in dvt patients	
4.	**Santosh Kumar Rathore**	BSC18-MS-RI-317	Research Scholar	Duality Results in Theory of Tensor Products	
5	**Amber Jabeen**	bsc18-st24x7e-ri-122	Research Scholar, Patna University, Patna	in vivo STUDY of antioxidant properties on date seed	

6	**Dr. Ujjawal Kumar Bhagat**	BSC18-CS-PI-104	Delegates S.K.R College Barbigha, Sheikhpura, Munger University Munger	Base-mediated Synthesis of 2,4-Disubstituted 1,2,3-Triazoles by N2-selective aza-Michael addition of 4-aryl-NH-1,2,3-triazoles with electrophiles unde	
7	Pallavi Singh	bsc18-bb-ri-342	Research Scholar Aryabhatta Centre For Nanoscience & Nanotechnology, Aryabhatta Knowledge University Patna	Curcumin based Nano drug delivery- A novel approach in treating Cervical cancer	
8	Pushpa Kumari	BSC18-PLS-RI-217	Research Scholar, Department Of Botany, Patna University, Patna	Antagonistic Study of Some Soil Borne fungi against fusarium solani	
9	Surendra Singh	bsc18-as-ri-321	Research Scholar, Dept. Of Zoology, College Of Commerce, Arts & Science Patna	yield loss assessment due to major insect pest of rice crop(oryza sativa)in patna district	
10.	Kumari Uma	BSC18-AS-RI-148	Research Scholar, Jai Prakash University, Chhapra	Diel variation in plankton Density in relation of physicochemical quality of river ganga	
11	Seema Kumari	bsc18-as-ri-164	Research Scholar, Department Of Zoology, Patna University ,Patna	effect of ddt on the protein and free amino acids concentration of the ovary, fat bodies and muscles in adult female,dysdercus cingulatus .	
12	Tajindra Kaur	BSC18-PS-RI-123	Research Scholar, Magadh University, Bodh Gaya	a solar gear shift	
13	Chandni verma	BSC18-PS-RI-114	Research Scholar, Magadh University, Bodh Gaya	A theoretical study of Band Gap of Cubic and Hexagonal CdS Quantum Dots	
14	Reeta Kumari	BSC18-PSY-RI-132	Research Scholar, Department Of Psychology, L.N.Mithila University, Darbhanga	Study Of Demographic Variables And Happiness	

Best Poster Presentation

S.N	NAME	Ref ID	Designation/Affiliation	TOPIC
1	**Saema Jabeen**	BSC18-EES-SI-243	PG Student, College of Commerce, Arts & Science, Patna	EL nino and la nina
2	**Priya Ranjan**	BSC18-EES-SI-388	PG Student, A N College Patna	
3.	**Vinod Kumar Yadav**	BSC18-MS-RI-299	Research Scholar Jai Prakash University, Chhapra	Indians Contributions To Origin Of Mathematics
4.	**Dr. Krishnanadan**			
5	**Ritu raj**	BSC18-ST24X7E-SI-372	PG Student, College Of Commerce, Arts And Science, Patna	Toxicology in our life
6	**Priyanka Jha**	BSC18-ST24X7E-SI-371	PG Student, College of Commerce, Arts & Sciences, Patna	
7	**Anju Bala**	BSC18-PLS-SI-256	PG Student, College of Commerce, Arts & Sciences, Patna	Impact of human activity on atmosphere
8	**Farha Naaz**	BSC18-PLS-SI-238	PG Student, College of Commerce, Arts & Science, Patna	Application of Biotechnology
9	**Pratima Kumari**	BSC18-PLS-RI-227	PG Student, College of Commerce, Arts & Science, Patna	Phytochemicals of Bark of Ficus microcarpa L. fil
10.	**Sahana parveen**			
11	**Aishwariya Kumari**	BSC18-THEME-RI-147	Research Scholar, P.G. Department Of Zoology, Jai Prakash University, Chapra	A Comparative Study of Trematode Infection in two species of Freshwater fishes, Chhapra, Bihar
12	**Syed Irtaza Hussain**	BSC18-PS-RI-130	Research Scholar, Jai Prakash University, Chapra	Lorentzian Model of Nano Optical Antennas

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ANIMAL SCIENCE

14	Ravi Ranjan	Teacher(TGT) Srps Govt. +2 School, Gardanibagh Patna 800002	Parametric determination for bioenergetic transformation of molasses pollutant to ethanol by Saccharomyces cerevisiaeNCIM-2086	BSC19-cs-PI-573	52
15	Sanjay Kumar	Research Scholar, Dept. of Zoology, Magadh University. Bodhgaya, Gaya, Bihar	Novel mode of action of cisplatin in acute leukemia cells	BSC19-AS-PI-565	52
16	Mandip Kumar Roy	Deptt. Of Zoology,T.P.Verma College, Narkatiaganj	Effects of heavy metals on the ventilation and Operecular movement in Channagachua and Cirrhinus reba	Bsc19-as-pi-569	53
17	Pryuttma and Parimal K Khan	Asst. Professor, Dept. of Zoology, Gmrd College Mohanpur Samastipur	Amelioration of Endosulfan Induced Hematological alterations in mice by Phyllanthus emblicaand WithaniaSomnifera	BSC19-AS-PI-576	54
18	Mridula Renu Sinha	Head, Zoology Deptt., Magadh Mahila College, P.U., Patna.	Toxic effect on Blood Glucose level of theChannapunctatusdue to Environmental stress induced by the use of pesticidesCarbaryl and Endosulfan	BSC19-AS-PI-580	54
19	Mithilesh Kumar	Department Of Zoology M Ls College Sarisabpahi Madhubani-847424	Effect of Different animal manures on freshwater fishof Anabas testudineus (Bloch, 1792)	BSC19-AS-PI-598	55
20	Sunita Kumari Sharma	Head, Pg Department Of Zoology, Maharaja College, Ara	An assessment of plankton diversity in river Sone in Bihar	bsc19-as-Pi-601	55
21	Nidhi Verma	Research Scholar, Dept. of Zoology, Tilkamanjhi Bhagalpur University	Mitigating effect of Murraya koenigii (L.) Sprengel leaves (curry leaves) against paracetamol induced genotoxicity in mice sperms	bsc19-as-ri-506	56
22	Sanjay Kumar	Research Scholar, Dept. of Zoology, Magadh University. Bodhgaya, Gaya, Bihar	Common lepidoptera species and their host plants	BSC19-AS-RI-577	56
23	Dina Nath Pandit and Kumari Priya	Research Scholar Department Of Zology, Vks University, Ara Bhojpur	Assessment of toxicity, Ethological Stress and Safe level of Garlic to an Indian air-breathing catfish, Clarias batrachus (Linnaeus, 1758)	bsc19-as-ri-584	56
24	Dina Nath Pandit	Department Of Zology, Vks University, Ara Bhojpur	Assessment of toxicity, Ethological Stress and Safe level of Garlic to an Indian air-breathing catfish, Clarias batrachus (Linnaeus, 1758)	BSC19-AS-PI-595	56
25	Pramod Shankar	Dept. of Zoology, Patna University, Patna	Ameliorating effect of Curcuma longa on Streptozotocin induced nephrotoxicity in Swiss albino mice	BSC19-AS-PI-595	57
26	Saloni Kumari	PG Student Dept. Of Zoology, College Of Commerce, Arts & Science,Patna	Avin Diversity of Saranda Forest Division in Jharkhand, India	BSC19-AS-SI-628	58
27	Aarti Verma and V.N.Singh	Guest Faculty Dept. of Zoology, S.M College, Bhagalpur.	Piper betel leaf stalk extract influence of selective and directional on anodic proteins and M-Isozymes of LDH in semen of Swisss Albino Male mice in relation to control fertility	BSC19-AS-PI-613	59

28	Prakriti Verma	Department Of Zoology Patna University Mahendru Patna-5	Correlation between physiological stress response & consequences of oocyte maturation in female teleost exposed to butachlor	BSC19-AS-PI-694	59
29	Ravindra Kumar Sharma	Sjs Senior Secondary High School. East Champaran	Effect of Mixtusre of Eichornia, Ipomea and Acorus leaf powder on adult mortality of Rizopertha dominica (Fab.) infesting rice in different ration 2:1:2	BSC19-AS-PI-651	60
30	Nazia Hasan and Rakesh Prasad	Research Scholar Dept. of Zoology, Jai Prakash University Chapra Saran	Fish diversity of River Ganga Flanking Chapra, Saran, Bihar	BSC19-AS-RI-567	61
31	Rina Kumari	Research Scholar Dept. of Zoology, Patna University, Patna	Differential Genotoxic and Oxidative Stress Induced by Fluoride in a Freshwater Fish, Channa punctatus	bsc19-as-ri-623	61
31	Kanchan Kumar	Research Scholar Dept. of Zoology, S.R.P.B.U.M.Vidyalaya	Studies on dissolved oxygen and carbon dioxide of a perennial pond ecosystem of Shekhpura khajuri of Naubatpur block Patna, Bihar	BSC19-AS-RI-697	62
BIOTECHNOLOGY & BIOINFORMATICS					
32	Muskan Manjari	Student, Dept Of Biotechnology, A.N.College, Patna	Fly ash impact on environment and it's utilization in agronomic activities	BSC19-BB-SI-636	64
33	Richa Rani	PG Department Of Zoology, Patna University, Patna 800005	Genetic algorithm applications to RSM-based models for production of phytase by heat-stressed Rhizopus oryzae under submerged fermentation	bsc19-bb-pi-579	64
34	Anand Mohan	Research Student Dept. of Botany & Biotechnology, College Of Commerce Arts And Science,Patna	Cyanobacterial composition under different agro-ecosystems in Patna (Bihar) Effect of Lead on the sperm quality of male Swiss albino mice	bsc19-bb-ri-511	65
35	**Reeka Rani**	Research Student Magadh University, Bodh Gaya	Cyanobacterial composition under different agro-ecosystems in Patna (Bihar) Effect of Lead on the sperm quality of male Swiss albino mice	BSC19-BB-RI-699	66
CHEMICAL SCIENCE					
36	Brahmanand Thakur	B.N.S.S.School, Murlichandwa, Udakishunganj, Madhepura	INVESTIGATION OF JANUS GREEN-B AND MANGANESE DIOXIDE USED AS A SUPRAVITAL STAIN	BSC19-cs-pi-644	68
37	Sudhir Kumar Mishra	S.S. College Jehanbad, M. U. Bodh Gaya	Amino fluorination : transition-metal-free N-F bond insertion into diazocarbonyl Compounds	bsc19-cs-pi-648	68
38	Shiv Kumar Rai	Research Student Dept. of Chemical Science, B R A Bihar University Muzaffarpur	Modified Synthesis of Hydantoins under Microwave Irradiation	BSC19-CS-RI-507	69
39	Prashant	Research Scholar, Department of Chemistry, L.N.Mithila University	Mixed metal oxides-synthesis, characterization and catalytic reactivity	bsc19-cs-ri-586	69
40	Narendra Kumar	Research Scholar Dept. of Chemistry, V. K. S. University, Ara	Effect of aquo-Acetone Solvent Systems on the Biochemical Efficiency of Higher Format	bsc19-cs-ri-591	70

41	Ghanshyam Kumar	Research Scholar Dept. of Chemistry, Magadh University, Bodh Gaya	Anticandidal Activities of some Transition Metal Complexes	BSC19-CS-RI-609	70
42	Abhilasha Kumari Tiwary	Research Scholar Department of Chemistry, Jai Prakash University, Chapra	Traffic Induced Noise Pollution and its Effects on Human Health in Siwan Town	BSC19-CS-RI-645	70
43	Praduman Sharma	Research Scholar Departmant of Chemistry, Jai prakash University, Chapra	Air pollution caused by burning of firewood	BSC19-CS-Ri-654	71
44	Satyendra Sharma	Research Scholar Departmant of Chemistry,, V.K.S.U Ara	Henna as a green inhibitor for the corrosion control in non ferrous medium like aluminium and its alloys	BSC19-CS-RI-659	72
45	Raghaw Kumar and R. T. Singh	Research Scholar, Dept Of Chemistry Vksu Ara	Hazardous Effects of Persistent Organic Pollutants	bsc19-cs-ri-668	72
46	Serwer Equbal	Teacher, Project Girls +2 School Bodhgaya	Efficacy OF Acridine on Aerobic dissimilation of sugars to citric acid by Aspergillus candidus NCIM – 883	bsc19-cs-pi-558	72
47	Amit Kumar and Rewati Kant	Research Scholar Dept Of Chemistry Vksu Ara	Spectral study of the some complexes transition ion	BSC19-CS-RI-516	73
48	Vijay Kumar	Research Scholar Dept. Of Chemistry, Magadh University, Bodhgaya	Biological and Anti-tubercular Activities of Heterocyclic Compounds	Bsc19-cs-ri-517	73
49	Suresh Kumar Singh	Research Scholar, Dept. of Chemistry, J. P. University, Chapra, Bihar, India	Eco-Friendly and Efficient Synthesis, Characterization and Anti-Bacter	BSC19-CS-RI-519	74
50	Kajal Kumar Chakrabortti	Research Scholar Dept. of Chemistry, Skmu	Mitigation of AS and F- from Ground Water / Surface water by the filtration through the special laterite soil with using AAS	BSC19-CS-RI-549	74
51	Sudhanshu Shekhar	Research Scholar Department Of Chemistry, Jai Prakash University;Chapra	Structural studies of some Chelates of Cobalt(ii), Nickel (ii) and Copper (ii) Metals with Tetra-dentate Schief base	BSC19-CS-RI-582	75
52	Atul Kumar	PG Student LN MU, Darbhanga	Studies of synthesis, Characterisation of mixed ligand complexes of Co (II) and Fe (III) ions with maleic acid and mine base as primary and secondary ligands	BSC19-CS-SI-546	75
53	Mukesh Kumar Sharma	Research Student Dept. of Chemical Sciences, LNMU Darbhanga	Studies of Thioamide Bands and Nature of Bonding in Metal Complexes	bsc19-cs-ri-581	76
EARTH AND ENVIRONMENTAL SCIENCES					
54	Narendra Pratap Palit	Associate Professor PG Dept. of Geography, Maharaja College ,Ara V.K.S.University,Ara	Impact of Sand Mining on Water Resource : A Case Study of River Sone Basin of Bhojpur District, Bihar	bsc19-ees-pi-624	78
55	Kamlesh Kumar Yadav	Assistant, Dept. of Botany, M.L.S. College, Sari sab pahi, L.N.M.U., Darbhanga, Bihar-	Effects of Environmental Pollution on Human Health	BSC19-EES-PI-647	78
56	Poonam Kumari	Research Scholar Department of Zoology, Jai Prakash University, Chapra	Dynamic of macrobenthic community of River Ganga (Hajipur) to their biomass content	bsc19-ees-ri-615	78

57	Ramesh Kumar	Research Scholar DEPT. OF GEOGRAPHY, V.K.S.University, Ara	Environmental degradation in Bihar: Issues and Challenges	bsc19-ees-ri-625	78
58	Supriya Kumari	Research Scholar, Deptt of physics, J.N college, Madhubani	Environmental Aspects in Neighbourhood Design	bsc19-ees-ri-660	79
59	Rashmi Kumari	Research Scholar Dept. Of Zoology, Jai Prakash University Chapra.	Ecological study on the distribution and abundance of Oligochaetic of a Lentic ecosystem at Siwan, Bihar.	BSC19-EES-RI-670	80
60	Suman Saurav	PG Student Dept Of Zoology,Patna University, Patna	ARSENIC IN FOOD CROPS AND ASSESSMENT OF POPULATION HEALTH RISKS IN SAHIBGANJ, JHARKHAND	BSC19-EES-SI-661	80
61	Ragini Kashyap	PG Student, Environmental Science & Management, Department of Zoology, Patna University, Patna	Allelopathic effect of Eichhornia spp. against selected strain of microbes	bsc19-ees-si-663	81
62	Md Aasif Sulaiman	PG Student Department Of Zoology, Patna University	Assessment of physicochemical properties of groundwater in and around Patna, Bihar	BSC19-EES-SI-675	81
63	Mrityunjay K. Jha	Assistant professor (Guest faculty) PG Department of Geology, Science College, Patna University, Patna	Geochemical characterization of coals of Barka Sayal area, South Karanpura coalfield, India, the implication to paleodepositional settings and environmental impact	BSC19-EES-PI-578	82
64	Ravi Prabhakar	Research Scholar Environmental Biology Laboratory, Department of Zoology, Patna University, Patna	Assessing the impacts of sand mining activities on zooplanktondiversity of River Ganga in and around Patna, Bihar, India	BSC19-EES-RI-587	83
65	Shilu Chandra	Deptt. Of Biology, FNS Academy Gulzarbagh, Patna	Earth its environment and its challenges	BSC19-EES-PI-689	83
66	Sumona Sanyal and D K Paul*	Research Scholar Department Of Zoology, Patna University, Patna	Benthic macroinverteberates as bioindicator of water quality of a pond ecosystem	BSC19-EES-RI-691	84
HEALTH SCIENCES					
67	Priyanka Shankar	Assistant Professor Pg Department Of Home Science, Patna Womence College, Patna University	Calcium homeostasis in fluoride intoxicated and low calcium fed rats	BSC19-HS-PI-570	86
68	Kirti Prakash	P.G.Scholar Ras shashtra Govt. Ayaurvedic College and Hospital , Patna-3	Role of heat energy in health management	BSC19-HS-SI-530	86
69	Gunjal Priya	P.G. Scholar, Govt. Ayurvedic College, Patna	Biomedical waste management in Hospitals	bsc19-hs-si-544	87
MATHEMATICAL SCIENCES					
70	Dhananjay Kumar Mishra	Dept. of Mathematics, L. N. Mithila University Darbhanga	The equation of continuity and junction theorem In fluid dynamics	BSC19-MS-RI-548	89
71	Priyadarshini	Research Scholar, Dept. Of Statistics, Patna University	Parametric complexity analysis of some sorting algorithms under skewed distributions	bsc19-ms-ri-655	89
72	Amit Prakash	Research Scholar Dept. of Mathematics, J P University,Chapra	Discussion on brans -dicke theory of gravitation in general relativity	bsc19-ms-ri-664	89

73	Sanjay Kumar Shrivastava and P.N. Rai	Lecturer D.A.V Government Inter College, Siwan	Numerical simulation of boundary layer flow of a bingham fluid over a rotating disk	BSC19-MS-RI-512	90
74	Rahul Kumar	Research Scholar, Dept. of Mathematics, VKSU Ara	Conjunctive and disjunctive models	BSC19-MS-RI-653	90
NSNT					
75	Jagriti	Research Scholar, BRA Bihar University Muzaffarpur	Nano thin films for device application	BSC19-NSNT-PI-551	92
76	Shashank Bhushan Das	PG Student, Aryabhatta Center for Nano science & Nano technology, AKU, Patna	A novel synthesis of cobalt ferrite nanoparticles from lemon juice via sol-gel route	BSC19-NSNT-SI-698	92
PLANT SCIENCE					
77	Rajesh Kumar	Research Scholar Dept. of Botany, Veer Kunwar Singh University Ara	Estimation of chlorophyll content in the seedling raised from the lauki seeds stored for two-month period at varying temperature	BSC19-PLS-RI-527	94
78	Shweta Singh	Research Scholar Dept. of Botany, Veer Kunwar Singh University Ara	Effect of amended soil on the growth of seddling raised from the chilli seeds for one month period	bsc19-pls-ri-534	94
79	Manish Kumar Singh	Research Scholar Dept. of Botany, Veer Kunwar Singh University Ara	Impact of vermicompost amended soil on germination and growth of tomato plant	BSC19-PLS-RI-537	95
80	Rajnish Kumar	Research Scholar Dept. of Botany, Veer Kunwar Singh University Ara	Impact of relative humidity on the biomass of the tomato seedling	Bsc19-pls-ri-538	95
81	Manish Kumar	Research Scholar Dept. of Botany, Veer Kunwar Singh University Ara	Antitoxic effect of Solanum nigrum (Black berry) leaf on growth and aflatoxin production by Aspergillus flavus	BSC19-PLS-RI-539	96
82	Kumari Sona Rani	Research Scholar Dept. of Botany, Veer Kunwar Singh University Ara	Seasonal variation of algal vegetation in Adri river at Aurangabad, Bihar	BSC19-PLS-RI-542	96
83	Nand Kishor Verma	Research Scholar, Dept. of Botany, Veer Kunwar Singh University Ara	Influence of preharvest seedborne moulds on the growth of seedlings of pearl millet	bsc19-pls-ri-547	96
85	Anupam Kumari and Ritika Kumari	PG Student Dept. of Botany	Induction of callus from nodal explants of Asparagus racemosus an important medicinal plant	bsc19-pls-si-524	97
86	Priya	Mphil Student University Department of Botany, B.R. Ambedkar Bihar University, Muzaffarpur,	Selection of composition and concentrations of plant growth regulator for efficient callus induction from different explants of Heliotropium indicum Linn., an important medicinal herb	BSC19-ST24X7E-SI-521	98
87	Punam Ranjan	Assistant Professor,Plant Sciences, Patna University	Mixed infection causing frequent emergence of begomovirus	BSC19-PLS-PI-701	99
PHYSICAL SCIENCES					
88	Pintu Bhattacharya	Department Of Physics, L.N.College,Bhagwanpur, Vaishali	A first principle approach of modeling the pyramidal composite gamma detector	BSC19-PS-PI-602	101

89	Ashish Kumar	Pg Department Of Physics, M.S.College, Motihari	About elastic cable-connected satellites system under several influences of general nature	BSC19-PS-PI-638	101
90	Priyanka Kumari	Department of Physics MIRZA GHALIB COLLEGE , GAYA	PHYSICAL PROPERTIES OF QUANTUM WIRE	BSC19-PS-PI-514	102
91	Anar Singh	Department Of Physics, University Of Lucknow, Lucknow	Interfacial magnetization in BiFeO3 / La2 / 3Sr1 / 3MnO3 Heterostructures	BSC19-PS-PI-552	102
92	Rakhi	Dept. of Physics	Energy Scavenging	BSC19-PS-PI-556	103
93	Vinay Kumar	Assistant Professor & Research Scholor, Department Of Physics, L. N. M. U; Darbhanga	Photovoltaic Solar Cell a Renewable Energy Perspective: Theoretical Modelling and Simulation Study	BSC19-PS-PI-592	104
94	Ranjan Prasad	Dept.of physics, B.N Mandal University,Madhepura	Study of Theorem Bekenstein-Hawking Entropy black hole	BSC19-PS-RI-557	104
95	Niranjan Kumar	Research Scholar, Dept. of PHYSICS, B.R.A. Bihar University, Muzaffarpur, Bihar,	Multiwall Carbon Nanotube Enhance the Invisibility Effect from Radar	BSC19-PS-RI-560	105
96	Saraswati Kumari	Research Scholar, Dept. of PHYSICS, B.R.A. Bihar University, Muzaffarpur, Bihar,	Comparative study of refractive index sensors and their applications	BSC19-PS-SI-568	105
97	Kushal Singh	Centre for Nanoscience and Nanotechnology, Aryabhatta Knowledge University Patna,	Structural and Electrical Conductivity studies of Zr4+ doped ceria Ceramics	BSC19-ST24X7E-PI-543	105
98	Sanjay Kumar	PGT, Department of Physics Shyogi+2 School, Hajipur VAISHALI	A theoretical study of transport property of heterojunction and evaluation of electric fields ofthe space charge region and energy band of the heterojunction under applied bias voltage	BSC19-PS-PI-572	106
99	Lav Kumar	PGT Department of Physics S.R.P.S Govt.+2 School Road No. 16,Gardnibagh Patna-	An evaluation of thermal conductivity of high-temperature super conductors	BSC19-PS-PI-574	107
PSY					
100	Deepak Prakash and Neha Kumari Singh	*Department of Psychology, Patna University*	The Impact of Student's Socio-Economic Status on Self Concept -A Study of Patna District Students	bsc19-psy-ri-603	108
ST					
101	Santosh Kumar	Faculty, Department of Mathematics, Patna Science College	Developments in the theory of Topological tensor products of locally convex spaces	BSC19-ST24x7E-pi-608	110
102	Kanhaiya Singh	H.O.D BOTANY, A. S. COLLEGE, Bikramganj (Rohtas)	Role of Ethics in Science for quality Research	BSC19-ST-EI-PI-561	110
103	Sanjay Kumar	Dept. of Zoology B. N. Mandal University, Madhepura	Water analysis of dug wells of Lakshmipur - Bhagwati panchayat of Madhepura District.	BSC19-ST-WRM-RI-532	110
104	Neha Verma, Ashok K. Ghosh	Department of Botany, A. N. College, Patna	Treatment of Hospital Waste water through Vermifiltration unit	BSC19-ST-WRM-RI-688	111

Keynote Speakers Abstracts

Getting ready for knowledge era

Anil Kakodkar
Chairman, Rajiv Gandhi Science & Technology Commission
Former Chairman, Atomic Energy Commission.

Preamble

Knowledge evolution has been central to wellbeing and prosperity of societies. In the context of the knowledge era that is fast emerging, this has become crucially important. Economy of nations and societies and their relative competitive advantage is now strongly linked to their capability with respect to knowledge and knowledge products. Raw materials, human resource and technologies are the three basic ingredients to support economic activities and wealth creation. Leveraging latest knowledge is the key to maximise gains in respect of all three. We are now by and large a raw material resource poor country. Our demography is very favourable and is potentially the engine for our growth. Sustaining our growth and our relative competitive advantage however depends on the level of knowledge empowerment of our people and knowledge products they can bring out. This is a major challenge for our education and S&T system. The challenge is even bigger in the context of rural India where two thirds of Indians live

Nuclear Fusion in India : Past, Present and Future

Prabhat Ranjan
D Y Patil International University, Akurdi, Pune

Activity in Indian Nuclear Fusion program started in early 1980s with two programs : (1) Institute for Plasma Research, Gandhinagar funded by DST and (2) Hot Plasma Project in Saha Institute of Nuclear Physics, Kolkata funded by DAE. Both these projects followed Magnetic Confinement route to confine very high temperature plasma using “Tokamak” device. In mid 90s, Govt of India gave a go ahead to an ambitious project of developing Superconducting Tokamak, SST-1 with very long plasma discharge of 1000 sec.

In mid 2000s, India also joined hands with other countries to participate in an International project called ITER that is being built in south of France with the goal to produce 500 MW net power. This is of a huge dimension and after starting the design in 2007, it would be ready in 2025 at huge cost. Commercialization based on this path was expected sometime in 2060.

In the mean time, much technological advancement such as high temperature high magnetic field superconducting magnets are proving to be game changer and suddenly nuclear fusion as energy source has started to look much closer. It is expected that we would be able to produce net energy in a device of much smaller dimension than ITER in 2020s and we would be ready to feed power to grid in early 2030s and then it would keep on scaling up till 2045 or so to replace fossil fuel across the globe as a clean energy source.

These developments have resulted in many private initiatives with good level of funding and with focused objective across the globe in last few years. Are we ready for such an initiative in India? Or India would miss this bus also like many others and be dependent on other countries to supply us this technology.

Climate Adaptive Smart Agriculture Technologies and India's Farm to Market Solution

Ajay K. Jha
Institute for Global Agriculture & Technology Transfer (IGATT), Fort Collins, Colorado, USA

Sustainable Agriculture food production, efficient water and energy use are main challenges facing the world in the 21st Centuries in terms of supply of adequate food, water and energy to meet the growing needs of people and preserve the environment. At present, agriculture and global communities are facing new challenges with a new paradigm shift into clean and renewable energy, adapting to climate change, conservation and efficient use of limited water, protection of the environment, controlling pollution, preserve biodiversity, grow nutritional local food and healthy lifestyle. It is estimated that 70% more food required by 2050 to feed 9 billion, additional 40% more water requires by 2030 which triggers more worries to reduce global hunger and eradicate poverty. Climate change causes temporal and spatial shifts in precipitation and irrigation water availability that will impact crop yield and food production and is likely to worsen water shortages, particularly in arid and semiarid regions of the world.

The overall challenge is to create an integrative and interdisciplinary unit to provide the science and technology transfer for development of enterprises in area of agriculture, healthy food production, limited water resource, usage and development of renewable and efficient energy sources. A growing awareness of conventional agriculture's contribution to climate change and concerns over its consumption of water and energy are creating markets for technological innovation to minimize those effects. In India, the farm to market value chain (production, value addition, distribution and retail chain) is in infancy stage requires climate adaptive agriculture infrastructure, integration of cost-effective farm technologies, hands on applied farm to market R&D, availability of farm finance and a farm service centers.

Startup entrepreneurial hubs for AgTech, Internet of Thing (IOT) and Big data platform integration will revive India's agriculture output both in terms of doubling farmers income and building a resilient value chain to expedite global export. As we enter in era to deal with the Pandemic, the youth entrepreneurship education and re-skilling is needed to have access of jobs in a new global workforce regime.

21st Century Imperatives of Indian Science: Translating Research to Products

Rudra Pratap
Centre for Nano Science and Engineering & Indian Institute of Science, Bangalore

In the modern world, everything seems to be driven by economic imperatives;but today, the economy itself is largely driven by science and technology. Even a cursory analysis of global developments in the last century reveals one unmistakable fact — countries and societies with unwavering commitment to technological advances have made huge leaps and catapulted themselves in the league of developed nations. No other human endeavor has made as much impact as science and technology has. A closer examination of this endeavor reveals a clear distinction between two groups — those that have been able to translate scientific research into successful commercial products and those that haven't. A related issue that falls in between is that of external technology absorption. Irrespective of which of these metric we use, we find gaping holes in the fabric of Indian scientific enterprise. On the one hand, India has made

tremendous strides in its scientific research output, on the other hand, the economic benefits to society from this output has not been very satisfactory. This then, naturally, calls for a deeper introspection. An insider view reveals severe shortcomings at multiple levels. Fortunately, all of them are addressable.

At the topmost level is policy intervention and resource allocation. Here the basic requirement is the understanding of widely varying timescales needed for advances in translational research and thatof showing immediate results on public investmentsdue to political expediency.A firm commitment and tenacity in policy to pursue translational research to its logical end will require a lot more patience than what all research funding bodies show today. What has become obvious is that the impatience of these bodies is doing both immediate and long term harm to the entire endeavor. A policy for success will have to necessarily accommodate and pay for a lot of failures and meticulously monitor the progress in the long drawn development. In the middle level, we have to coax the foot soldiers — the researchers — to shred their complacency and look beyond being happy about the "number" of papers they publish or citations they garner. This calls for a much bigger stretch in their capabilities for forming multidisciplinary teams, working with others who can bring complimentary skills, learning to be appreciative of what others do, and weaving science, technology and engineering together. At the lowest level — the feeder or the school level — we have a bigger challenge of moving from the degenerate system of science education today that only focusses on formula application and examination results to what science education is meant to do—make the students curious, make them keen observers of nature and phenomena, make them thinkers and tinkerers.

In my talk, I will present solid examples of everything mentioned above and demonstrate how the goals of translational research can be achieved. I will present examples from experiments that we are doing at all levels to propel India into the big league with a solid scientific enterprise. In particular, I will discuss our effort in changing the technological landscape of India in certain areas aided by nanotechnology and demonstrate the vertical integration of science-to-systems.

Convergence Techniques for Infinite Series and Applications in Approximation Theory

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An infinite series which is divergent in nature cannot be used for significant computations of its value as divergent series does not have limit. If a series fails to converge in the usual sense, it is highly desirable to assign a limit to the series. For summing the series in a way different from usual one, it is important to generalize the sum of convergent series. For generalizing the concept of a sum to the case of a divergent series, an operator is taken to assign a certain number to a divergent series called its sum. Such operator is called a convergence or summation technique.

Approximation theory mainly deals with the approximation of individual functions and different class of functions with the use of given subspaces, each of which consists of functions that are, in a certain sense, simpler than the functions being approximated. The set of theses subspaces is most often demonstrated by the set of algebraic polynomials or in periodic case by the set of trigonometric polynomial.

Climate Change, Aerosol and Meteorological Drought over the Gangetic Plains of Bihar

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Climate change is not a hoax but is a call. In recent years, the changes (increase/decrease) in rainfall and surface temperature have been observed and have many causes for it. Over the Gangetic plain of Bihar, the Aerosol Optical Depth (AOD) is associated with changes in summer monsoon rainfall and surface temperature. For this purpose, AOD (2000–2015) derived from moderate resolution imagingspectro-radiometer (MODIS) at 550 nm (at a surface resolution of $1^0 \times 1^0$),gridded rainfall ($1^0 \times 1^0$) of Indian Meteorological Department (IMD), the surface wind data of National Centers for Environmental Prediction (NCEP) is considered. The Indian Summer Monsoon Rainfall (ISMR) and AOD are inversely related. The difference in mean monthly surface maximum and minimum temperatures increases (decreases) with a decrease (increase) of AOD. During winter months, more AOD is noticed in January and December over the area.

The Meteorological drought over the Bihar is due to spatial and temporal variability of Indian Summer Monsoon Rainfall (ISMR). The high-resolution gridded rainfall data (1961–2013) at resolution of 0.25^0x$0.25^0$of India Meteorological Department (IMD) and u, vwind at 850 hPa at the same resolution of ERA-40 of the European Centre for Medium-Range WeatherForecasts (ECMWF) is considered. Over the agro-climatic zones, the Seasonality Index (SI) of summer monsoon rainfall, spatial and temporal distribution of the 4-month Standardized Precipitation Index (SPI-4), frequency and probability of drought occurrence isestimated. The severe drought-prone zones are found to be overagro-climatic zones 1, 2 and 3B of Bihar and at a 95% confidencelevel, a significant decrease in rainfall (for the period1961–2013) is found over these zones. The shifting of low-level easterly wind at 850 hPa in July towards foothills of theHimalaya, and weakening in August may be the probable cause of meteorological drought over the region.

Keywords: Aerosol Optical Depth (AOD); Rainfall, Surface Temperature, MODIS, Meteorological Drought, Standardized Precipitation Index (SPI), Seasonality Index (SI)

Determining orbital angular momentum of light using self-referenced interferometry

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Structured light is one of the significantly explored sub-disciplines of optics in which various degrees of freedom of light such as amplitude, phase, and polarization are tailored purposefully and carefully which led to new effects and phenomenon. Light beam with helical phasefronthas extensively gained importance because of its association with orbital angular momentum (OAM). Such beamsalso carryphase singularity in their beam axis and are often referred to as vortex beams. Each photon of these beams with helical phasefront carries well-defined OAM of where is the azimuthal angle, is the Planck's constant and is the topological charge (TC). The TC is an important parameter to specify the OAM carried by the beam. Its magnitude

reveals the number of the windings of the phase per revolution about the beam axis and its sign specifies the direction of helicity of the beam. Because of its unique properties, OAM beams have found applications in many areas such as classical and quantum communication, information security, particle manipulation,imaging and microscopy [1].

For many such applications efficient generation of these beams along with proper measurement of the OAM value carried by them is crucial. Investigation on several interferometric and diffractive methods have been carried out for efficient detection of OAM modes.Among them, interferometric approaches are simpler and allow more intuitive way to determine the TC of the beam using interferogram analysis.Interference of a vortex beam with plane or spherical reference beam results in fork or spiral fringe pattern. In a fork-like fringe pattern the number of tines of the fork and its orientation are analyzed to determine the magnitude and sign of TC respectively. Recently several self-referenced techniques have been investigated to avoid the use of additional reference beam for experimental simplification. In this simplified approach, the vortex beam interferes with its own modified copy to produce specific fringe pattern revealing the sign and magnitude of TC.

In this study, some self-referenced techniques for estimating TC has been discussed.Lateral shear interferometry is a well-known technique to verify the vortex beam [2]. In this method, the input vortex beam interferes with its own displaced and tilted copy. A pair of oppositely aligned fork structure appears in the fringe pattern, where the number of tines reveals the TC. Such fringe pattern can be obtained using a shear glass plate. In a recent study, it has been shown that fork as well as spiral shaped fringe patterns can be obtained through the interference of a vortex beam and its laterally displaced modified copy [3-4].In most of the techniques, the fringe patterns for opposite sign of TCs are similar to mirror images of each other which cause ambiguity while estimating the TC, especially its sign. This problem can be resolved through conjoined fork-like structures where the pair of forks share either their tines or handles depending on the handedness of the input vortex beam [5-6]. The magnitude of TC is estimated by counting the number of tines of the fork structure. Such fringe patterns can be obtained using Mach-Zehnder interferometer by incorporating lateral displacement and tilt in the modified beam copy along the orthogonal direction.

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Morphological Studies of Nano-structured NiO and its Application for Moisture Sensing Studies

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In the last few decades, metal oxides have been actively studied due to its diverse chemical and physical properties. Some of its unique physical properties like surface to volume ratio, high chemical reaction rate, and unusual adsorptive properties, etc. made it an excellent material for chemical sensing and transduction[1,2]. Nickel oxide (NiO) is an important p-type semiconductor and has received a great attraction in the fields of gas sensor[3], fuel cell electrodes[4], battery cathodes[5], electrochemical super capacitors[6] and dye-sensitized photocathode[7]. The above-mentioned applications mostly require particles of small size, thus nanoparticles possess many

improved properties than bulk size particles. NiO is well known for its chemical stability, excellent optical and electrical properties[8,9]. But there are very few literatures reported on the humidity sensing characteristics of pure and doped/composite NiO.

NiO nanoparticles were synthesized using sol-gel method. Pellet samples were annealed at temperatures of 200°C, 400°C and 700°C for 1 hour in air. XRD analysis confirmed the crystallographic growth of NiO nanoparticles. XRD revealed a fine nanocrystalline grain structure. The Williamson-Hall and size-strain plots was used to study the individual contribution of crystallite size and strain on the peak broadening of NiO nanoparticles. The FESEM images confirmed the mesoporous surface morphology of nickel oxide. Samples in the form of pellets were exposed to humidity in the range from 10% to 90% relative humidity (RH). NiO sample annealed at 700°C has demonstrated the highest sensing response of 47.09% at 90% RH.
My lecture in the conference will be based on use of various metal oxides for moisture sensing. This abstract is giving a brief work on the Morphological Studies of Nano-structured NiO and its Application for Moisture Sensing Studies

Chitosan a waste-based biopolymers for environmental applications

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Bio waste-based material is a fast growing field of research and a broad range of technologies are being explored with fascinating clean and renewable energy for the future. Larger surface area and controllable pore size and surface properties, make these materials ideal adsorbents for gas storage and conversion. Amines are generally expected to enhance CO_2 adsorption in porous materials by acid-base chemistry, electrostatic forces or enhanced dispersion forces. Chitosan waste-based biopolymers materials enhanced adsorption at low pressures is likely only partially imputable to the basicity of the nitrogen donor atom. The chitosan derivatives were prepared by a greener approach. The resulting chitosan-based materials were characterized using advanced technologies including attenuated total reflection-infrared (ATR-IR) spectroscopy, X-ray powder diffraction (XRD) analysis, thermogravimetric analysis (TGA), high-resolution field-emission scanning electron microscopy (HR-FE-SEM), high-resolution transmission electron microscopy (HR-TEM), and nitrogen adsorption-desorption isotherms. The Brunauer-Emmett-Teller (BET) surface areas of the chitosan-based materials were larger than pure chitosan. The chitosan-based materials show enhanced CO_2 gas storage and conversion. Therefore, chitosan-based materials may open new vistas in environmental applications in suitable for energy storage, carbon capture, and sequestration (CCS) applications.

Deciphering the Molecular effects of Hypobaric Hypoxia: Diagnostic and Therapeutic Possibilities

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Acclimatization to high-altitude simply means spending weeks at particular altitude and increasing physical activity slowly to reach the next higher altitude. Till now, it is only known that high-altitude areas require weeks for proper acclimatization with slow ascent advised as a thumb rule. But the crucial questions of the minimum duration and altitude that can cause maximal perturbations at the proteome level without causing mortality and aiding acclimatization still remains unanswered. We divided the above question into two related but separated investigations using animal model, i.e. SD rats. In the first study, we established 24

h as the time point that causes maximal perturbations in the organism and also identifiedSULT 1A1 to be a potential marker for detecting HAPE. In the subsequent study, we investigated which altitude zone caused maximal perturbations in the lung and plasma proteomes but without mortality. It was observed that very high-altitude zone signified by 15,000 ft caused the maximal perturbation in both lung and plasma proteome but no mortality. Higher extreme altitude zone characterized by 25,000 ft caused 100% mortality. We also provided a proof-of-concept that a short 10 h pre-exposure at 15,000 ft followed by 1 h of normoxia caused 100% survival at extreme altitude.To alleviate such suffering in humans, we investigated a micronized aqueoussuspension of Silymarin which is efficacious at low doses in providing antioxidant, anti-inflammatory and hypoxiaadaptivevascular responses in addition to being a free radical quencher itself. To conclude, all the three studies were aimed at minimizing the suffering of Armed forces troops at high-altitude on account of hypobaric hypoxia

"The End of Engineering, Education and Society .....As we know it ..."

Bhaskar Choubey
Head of Microelectronics Intelligence, Fraunhofer Institute Duisburg
and Chair of Analogue Circuits, Siegen University, Germany

In this lecture, I will undertake the scientifically dangerous activity of trying to become an astrologer predicting the future of the society. Generally, any prediction has at best a 50-50 chance of success. However, considering the growth of society from its early era of discovering fire and wheel to the present day of networked humans, one can see some trends which present challenges for the way we live as well as educate our future generations. I will try to convince you that the history of human beings is not about kings and wars, rather is the growth of engineering. It has been this constant strive which has led to 3 generation of industries till now. But more importantly, this has also led to three generations of the way we teach and educate our next generation and the workforce for society. Now that we are in the beginning of industry 4.0, we need to revisit the paradigm of education and society. I will go through industries from their 1.0 to the current 3.0 versions and try to make predictions for the 4.0 version. The lecture will be in no particular field; however, should lead to some soul searching by all scientists and engineers.

Engineering microenvironment with macromolecular crowding: A paradigm shift in regenerative medicine

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Advancements in cell and molecular biology have led to the development of tissue engineering by self-assembly therapy. The driving hypothesis of this venerable concept is that replacement, repair and restoration of lost tissue function can be accomplished best by recruiting the cells' inherent proficiency to create highly sophisticated and hierarchical structures (organs) with precision and a stoichiometric efficiency still unmatched by man-made devices. However, the prolonged culture time and non-physiological oxygen supply to develop an implantable device jeopardises clinical translation and commercialisation. A key challenge of in vitro organogenesis is the well-timed development of tissue equivalents that can match the native in vivo physiology. Here, we provided the evidence for the notion that macromolecular crowding, by imitating native tissue localized density, can be utilized to modulate in vitro microenvironments and

ultimately produce ECM-rich cell substitutes, within hours rather than days or months in culture, without compromising fundamental cellular functions. This approach has currently been utilized for skin, bone, tendon, small intestine and kidney injury and repair.

Computational Approaches Leveraging Protein Interaction Information for Solving Biomedical Tasks

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Abstract:

Protein-protein interactions (PPI) are large, complex, and diverse networks of protein molecules that are crucial to understanding various intricate regulations and multi-stage executions of most biological processes. A PPI helps researchers comprehend metabolic pathways along with biochemical behaviors of biological entities such as proteins, carbohydrates, etc. Significant growth in the number of protein-protein interactions for the past three decades has immensely helped the research community because the protein interaction network is generally considered to be one of the most enriched biological sources. Recent studies have also shown that genes associated with similar disorders generally have higher probabilities to physically interact with their protein products and this characteristic has been reported as an important symbolic property of diseased genes. A novel multi-objective optimization (MOO)-based technique is developed for improving gene clustering through the utilization of protein interaction information and the integration of graph-mining algorithms. We have also used the ensemble technique, implemented through graph walk and deep learning algorithms, for achieving the same goal. A deep generative model is also exploited for generating the final consensus partitioning. In both these cases, we have prudently integrated the protein interaction information for improving the gene clustering technique. Some popular graph-mining algorithms and the protein interaction information are utilized for finding the hub genes. Here, we have formulated this work as a sample classification task. Finally, we have extensively focused on solving more intriguing problems of computational biology using deep learning techniques with multi-omics data. A deep multi-modal architecture is proposed for predicting protein functions based on parameters like protein structure, sequence, and protein interaction network. There-after, it dives into the detailed explanation of a deep multi-modal architecture for diseased gene prognosis that exploits the aforementioned multi-omics data. Finally, some deep multi-modal architectures are proposed to illustrate how the biological information of the protein can be utilized for improving the prediction of protein interactions from biomedical text corpora.

Recycling of waste Electric Vehicle (EV) batteries for rare earth metal extraction

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Li-ion batteries are widely being used in electric vehicles (EVs) and consumer electronics due to their high energy storage capacity. Especially, the production of electric vehicles has significantly increased in recent years due to strict government norms and initiatives to reduce toxic CO2 emissions as well as promote the use of clean and green technologies. The global production of EVs is expected to increase to 11 million and 30 million by 2025 and 2030, respectively. Consequently, a huge quantity of spent EV batteries is expected to be generated after its end-of-life in near future, which will require proper disposal or recycling. These

discarded EV batteries are rich in critical metals such as cobalt, lithium, rare earths, etc. which are scarcely present in nature. Keeping in view the above, as well as limited availability of such critical metals, their restrictions in mining and increasing demand, recycling of EVs batteries will not only be a booming area of research opportunity in years to come but also be economical as it will minimize the load on import of the above metals. Present paper is focused on the extraction and recovery of rare earth metals from waste EV batteries using various techniques of pre-treatment followed by hydrometallurgical processing. Initially, the waste EV batteries were crushed and physically beneficiated to obtain plastics, metal concentrate and black cathodic powder. The black cathodic powder containing rare earth metals were processed for selective dissolution using suitable lixiviant, pulp density and mixing time at elevated temperature. The obtained leach liquor was further purified using advance separation techniques (SX/IX/precipitation) to get pure solution of individual rare earth metal. Further, precipitation/ evaporation/ electro-winning techniques could be used to produce valuable products (salts/ metals).

Keywords:EV batteries; REMs, Recycling, Hydrometallurgy, Environment

Faunal diversity of Rajgir and Gautam Budha Wildlife Sanctuary, Bihar, India

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Conservation of any ecosystem and its biodiversity is a herculean task for the Government as well as the agencies working for conservation in India. Indian forest (about 174mha of total land area) is degraded due to tremendous anthropogenic activities and unsustainable practices. Even today protected areas (PAs) are also facing deteriorative great human impact.

There are 11 WLS are in the territory of Bihar. Among those the Gautam Budha Wildlife Sanctuary (GBWLS) is one of the PA of Bihar notified on the line of the conservation strategies plans. The sanctuary possesses mixed biodiversity features due to its unique geographical conditions. It has northern tropical dry deciduous type of main forest. Rajgir is also one of the prime religious and cultural significance important to Buddhist, Jains and Hindus alike, and is dotted with numerous shrines, relics and monuments to the past.

Protecting this sanctuary, which is far more important to the larger ecological, agricultural and cultural landscape than its mere size suggest, it consequently important. Rajgir is a small sanctuary of 35.84 sq. Km. under the Nalanda forest division, Biharsharif. Rajgir Wildlife Sanctuary represents remnants patch of forest nestled in the picturesque Rajgir hills within the South Gangetic Plains that is an important habitat for wildlife endemic to central India.

Six monthly survey were conducted in both the sanctuaries during 2017-2019. But during the month of February 2018 a thorough survey was conducted for 5 days in each sanctuary. The Budhha WLS (138.33km^2 under the Gaya Forest Division in the territory of Bihar and 129km^2 in the territory of Jharkhand) is the habitat of variety of wild animals including Indian Cursor (*Cursorius coromandelicus* Gmelin, 1789), Ashy Drongo (*Dicrurus leucophaeus* Vieillot, 1817), Four species of Wagtail White, Citrine, Pied and Yellow (*Motacilla alba* Linnaeus, 1758, *Motacilla citreola* Pallas, 1776), *Motacilla maderaspatensis* Gmelin, 1789), *Motacilla flava* Linnaeus, 1758, Red Napped Ibis-*Pseudibis papillosa* Temminck, 1824), Grey Backed Shrike (*Lanius tephronotus* Vigors, 1831)), Long Tailed Shrike (*Lanius schach* Linnaeus, 1758), Grey Hornbill (*Ocyceros birostris* Scopoli, 1786),

Crimson Sunbird (*Aethopyga siparaja* Raffles, 1822), Indian National Bird-Peafowl (*Pavo cristatus* Linnaeus, 1758) with more than 200 house sparrow (*Passer domesticus* Linnaeus, 1758) were recorded from Buddha WLS that provide ecological integrity to its forests. During the current study the painted Spur-fowl, Eurasian Thick-Knee, Painted Sand-grouse (Rare bird sighted for the first time in 2018 February),Yellow Footed Green Pigeon-*Treron phoenicoptera* Latham, 1790), Indian Jungle Nightzar (*Caprimulgus indicus* Latham, 1790), Black-Crowned Night Heron (*Nycticorax nycticorax* Linnaeus, 1758), Three species of Kingfisher-Pied Kingfisher (*Ceryle rudis* Linnaeus, 1758), Common Kingfisher (*Alcedo atthis* Linnaeus, 1758), White-Throated Kingfisher (*Halcyon smyrnensis* Linnaeus, 1758), Orange-Headed Thrush (*Halcyon smyrnensis* Linnaeus, 1758) and Indian Paradise flycatcher (*Terpsiphone paradise* Linnaeus, 1758) apart from numerous other fauna including mammals such as Nilgai-(*Boselaphus tragocamelus* Pallas, 1766), Wild Boar Black-Naped Hare (*Lepus nigricollis* F. Cuvier, 1823), Indian Crested Porcupine-*Hystrix indica* Kerr, 1792), Primates-Rhesus Macaque-*Macaca mulatta* Zimmermann, 1780) & Hanuman Langur (*Semnopithecus entellus* Dufresne, 1797), Jungle Cat (*Felis chaus* Schreber, 1777), Golden Jackal (*Canis aureus* Linnaeus, 1758) and Striped Hyena (*Hyaena hyaena* Linnaeus, 1758) were also recorded from the Rajgir WLS during current survey, Among important reptiles Monitor lizard (*Varanus bengalensis* Daudin, 1802) and Indian Rock Python (*Python molurus* Linnaeus, 1758) were prominent records are from RWLS. Although Singh (2004) reported 28 species of Larger mammals, Over 182 species of birds, 39 species of reptiles, 11 species of amphibians,13 species of fishes, 51 species of butterflies and 6 species of scorpions from the Rajgir Wildlife Sanctuary. Among the butterfly group (Lepidoptera) 34 species were recently recorded from the Rajgir WLS (Sharma & Kumar 2017).

During the current faunal diversity survey more than 80 and 73sps. were recorded within the jurisdiction of Rajgir WLS and Buddha WLS respectively. They appear in various schedules of the Wildlife (Protection) Act (1972), and IUCN Red Data List. But due to anthropogenic pressure, the faunal diversity of both the Wildlife Sanctuaries are going to be depleted to a considerable level in the last few decades that is adversely affecting its forest and ecosystem. There is an urgent need to construct waterhole in the core zone of forest with continuous monitoring of water availability.

Such Ecological degradation of both the Wildlife Sanctuaries area requires a well-planned strategy for conservation of biodiversity and its habitats. For development of the ecosystem of the WLS the eco-development schemes may prove to be a success.

Keywords: Rajgir WLS and Buddha WLS, Herpeto fauna, Gangetic Plains, Threats, anthropogenic activities, PA of Bihar, Conservation, IUCN Red Data List

Groundwater arsenic contamination in West Bengal, India: Special reference to its accumulation and distribution in rice grain and cooked rice, health effects and mitigation strategies

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ABSTRACT

Natural groundwater arsenic (As) contamination and the resulting toxic effects have become one of the greatest challenges to human health in modern times, with large parts of the Ganga-Meghna-Brahmaputra plain of India with an area 569,749 km^2 and population over 500 million has been exposed to this devastating calamity. The calamity in these places, particularly in Bengal delta, with over 100 million people living in zones has assumed gargantuan proportions as arsenic levels in drinking water has overshot far above the guidelines set by World Health Organization (WHO) at 10 µg/L. Arsenic concentration in groundwater initially increases up to a certain depth (approximately 40 m below ground level), then decreases with increase of depth. Moreover, arsenic concentrations in many tube wells had been increased 5-20 folds within a span of 3-7 years. That means, once a tube well water seems to be safe with respect to arsenic, that does not mean that it will remain safe for ever. The presence of deep tube well in the rural areas has somewhat ensured the arsenic contamination problem in groundwater, but it varies on hydro-geographical conditions. Furthermore, what is worrisome is that arsenic-contaminated groundwater is increasingly being used to irrigate the fields. Thus, arsenic has begun to seep into crops and food chain which could trigger a large scale environmental tragedy, fatally affecting future generations

Design Thinking in Tissue Engineering

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ABSTRACT

In addition to biochemical cues, extracellular biophysical signals arising from cellular microenvironment have a wide and deep influence on cell responses, including its growth, motility, differentiation, apoptosis, gene expression, adhesion and signal transduction. These mechanical cues range from fluid shear stress to extracellular matrix properties in both physiological and pathological conditions. A combinatorial interaction of stem cells with different nanoarchitectures and fluid shear stress elucidated on the relevance of extracellular matrix architecture in maintaining stem cell renewal capacity or enhancing its differentiation capabilities. Curvature of matrix architecture also modulates the migration properties and mode of epithelial tube formation and elongation. These results can be translated to the scaffolds designs relevant for tissue engineering and regenerative medicine.

On low extracellular matrix rigidity, increased tissue stress led to epithelial monolayer failure in maintaining its integrity. In pathological conditions, such failures can cause loss of vision due to retinal detachment or increase in intestinal permeability due to reduced cell-cell adhesion. At molecular scale, *adherens* junction proteins apply forces to modify their microenvironment, which can eventually be linked to the physiological intercellular interactions and pathological conditions like cancer.

Taken together, the coupling between cell and the biophysical properties of its matrix hold important implications for pathophysiological and clinical applications.

Biotechnology Entrepreneurship- Challenges and Tool kit for success

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Setting up a new venture or start-up in Biotechnology is fraught with challenges. Risks are high but rewards too are commensurate. Opportunities are immense as the problems facing the world related to food security, environmental security, health security etc could be effectively solved by deploying Biotechnology tools. Starting a Biotech firm involves a novel idea/ technology that meets an unmet market need. The idea could be of one's own or could licensed

out from public research laboratories such as of SCIR,DBT, ICMR etc. One needs to build effective team and manage finances. Since Biotechnology ventures require long gestation periods with high risk it is important that grant funds available from BIRAC, MSME,DST are effectively leveraged to establish proof of concept studies. A good Incubator where equipment, infrastructure, mentorship, funding, branding and networking etc are available at cheaper rate should be approached to nurture the idea/technology. Depending on ones's business model, a Angel/venture fund could be approached for scaling up the operations of the Company. It is important to have a competitive advantage in terms of cost or quality differentiation or both to sustain the business. Depending on one's business model an exit is decided.

Rare Earths Recovery from Waste Electronic and Electrical Equipment (WEEE) for Clean Energy Tech Industries Applications: E-Waste Management

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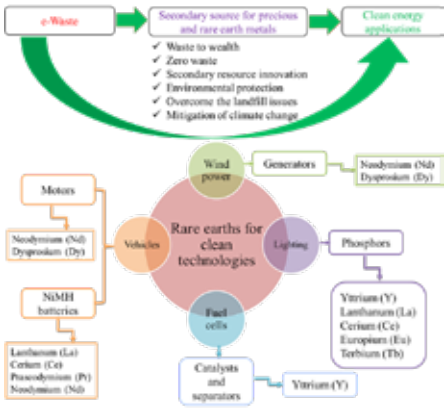
Rare earths are a series of 17 elements (the lanthanides, yttrium, and scandium) which are key components in the current lifestyle. Those metals have multiple applications in different areas especially in the electrical and electronical fields alongside being key materials for green energy production. To recover rare earths from primary (ores) and secondary sources (scraps, spent magnets, etc.) the economically sound and most convenient technology involves liquid-liquid extraction. Several countries, such as South Korea, lack of primary sources of these important metals, therefore they must recur to recycling –or importation (fluctuating depending on the market supply and demand)- to fulfill the demand necessary for their growing high-tech industries, dedicated primarily to the manufacture of electrical and electronic items used in the daily life. In addition, after electronic and industrial goods are used they must be discarded usually in landfills, which in small countries with high population density is a great economic, social and environmental burden. The countries with the highest population densities according to the economic co-operation and development (OECD) organization records (year 2012) are South Korea, The Netherlands, Belgium, Israel, Japan, UK, Germany, Luxemburg, Italy and Switzerland (http://www.un.org/en/development/desa/population/publications/trends/wpp2012. The market trade of rare earths is a monopoly controlled by China, followed by a small supply from India, Australia, Malaysia, Brazil, USA and Russia. China's monopoly of the RE trade can be seen as detrimental for the free economy of these goods having applications widely in the metallurgy, permanent magnets, electronics, fabrication of household items, glass, alloys, petroleum refining catalysts, among others. The major rare earth consuming industrial products are magnets 26%, metal alloys 19%, polishing 16.5%, catalysts 15%, glass/phosphors 6% and ceramics/others 5.5%, which shows the necessity of an industrial and economically feasible process to recover REEs from waste or secondary resources.

The Department of Energy in the United States recognize four elements as critical due to their multiple industrial applications: neodymium, praseodymium, dysprosium and terbium. When talking about green economy, the first option that must be considered is the minimization of the consumption of the elements or the minimization of waste production. The second option to be considered is the reuse, recycling and recovery of the waste produced in the fabrication process of consumer products. Finally, the least favored option is the disposal of waste, which must

overcome the landfill challenge. By reusing and recycling rare earth elements from secondary sources the national demand of these metals can be reached without consuming primary resources and having and environmental friendly process.



Electronic waste (e-waste) is the secondary resource for clean energy applications
(Adapted from my own research paper Journal of Cleaner Production, **267**, 122048 (2020))

Newer Approaches for Pharmaceutical Protein Production: Testicular Stem Cell-Mediated Transgenesis

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Pharmaceutical proteins have growing demands world-wise. They are generally produced by recombinant DNA technology in bacteria, yeast, insect cells or mammalian cells. However, mass production of these proteins is costly and their bioactivity is lower than endogenous proteins. Transgenic animals provide an alternative approach for low-cost production of high quality pharmaceutical protein. A number of methods such as pronuclear microinjection, MII-transgenesis, somatic cell nuclear transfer, viral vectors and embryonic stem cell-mediated transgenesis have been proven to be successful in generation of transgenic animals for use as bioreactors for human pharmaceutical proteins. Our research group has been successful in the isolation of male germ-line stem cells from mouse, pig and goat testis, which could be genetically engineered for production of human granulocyte colony stimulating factor (hG-CSF), human stem cell factor (hSCF) and their fusion proteins. The proteins were initially expressed and optimized in *E.coli* using pET14b vector, which showed that mutation of N-terminal end of hG-CSF and their fusion with hSCF could dramatically increase the yield and stability of proteins. These proteins could also be transfected into goat testicular stem cells by their cloning into pEF1alpha-IRES-AcGFP1-hG-CSF/hSCF expression vectors. Successful expression was confirmed by expression of fluorescent GFP, Western blotting and RT-PCR. Future studies are ongoing for production of transgenic goats by testicular transplantation of these genetically engineered testicular stem cells.

Keywords: CSF3; ethanol; G-CSF; pharmaceutical protein; SCF; testicular stem cells; transgenic animals

ANIMAL SCIENCE

Histopathological changes in the gill tissues of *channa gachua* exposed to a fungicide sedaxane for 72 hrs

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Abstract:

The present study is aimed to assess the damage caused to the fish *Channa gachua* (family channidae) exposed to sub lethal concentration (0.4ppm) of sedaxane for 72 hours. Respiration in *Channa gachua* mainly occurs through their gills. Any change in the chemical quality of water directly affects the structure and function of gills. Fish gill also helps in osmoregulation and excretion besides respiration. The fish can survive even for 24 hours or more on moist grassy surface as they are able to take oxygen from air through their airbreathing organs the histopathological changes in the gills due to exposure of Sedaxane include hyperplasia, epithelial lifting ,fusion at the tip of lamellae,curling and fusion in secondary lamellae, breakage of gill filament.

Keyword: lethal concentration, damage, gills, osmoregulation, airbreathing, lamellae,

Impact of water quality on the growth of freshwater fish in gaya ponds, Bihar, India

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Abstract:

This research work presents the impact of water quality on the growth of freshwater fish of Gaya ponds have immense significance where large population depends on fishing not only as food source but also for their livelihood. Fish are the main aquatic vertebrate as far as nutritional point of view and concerned due to its high protein content. It is required to correlate the growth of fish with respect to local environment that surround the water body and influence water quality. Any change in water quality leads to imbalance the whole ecosystem of the water body. Each water body has its own environment with interesting biotic population and abiotic factors. It has been suggested that water pollution is the leading worldwide cause of death and diseases. However, fish are very sensitive to wide variety of toxicants especially pesticides which cause deleterious effects through accumulation. Both human and fish health could be effected by microorganisms and infections can represent the cause of loss in freshwater fish. The microbial pollution in the aquatic ecosystem gets accumulated in the tissues of fishes and they become unfit for human consumption (Therefore, fish represent an important part of a healthy diet, can be eaten by some people who catch it and it is the source of economic help. A number of potential water quality effects on fish population growth. The members of family Cyprinidaeare dominate in population.

Keywords: Frewhater fish, water quality, Growth, Cyprinidae, Toxicants.

The effect of chlorantraniliprole on the histology of the liver of an air breathing fresh water fish *Channagachua* (bloch)

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Abstract:

The present study is aimed to assess the histological damage caused to the liver of an air breathing fresh water fish *Channagachua*(BLOCH) after exposure of chlorantraniliprole. Sublethal concentration of this pesticide is 0.04 ppm for 96 hours. Fish were exposed at this concentration. Light microscopic study of liver of treated fish showed vacuolization of hepatocytes, haemorrhage, nuclear hypertrophy, pycnotic nuclei, degeneration of cytoplasm, appearance of macrophage etc .This result showed that chlorantraniliprole is toxic to the *Channagachua*as it had caused Impairment of physiological process of the fish.

Keywords: Histology, Chlorantraniliprole,physiology, chlorantraniliprole, *Channagachua*

Transgenerational effect of paternal diabetes on blood glucose level of f-1 offsprings (*Mus musculus*) and their probable recovery using *Syzigium cumuni*

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Abstract:

Paternally induced hyperglycemia by injecting alloxanMonohydrate lead to deficiency in insulin secretion in male parents followed by offsprings of F1 generation.The aim of the study was to investigate the ameliorative effect of *Syzigiumcumuni* seed powder on blood glucose level of F1 male generation obtained when diabetic male mice was mated with normal female. Fixed dose of *syzigiumcumuni* seed powder were given along with food to F1 generation and blood glucose level were observed at a regular intervals for three weeks.

Syzigiumcumuni seed powder restores the histoarchitecture of pancreatic β cells and stimulates the secretion of pancreatic insulin in F1 generation of male mice. Blood glucose levels were found to return to their normal levels. Significant reduction in the alterations or abnormalities (i.e. smaller and more irregular shaped islets) in F1 male mice generation were noticed.

Hyperglycemia may influence the epigenetic modifications during spermatogenesis and these epigenetic alterations in pancreatic structures cannot be normalized by providing normal diet implying that these changes were trans generational and may inherited through male germ line and passed onto more than one generations.

In near future, transgenerational /epigenetic factors may be regarded as important aspect in determining risk of diabetes.

KEYWORDS: Histoarchitecture,Epigenetic,Transgenerational, Diabetes, Spermatogenesis and *Syzigiumcumuni*

Conservation of wild life and habitat in valmiki national park, bihar

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Abstract:

The Valmiki National Park is India's one of the biggest unfragmented tiger population in the Far East. The National Park is the 18th Tiger Reserve of the country and 2nd in Bihar is located in the northern part of the West Champaran district. One of the objectives of creation of Valmiki National Park (Tiger Reserve) is to maintain a viable population of supreme predator; the tiger and other fauna as well as flora for scientific, economic aesthetic, cultural and ecological values. Tiger is also considered as the flagship or umbrella species to conserve the unique biodiversity of the National Park. The forest under the proposed area has been known to be one of the best floral and faunal areas in the state. Special attraction of this area has been the existence of large no. of faunal species like Tigers, Leopard, Spotted deer, Hog deer, Barking deer, Wild boar besides a large number of floral species like Karma, Semal, Siris, Satsal, Harra, Bhant etc. Judicious manipulation and conservation of habitat will increase the carrying capacities of the reserve area. Carrying capacity of dense forest is always little. Hence, the habitat of forest needs manipulation in a manner that forest is always kept at a minimum utilization during the different periods of the year. Habitat manipulation and conservation should always be done to benefit all wild animals without much disturbance to them. It includes conservation of soil and water, development of new water sources, improvement of food and cover and control of grazing.

Keywords: Ecology, Conservation, Wild animals, Soil, Water, Flora and Fauna.

Application of micronucleus assay for assessment of ground water arsenic genotoxicity and its amelioration through *Psidium guajava* in *Mus musculus*

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Abstract:

Arsenic trioxide (3mg/kg.bwt/day) when fed orally to the Swiss albino mice for continuous 15 days, increased the incidence of micronuclei in polychromatic cell and normochromatic erythrocytes. The result showed the frequency of micronucleus significantly increased to 166 (1.41±0.10) in arsenic trioxide treated group of mice in comparison to that of control 22 (0.18±0.03). Two dose of guava fruit extract has been used *i.e.* D_1(23.5mg/kg.bwt/day) and D_2 (double of D_1). The group fed only with guava fruit extract D_1 and D_2 had micronucleus value recorded as 17(0.14±0.0) and 10 (0.08±0.02), respectively. While the group fed concurrently with arsenic trioxide and guava fruit extract (both doses) showed micronucleus frequency decreased to 80 (0.68±0.07) for D_1 guava fruit extract dose and 39 (0.33±0.05) for D_2. Therefore, guava fruit extract had an ameliorating effect upon arsenic trioxide induced micronuclei group. This work suggests that antioxidant is a powerful agent for reducing genotoxicity induced by heavy metal pollutant in drinking water.

Keyword: Arsenic trioxide , ground water, guava fruit, micronucleus, antioxidant

Studies on the Helminth Parasites of *Rana tigrina* of Chapra town with reference to its ecological conditions

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Abstract:

To find out the prevalence of helminth parasites in frog (*Rana tigrina*) of Chapra town, the visceral organs involving-gut, lungs, liver, gall bladder, urinary bladder and trachea of 1865 specimens were examined between September, 2008 and September, 2011. Out of total 1865 host specimens, 665, i.e. 35.65 per cent were found infected with one or more helminth parasites. Sex-wise, the female showed higher (38.23 per cent) rate of helminth infection than that of their male partners (32.54 per cent).

Parasite-wise

Male:

In case of total examined male hosts, the highest prevalence was observed in nematodes (18.81 per cent), followed by trematodes (15.38 pet cent) while the lowest was observed in cestodes (12.07 per cent),but in total infected male hosts, the nematode prevalence was recorded 57.81 per cent, followed by trematodes 47.27 per cent and the lowest (37.09 per cent) was recorded in cestodes.

Female:

In case of total examined female hosts, the highest prevalence of infection was also found in nematodes (23.23 per cent) followed by trematodes (20.58 per cent) and lowest (15.49 per cent) was recorded in cestodes, but when taken out from the total infected female hosts, nematodes were 60.76 per cent, followed by trematodes (51.12 per cent) and cestodes (39.09 per cent). Season-wise and month-wise rate of prevalence of helminth infection have also been studied.

Keywords: Helminth Parasites trematodes cestodes

Protozoan parasites of fresh-water fishes

Ashish Kumar

BSC19-AS-RI-599

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Abstract:

The present investigations were carried out on the protozoan parasites of fresh water fishes of different ponds which are stocked for fish culture. Due to heavy stocking and pollution, a large number of parasites attack the fish which is a serious problem for aquaculturists. Thus, for proper culture one should know about the different types of parasites and their control. The protozoan parasites cause weight loss, debilitation and mortality of fishes. It has been observed that use of salt solution, formalin solution and potassium permanganate solution are cheap methods for controls of protozoan parasites.

Keywords: Protozoan parasites, Fresh water fishes.

Primary Productivity of a Healthy Fish Pond Suryapokhra in Relation to Fish Culture *Labeo rohita*

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Abstract:

The study on pond productivity of Suryapokhra (Manpur, Gaya) depicts a clear picture of the pond. It is one of the healthy pond in Gaya district. Various physic-chemical parameters and phytoplankton diversity establish the effect on primary productivity. Comparative studies of three ponds were conducted from the month of June 2018 to the month of November 2018. Phytoplankton diversity index was calculated by Shannon Wiener index. Statistical significance was set at $p<0.05$. There was a significant difference in temperature, DO, conductivity, pH and secchi depth in three ponds ((ANOVA;$P<0.05$) of Gaya. There was no significant difference in nutrients measured in the three types of ponds (ANOVA, $P<0.05$). In Suryapokhra pond, Chlamydomonas and Volvox species were dominant while Anabaena flos-aquae were dominant in Digghi Pond. In Ramsagar Pond, *Microcystis aeruginosa* was dominant. In Suryapokhra Pond, there was higher Shannon Wiener index 3.418, Digghi Pond 3.0439 and Ramsagar Pond 1.6416. A fish pond is an environment created by man which is unique in its own way that requires proper management in order to achieve high productivity. Live water organisms comprise of three main categories namely; phytoplankton, nekton and the benthic organisms. Among the above groups, Phytoplankton is important to fisheries and it is vital in influencing pond productivity in terms of fish yields. Other physico-chemical parameters are also balanced which are important for fish culture. *Labeo_rohita* production is found in greater extent.

Keywords: Phytoplankton, Physico-chemical; Primary Productivity, Shannon Weiner Index Suryapokhra Pond.

Survey of root knot disease of *Luffa cylindrica* caused by Nematode at different locality of Muzaffarpur

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Abstract:

Luffa cylindrica of *Cucurbitaceae* family is an important vegetable of the common people in North Bihar. This vegetable crop is severely damaged by the nematode paste and farmers are unaware with this. A survey was conducted in different locality at Muzaffarpur to identify the infected plants. It was found that crops of Kharif season revealed no symptoms up to July but form Augusts the above ground symptoms appeared such as curling of leaves, reduced size of the young leaves, appearance of chlorotic patches on it, reduction in flowers, fall of immature fruits, deformed fruits etc. such plats were identified and underground symptoms were studied. It was found that both the primary and secondary roots had galls of different size. The symptoms were much prominent in the month of October, when the entire old leaves dried and few deformed new leaves were produced. There were no fruits at all. The underground symptoms as revealed by the galls on the roots were much prominent and some galls were one inch in diameter, they were corky and gelatinous exudation was found on it. The number

of galls varied from 68 to 136 per plant. Further number of galls varied in different localities. Where the field was upland and no moisture in soil, the galls were smaller and lesser in number. The nematodes were isolated from such infected roots as well as form the rhizospheric soil. The standard methodology was followed and based on the structure of the female, the males and juvenile stage of the nematode it was identified as *Meloidogyne incognita*. The growers were suggested to use Neem cake, not to dump the debris in the field and destroyed the roots showing galls. They were advised not to do cultivation of *Luffa* every year. They were suggested to do plantation of Marigold plants and Chrysanthenum and do deep plaughing in summer. Next year fresh survey shall be done in the same locality to identify the same disease on the same crop.

Keywords: Root Knot, *Luffa cylindrica*, Galls, Neem cake, Deep plaughing, Marigold.

Survey of kitchen garden at different location in Muzaffarpur for root knot disease of Chilli and bottle gourd.

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Abstract:

Root knot disease of chilli of *Solanaceae* and bottle gourd of *Cucurbitacea* is caused by plant pathogenic nematode *Meloidogyne incognita*. The nematode is polyphagous and obligate parasite on several plant species. Infection is associated with secretion of proteins, surrounded by proliferating cells. The specific secretion by the nematode helps in the penetration of the host cells by the nematode stylet. This causes suppression of immunity and reprogramming of the plant cells to form multinucleate giant cell, which are exploited by the nematodes for their own feeding. Based on the above ground and below ground symptoms the infected plants of chilli and bottle gourd were identified. The root galls were the authenticating symptoms. The number of galls per plants was counted. From the rhizospheric soil and the infected roots nematodes were isolated by applying the standard methodology. The females, males and juvenile stages were studied separately. It was noted that number of galls per plant in both, the chilli and bottle gourd varied in different location. It was further observed that the number of galls per plant varied due to soil condition, the organic matter dumped in it and availability of moisture in the soil. Such kitchen garden which was connected with domestic waste water and where domestic wastes were dumped revealed higher no. of galls per plants. Nematode was identified after microscopic studies of their head shape, stylet morphology, length and width of male and female. The growers were advised certain eco-friendly control measure, such as rotation of crops with non-host plants, summer plaughing, use of Neem cake, co-cultivation of plants of marigold and arrangement for water logging during the rainy season. Most of them followed the suggestions and surprisingly there was considerable reduction in the incidence of the disease. Plants which revealed galls, their number were also reduced in comparison to the areas where treatment was not done.

Keywords: Root knot, Gall, Chilli, Bottle gourd, Kitchen garden, Domestic waste

Ameliorating effect of *Curcuma longa* on Streptozotocin induced nephrotoxicity in Swiss albino mice

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Abstract:

Diabetes mellitus is a universal problem affecting human societies at all stages of development. It is a condition where sufficient amount of insulin is either not produced or the body is unable to use the insulin that is produced, leading to excess glucose in the blood. Various medicines have been discovered till date to control it but ethno drugs in the present day is in high demand as its side effects are very least. The aim of this study is to investigate the anti- diabetic and antitoxic effects of *Curcuma longa* (Turmeric) rhizome extract on Streptozotocin induced diabetic mice.

The study was approved though the Institutional Animal Ethics Committee of the institute. Mice were grouped into 3 groups – Control (n=6), Streptozotocin treated (n=12) and *Curcuma longa* administered group (n=6). Treated group mice were administered with Streptozotocin 100 mg/kg body weight intraperitoneally. After the development of diabetes in mice the aqueous rhizome extract of *Curcuma longa* at the rate of 200 mg/ kg body weight was administered for 4 weeks to evaluate its anti- hyperglycemic activity. There serum glucose levels as well as the Kidney Function Tests (KFT) – Urea, Uric Acid and Creatinine levels were analyzed statistically using ANOVA and Dunnett's tests. The serum glucose levels show increase in the levels in the Streptozotocin induced diabetic group in comparison to control group while the turmeric group showed the glucose lowering down activity denotes the antidiabetic effect. The Kidney function test showed significant elevation in the Urea, Uric Acid and creatinine levels in Streptozotocin induced groups while the Turmeric showed significant decrease in in the KFT levels denotes the antitoxic effects. Thus, from the entire study it can be concluded that Turmeric can be used as potent natural anti-diabetic drug which can control the diabetes at much level furthermore it also prevents the Kidney from the diabetic damage and restores of cellular status of the kidney.

Keywords: Amelioration, *Curcuma longa,* Streptozotocin, Kidney Function Test

Effect of water pollutants on Biochemicals of gut of some aquatic insects

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Abstract

Some water pollutants liked DDT and detergent, having the poisoning effects on the insects because DDT and Detergent is non-biodegradable substances, which cannot be decomposed and persist in environment for long time of periods. These pollutants accumulate in the tissue of insects and alter the conformation of histology and change the concentration of biochemicals like carbohydrate, protein and enzyme.In insects, like other animals, glucose occupies a central role in carbohydrate metabolism participating in different biochemical process however, in a majority of insectspecies, amount of the free glucose is quite small.The most characteristic sugar in insecthaemolymph and other body tissue is trehalose, a disaccharide, of glucose. It is non reducing sugar by virtue of anomeric carbon atoms of both glucose molecules are bonded in glycosidic linkage. In haemolymph usually there is relatively low level of glucose along with higher trehalose content.

A sub lethal dose of insecticides although is a very low concentration apparently do not cause mortality of aquatic insects, crustaceans fish etc, but they cause alteration in their metabolic process including carbohydrate metabolism.

The two important pollutants DDT and detergent were taken in the presentstudy.These pollutants affect the decline ofbiochemicals like carbohydrate, Protein of gut of aquatic insects. The concentration of carbohydrate were changed with the treatment of pollutant compared with controlled condition.

Key words:-Water pollutants, Biochemicals, Carbohydrate, Gut, DDT, Detergent

Parametric determination for bioenergetic transformation of molasses pollutant to ethanol by S*accharomyces cerevisiae*NCIM-2086

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Abstract

The present study deals with selection of alcohol producing yeast selection of cheapest and easily available economic raw material, optimization of concentration of raw material selected, optimization of temperature, PH and incubation Period of alcoholic fermentation process. The study of the influence of different incubation periods on yields of ethanol from 16% molasses has been studied. It reveals that it proceeds in different phase. The first phase completes in 10-15 hours where slow molasses consumption is accompanied by poor yield occurs during 30 hours and 46 hours of incubation period where molasses consumption and yields of ethanol. The second phase occurs during 30hours and 46 hours of incubation period where molasses consumption and yields of ethanol follows the first phase with slight improvement in the yield of ethanol. After 40 hours of incubation period that the 3rd important and effective last phase begins and the ethanol yields are maximum in this phase, (46 hours). In this way 46 hours of incubation period gives the maximum yield of ethanolwhichis 5.70 ml/100 ml. Thus, ethanol formation by the yeast *saccharomyces cerevisiae* NCIM-2086wasoptimizedusing16%molasses4.8PH;32^0Ctemperatureand46 hours of incubation period along with some other necessary growth ingredients.

Keywords: Molasses; *Saccharomyces cerevisiae* NCIM-2086; Incubationperiod, Optimization Temperature, Ethanol.

Novel mode of action of cisplatin in acute leukemia cells

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Abstract

Cis-diamminedichloroplatinum (II) (cisplatin, CDDP) is a widely used anti-tumor drug for the treatment of a various kind of human malignancies. It is very effective against carcinomas, germ cell tumors, lymphomas,sarcomas, and other cancers.CDDP inhibits growth of acute promyelocytic leukemia [APL] cells through cell cycle regulation and apoptosis.However, the novel molecular mechanisms of its anti-leukemic actions are poorly understood. MDM2-DAXX-HAUSP complex is attractive target of existing anti-cancer drugs and should be novel

approach to treat APL disease. We hypothesize that CDDP acts in APL cells through disruption of complex, reduced expression of complex molecules and, activation of p53 leading to cell cycle regulation and apoptosis. We evaluated the expression of complex molecules and effect of CDDP in their expression and association, p53 accumulation, cell cycle arrest and death by using western blotting, immunoprecipitation[IP], immunocytochemistry, flow cytometry, gene knock down using CRISPR-Cas9 and RNAi method as well as advance imaging techniques in APL cells. For *in vivo* study, transgenic APL mice was used and the effect of CDDP on complex molecules expression and association in both liver tissue and bone marrow cells were observed. CDDP induced change in expression and association of complex molecules in both APL cells and tissues was analysed. The results could be beneficial forfinding new anti-leukemic drugs. Our findings could help for cisplatin pharmacology and drug designing with novel target in APL chemotherapy.

Keywords: Cisplatin, Leukemia, Gene Expression, RNAi technology

Effects of heavy metals on the ventilation and Operecular movement in *Channagachua* and *Cirrhinus reba*

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Abstract

Several heavy metals which are present as pollutants in the water bodies have been established as a toxic substances to fish. The present study has been aimed to regulate their entry in the various water bodies so that it can be ensured that aquatic organismsmay not be adversely affected. It has been found that the effects of heavy metals in fish can be variable to a greater extant. Apart from causing death either directly or due to starvation by destruction of food organism, many heavy metals have shown to effect the survival behavior, growth, reproduction, physiology, biochemistry and pathology of fish with the evidence of tissue damage.The present study deals with the opercular frequencies and respiratory distress.It was found that these frequencies anddistress were increased 2-4 times more than control fishes. The opercular frequencies per minute were observed in two different habit fishes at different concentration to two heavy metals pollutantsi.e CuSO4 and K2Cr2 O7 in relation to exposure periods. At the initial stage of exposure, both fishesi.e*C. reba* and *C.gachua* exhibited similar result and no significant affect were noticed. However, in case of *C.gachua*, the opercular frequency was found in increasing trend from 40mg /L to 265.4 mg/L level but suddenly and abruptly declined at 517.9 mg / L level up to 72 hour of exposure in both pollutants. Another test fish *C. reba* exhibited decreasing at 96 hr of exposure which was not abrupt like *C.gechua* rather in a systematic manner in case of CuSO4 polluntants at 88 mg/ L level of concentration where it exhibited 46±2.The initial increase in the opercular movement followed by a gradual decrease which becomes repid just prior to the death. These developments depended mainly on the concentration limit and exposure period and normally this is concentration dependent. Further, the movement of *C. reba* and *C gachua* towards water volume increased in almost all concentration to meet their O_2 requirement but it did not materialize in lethal concentration.

Keywords :*C.gachua*, *C.reba*, CuSO4 , Heavy metals,opercular movement,K2Cr2O7

Amelioration of Endosulfan Induced Hematological alterations in mice by *Phyllanthus emblica* and *WithaniaSomnifera*

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Abstract

Endosulfan is a man-made insecticide which is highly controversial agrochemical due to its acute toxicity potential for bioaccumulation but still used in large scale in India even though it is being phased out globally. Endosulfan plays a great role in alteration of hematological status of human beings. The present study was carried out to investigate the acute effects of endosulfan on hematological parameters such as Erythrocyte count (RBC), Leucocyte count (WBC), percent Hemoglobin (Hb%), Packed cell volume (PCV%) and Mean Corpuscular Volume (MCV) on swiss albino mice. Adult male mice were segregated into four groups, each group with 6 animals. Group I, served as the control was administered with distilled water @0.1 ml/10g b.w; Group II, received endosulfan @3mg/kg b.w; Group III, concomitantly received *Phyllanthus emblica;* Group IV, concomitantly received *Withaniasomnifera* (Ashwagandha) 150 mg/kg b.w along with endosulfan through oral gavaging.All the treatments were continued for 3 months. The toxic effects observed upon endosulfan treatment include Erythrocyte count (RBC) gradually decreased, Leucocyte count (WBC) increased, percent Hemoglobin (Hb%) significantly decreased, Packed cell volume (PCV%) reduced significantly and Mean Corpuscular Volume (MCV) significantly increased.

On contrast, treatment of extract of *Phyllanthus emblica* and *Withaniasomnifera* was found to alleviate the toxic consequences of endosulfan, thereby producing ameliorative effect.

Keywords: Endosulfan, *Phyllanthus emblica, Withania Somnifera,*Erythrocyte count, Leucocyte count, Hemoglobin, Packed cell volume, Mean Corpuscular Volume.

Toxic effect on Blood Glucose level of the*Channapunctatus*due to Environmental stress induced by the use of pesticidesCarbaryl and Endosulfan

Mridula Renu Sinha *BSC19-AS-PI-580*

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Abstract

Human population is increasing tremendouslywhich is creating need of more andmore food. This has led to use of chemicals viz pesticides, insecticides etc to improvethe agricultural productivity.Use of such chemicalsgenerates many environmental issues.These chemicals find their way through rain-water, wind and agricultural drainage to the water bodies and pollute them.

These polluting agents have fatal effect on fishes and also affect water quality disrupting biological equilibrium. The pesticides carried through the food chain are particularly harmful to the reproductive system of aquatic animals and pose potential danger to mankind when he consumes fish from polluted water bodies.The present project has been undertaken to evaluate the blood chemistry of ***Channa punctatus*** (Lata fish) exposed to the pesticides and to find

changes in their blood glucose level.For the toxicity test pesticides, carbaryl and endosulfan were used keeping in mind their common use in agricultural field in and around Patna.

A hyperglycaemic condition in ***Channa punctatus*** was only observed during the longer exposure to Endosulfan and Carbaryl. At 24 hours exposure, a hypoglycaemic state is found. The initial hypoglycemic condition of fishes may be an adaptation to meet the demand for marked increased activity of the fishes. The fluctuating level of glucose in the early phase of exposure may be due to the lack of stabilization of fishes to the effect of the pesticides.The review of the experiments concludes that Endosulfan was more toxic for ***Channa punctatus***. The toxicityof Carbarylwas less when compared toEndosulfan.

Keywords: Carbaryl, Endosulfan**,** ***Channapunctatus,***

Effect of Different animal manures on fresh water fish of *Anabas testudineus* (Bloch, 1792)

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MLS College Sarisabpahi, Madhubani, Bihar

Abstract:

India with exploding population has to increase its food production through less expensive different modes. One such mode is fish culture, however 40-60% of the production cost in aquaculture goes for fish food. India has large amount of organic manure to enhance fish production. Result indicate that a combination of pig manure and biofgas slurry recorded highest growth compared to cow dung and biogas slurry and poultry dropping bigas+slurry. These results suggested that these manure can be utilized for reducing the cost of fish production besides the clearing of environment that a combination.

Keywords: Organic manure, Anabas testudineus, Pond productivity

An assessment of plankton diversity in river Sone in Bihar

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Abstract:

Lotic systems, particularly rivers are found to be one of the important niches of plankton diversity. Plankton constitutes most basic producers of these freshwater aquatic bodies. An assessment of zooplankton has been carried out in River Sone in Bhojpur region from five sampling stations namely, Sandesh, Sahar, Koelwar, Babura and Bahiare in 2019. The study revealed the presence of a variety of zooplankton i.e., protozoans, rotifers, cladocerans and copepods, although their number varies in different seasons with fluctuations in physico-chemical environment of the river water. This paper tries to elaborate a relation of plankton diversity with different seasons of the year.

Keywords: Plankton diversity, niche, fluctuation, zooplankton, physico-chemical parameters.

Mitigating effect of *Murraya koenigii* (L.) Sprengel leaves (curry leaves) against paracetamol induced genotoxicity in mice sperms.

NidhiVerma and DharmshilaKumari *BSC19-AS-RI-506*

Abstract:

Self- medication is one of the major health issues inour country. People in order to get immediate reliefin minor problems related to health prefer self medication. Large groups of medicines including analgesics, antipyretics , multi-vitamins etc. are consumed throughout the world for this practice. Analgesics are most common group of drugs used by people in our country with great demand. Paracetamol is common analgesics as well as antipyretic drug, it is known for its characteristics of curing fever,pain relievers and also possess excellent safety profile.But its overdose have been reported to cause various health hazards like liver damage, renal failure, pulmonary toxicity, mutagenicity and genotoxicity.The present work was designed to evaluate genotoxic effect of paracetamol on sperm cells and its mitigation by *Murrayakoenegii* leaves on mice. Result showed that paracetamol increased the percentage of abnormal sperms than control and the concurrent treatment with curry leaves decreases the percentage of abnormal sperms up to the control level. Several abnormalities in sperms including hammer-headed, hookless, banana shaped, coiled tails, double headed etc. were reported in this investigation. Therefore, the result signifies that paracetamol induced genotoxicity can be ameliorated by *Murraya koenigii* leaves up to control level due to its potent antioxidant property.

Keywords: Analgesics, Paracetamol, genotoxicity, curry leaves, sperms

Common *lepidoptera* species and their host plants

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Abstract:

The *Lepidoptera* are among the most successful groups of insects. They are found on all continents, except Antarctica, and inhabit all terrestrial habitats ranging from desert to rainforest, from lowland grasslands to mountain plateaus, but almost always associated with higher plants, especially angiosperms. *Lepidoptera*is an order of insects that includes about 180,000 species of butterflies and moths. Butterflies and moths play an important role in the natural ecosystem as pollinators and as food in the food chain.

Keywords : *Lepidoptera***,** host plants, species.

Assessment of toxicity, Ethological Stress and Safe level of Garlic to an Indian air-breathing catfish, *Clarias batrachus* (Linnaeus, 1758)

Dina Nath Pandit and Kumari Priya *BSC19-AS-RI-584*

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Abstract:

A maiden study was conducted to assess the toxicity and ethological stress of garlic to an Indian freshwater air-breathing catfish *Clarias batrachus* (Linnaeus, 1758) of body weight 55.0g.

The physico-chemical parameters of experimental water were found within the favorable limits. 96hr-LC_{50} dose of fish was calculated by Lorke and Enegide *et al.* method, Up-and-Down (Staircase) method, Behrens-Karber method, Miller and Tainter graphical or regression analysis method, Finney probit analysis method and Reed-Muench method. The ideal median 96hr-LC_{50} value was determined 880mg/fish or 0.88g/fish (16g/kg) for garlic by these semi-static methods. Moreover, the safety level of garlic was calculated by varied methods. There have been massive variations within the safe levels calculable by different methods for garlic. Additionally, to dose and dose-time dependent increase in death rate, stress signs within the sort of behavioral changes were determined in response to garlic. Therefore, precautions ought to be taken once high concentrations of garlic are utilized in chronic treatment of *Clarias batrachus* (Linnaeus, 1758)

Keywords: *Clarais batrachus*, Garlic, Ethological responses, Toxicity, Safe level.

Ameliorating effect of *Curcuma longa* on Streptozotocin induced nephrotoxicity in Swiss albino mice

Pramod Shankar and Sudhir Kumar Srivastava *BSC19-AS-PI-595*
Department of Zoology, Patna University, Patna Bihar, India

Abstract:

Diabetes mellitus is a universal problem affecting human societies at all stages of development. It is a condition where sufficient amount of insulin is either not produced or the body is unable to use the insulin that is produced, leading to excess glucose in the blood. Various medicines have been discovered till date to control it but ethno drugs in the present day is in high demand as its side effects are very least. The aim of this study is to investigate the anti- diabetic and antitoxic effects of *Curcuma longa* (Turmeric) rhizome extract on Streptozotocin induced diabetic mice.

The study was approved though the Institutional Animal Ethics Committee of the institute. Mice were grouped into 3 groups – Control (n=6), Streptozotocin treated (n=12) and *Curcuma longa* administered group (n=6). Treated group mice were administered with Streptozotocin 100 mg/kg body weight intraperitoneally. After the development of diabetes in mice the aqueous rhizome extract of *Curcuma longa* at the rate of 200 mg/kg body weight was administered for 4 weeks to evaluate its anti- hyperglycemic activity. There serum glucose levels as well as the Kidney Function Tests (KFT) – Urea, Uric Acid and Creatinine levels were analyzed statistically using ANOVA and Dunnett's tests. The serum glucose levels show increase in the levels in the Streptozotocin induced diabetic group in comparison to control group while the turmeric group showed the glucose lowering down activity denotes the antidiabetic effect. The Kidney function test showed significant elevation in the Urea, Uric Acid and Creatinine levels in Streptozotocin induced groups while the Turmeric showed significant decrease in in the KFT levels denotes the antitoxic effects. Thus, from the entire study it can be concluded that Turmeric can be used as potent natural anti-diabetic drug which can control the diabetes at much level furthermore it also prevents the Kidney from the diabetic damage and restores of cellular status of the kidney.

Keywords: Amelioration, *Curcuma longa,* Streptozotocin, Kidney Function Test

Avin Diversity of Saranda Forest Division in Jharkhand, India

Gopal Sharma & Saloni Kumari

BSC19-AS-SI-628

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Abstract:

The Saranda forests, spread over an area of over 82,000 hectares (ha) in the hilly regions of West Singhbhum district of Jharkhand. Birds are some of the most prominent species of the Earth's biodiversity and being sensitive to environmental changes they act as key indicators for assessing the status of ecosystem health (Taper *et.al.* 1995; Olechnowski 2009, Agarwal *et.al*., 2015). The bird diversity is very rich in this area.

More than 9000 avian species found in the world and from India there is 1313 avian species is recorded. 141 are endemic species (Grimmett et al., 2011). 170 species of birds from worldwide is threatened as per IUCN Red List threatened species 2014 and bird life international. There are 465 bird species reported from Bihar and Jharkhand earlier (Dutta *et al.* 2004). In the management plan of Palamau Tiger Reserve 170 bird species is listed (Sinha and Mukherjee 1995). Verma, 2011 reported 71 bird species from Dalma Wildlife Sanctuary, Jharkhand. Satyapraksh et. al., 2014 reported 36 water birds during asian waterbird census in 2014 from Udhwa lake bird sanctuary and H. S. Gupta, 2009 documented 277 bird Species from Saranda.

Altogether 18 Order including Gruiformes, Accipitriformes, Anseriformes, Apodiformes, Bucerotiformes, Caprimulgiformes, Charadriiformes, Ciconiiformes, Columbiformes, Cuculiformes, Falconiformes, Galliformes, Passeriformes, Pelecaniformes, Piciformes, Psittaciformes, Strigiformes and Suliformes; and 58 families including Accipitridae, Acrocephalidae, Aegithinidae, Alaudidae, Alcedinidae, Anatidae, Apodidae, Ardeidae, Bucerotidae, Burhinidae, Campephagidae, Caprimulgidae, Ciconiidae, Cisticolidae, Columbidae, Coraciidae, Corvidae, Cuculidae, Dicruridae, Estrildidae, Falconidae, Rhipiduridae, Scolopacidae, Strigidae, Sturnidae, Charadriidae, Hemiprocnidae, Jacanidae, Laniidae, Leiothrichidae, Megalaimidae, Meropidae, Monarchidae, Motacillidae, Muscicapidae, Nectariniidae, Oriolidae, Pandionidae, Paridae, Pellorneidae, Phalacrocoracidae, Phasianidae, Phylloscopidae, Picidae, Ploceidae, Psittaculidae, Pycnonotidae, Rallidae, Recurvirostridae, Sittidae, Sturnidae, Sylviidae, Threskiornithidae, Timaliidae, Turdidae, Upupidae, Vangidae and Zosteropidae were recorded from the Saranda Forest Division.

As a result altogether 230 species of Avian Fauna from the Saranda Forest Division localities surveyed. The study is mainly based on information from published Literatures, sightings and photographic evidences during the present field work during 2017-2019. The fundamental threat to the forests is uncontrolled mining for iron ore, both legal and illegal, which is destroying not just the wildlife but also the forests.

Keywords: Bird diversity, IUCN Red List, bird life international, indicators, threats and mining.

Piper betel leaf stalk extract influence of selective and directional on anodic proteins and M-Isozymes of LDH in semen of Swisss Albino Male mice in relation to control fertility

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Abstract:

The population is rising tremendously this may affect drastically the economic growth of India and other developing country. Fertility regulation with plant and plant preparations has been reported in the ancient literature of indigenous system of medicine. In our country as well as in the world there are several medicinal plants associated with antifertility properties among them there are one plant *Piper betel* leaf stalk. The aqueous extract stalk of Piper betel administered orally at the dose of 0.15 ml (50mg/kg/BW/day) for 10, 20, 30, 40, and 50 days resulted in significant increase in total electrophorectic protein concentration in seminal plasma and total activity of seminal LDH isozymes in Swiss albino male mice due to increased level anodic protein and M-isozymes of LDH in treated groups than the control. The Piper betel leaf stalk treated Swiss albino male mice shows rise in anodic protein concentration which adds more negative charges on sperm surface membrane that inhibits capacitation and fertilizing capability of the sperm and increased levels of M-isozymes of LDH in seminal plasma of Piper betel leaf stalk treated male mice caused more accumulation of lactate and decreased cellular respiration. Possibly all this impairs sperm motility and causes higher mortality of spermatozoa in treated groups of male mice. Thus, aqueous stalk extract of Piper betel adversely affects fertility in Swiss albino male mice and showed antifertility effects.

Keywords: Fertility Control, Piper Betel Leaf Stalk, Plant, M-Isozymes and Anodic Protein.

Correlation between physiological stress response & consequences of oocyte maturation in female teleost exposed to butachlor

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Department of Geology, Patna University, Patna, Bihar, India[3].

Abstract:

The present research work was carried out to investigate the most widely used commercial brand herbicide butachlor, (2-chloro-N-(2-6 diphenyl acetamide) on the physiological stress response correlated with histo-pathological alterations in the ovarian cells of air breathing fish *Clarias batrachus* (Linnaeus,1758). The 96 hr. LC_{50} for butachlor was calculated as per standard APHA method. Then the fishes were exposed to 1.5 µl/L and 2.5 µl/L concentrations of butachlor for the of 5, 10 and 15 days durations respectively. Blood serum was assayed for serum cortisol, TSH and estradiol level by ELISA technique. Ovarian cells were studied under light and transmission electron microscopy (TEM). The TEM study was done at SIF- EM facility unit, department of anatomy AIIMS, New Delhi.

An overall increasing trend in the serum cortisol, TSH and decreasing trend in estradiol level was observed in butachlor treated fish. Light microscopic studies of ovarian tissue of normal fish marked different stages of development in oocyte with ovigerous lamellae extended from germinal epithelium and a few nutritive cells with distinct nucleus and nucleolus. However, 5 days butachlor exposed fish showed ruptured ovigerous lamellae, fused young and maturing

oocyte, shrinkage of nucleus and presence of peripheral vacuoles whose number increased significantly in 10 days and 15 days exposed fish. TEM of ovarian cells of treated fish showed severe damage and structural abnormalities in growing oocyte *viz*. disruption in theca and follicular epithelium layers, blocking of zona radiata, dose and duration dependent ionic deposition and appearance of condensed cloud like patches over the follicular layer.

The results of the present study highlights the pattern of xenobiotic action of butachlor in a dose dependent manner which elicits physiological stress response in fish by increasing serum cortisol and TSH level, and decreasing serum estradiol level that ultimately hampers the process of oogenesis, as a secondary manifestation.

Keywords: *Clarias batrachus*, butachlor, cortisol, TSH, TEM, etradiol, oocytes.

Effect of Mixtusre of *Eichornia, Ipomea* and *Acorus* leaf powder on adult mortality of *Rizopertha dominica* (Fab.) infesting rice in different ration 2:1:2

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R.D.S College, Muzaffarpur[2]

Abstract:

The present work is confiend to "comparative study of effectiveness of some plant products as protectant against *Rizopertha dominica* infesting rice on its adult, larval & egg population"

A lot of work has been done on insect infestation in different food grains such as wheat,jawar,maize,pulse.but very little or no work has been found about the effectiveness of *Eichhornia, Ipomoea & Acorus* were used as pesticides and their effect were observed.

In recent years have such a rapid advancement in the field of storage of food grains, however there is a lack of common storage practice even in a given agricultural area. Comprehensive principle of storage practices have to be developed keeping a view on its eco-friendly nature and human health. The practice of use of plant products as protectants against certain pest may certainly help the farmers immensely. Men have created problems for themselves by interfering in the nature and disturbing the Ecosystem. To maximize the yield the crops, men have used several devices & chemical pesticides control the outbreak of pests, so, Indian have fallen serious victims to pesticides poisoning. It has appreciably contributed towards improving general economic conditions, However, there is growing awareness among planners, manufactures & researchers about introducing newer & safer methods of pest control with greater pest specificity in order to keep the environment free from pollution hazard and fulfill the concept of sustainable development. We have created problems for themselves by interfering in nature and disturbing ecosystem. Now a days world is discussing on "sustainable development"

The present work is being under taken to examine use of mixture of plant *Eichhornia, Ipomoea & Acorus* leaf powder on most common coleopteron pest *Rizopertha dominica* and find out ideal plant product to check loss of grains through mortality of attacking pest.

Keywords: *Rizopertha dominica*, *Eichhornia, Ipomoea and Acorus* leaf powder, petroleum ether extrac

Fish diversity of River Ganga Flanking Chapra, Saran, Bihar

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Abstract:

"Ganga" the largest one and scared river of India, and lifeline to millions, who live along its bank. It supports a large number of endemic and exotic species of fishes. Fishes constitute a major component of diet for Northeast Indian and they are extensively used as a protein rich diet.

The present study was aimed to find the biodiversity of River Ganga around Chapra Saran, Bihar in the period of May, 2019 to December, 2019. This study was based on the survey analysis of different sites at Aami and Koilwar bridge between Chapra and Ara.

The fishes observed during the present study were : **Order Clupeiformes** ; *Hilsa ilisha, Ilisha motius, Notopterus chitala, Notopterus notopterus, Aspidoparia morar*, **Order Cypriniformes-** *Catla catla, Chela atpar, Labeo rohita, Wallaga attu, Mystus bleekeru, M. cavasius, M. vittatus, Aillichtys punctate, Eutropiichtys vacha, Heteropneustes fossils, Clarias batrachus, Alia coila, Pangasius upiensis, Pseudeutropius atherinoide,* **Order Ophiocephalioformes-** *Channa punctatus*, of order Perciformes:- *Anabus testudineus*, **Order Symbranchiformes**:- *Amphipnous cuchia* and **Order Mastacembeleformes-** *Macrognatha aculeatus, M. pancalus, M. armatus* of Ganga.

It was observed that members of order "**Cypriniformes**" were in highest strength, in Ganga river of Aami and Koilwar bridge between Chapra and Ara thruogh out the study period.

Keywords: Aami, Biodiversity, fish, Ganga.

Differential Genotoxic and Oxidative Stress Induced by Fluoride in a Freshwater Fish, *Channa punctatus*

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Abstract:

Ground water of many countries all over the world are contaminated with fluoride, so millions of people are exposed to fluoride through drinking water are suffering from serious health problems. The available information on the genotoxic effect of fluoride is, highly contradictory and even controversial. However, the present experiment was designed to assess the genotoxic potential of fluoride using the biomarkers of oxidative stress and genotoxicity in a fresh water fish *Channa punctatus*, segregated into 4 groups exposed to different levels of fluoride (T_1 = 1mg/L, T_2=1.5 mg/L, T_3= 5 mg/L, T_4=10 mg/L) for 28 days. Our findings indicate that exposure to fluoride only at high levels (5 and 10 mg/L) may results in toxic consequences, causing oxidative stress and potential genetic damage. Induction of oxidative stress was evidenced by significant elevation in the levels of Lipid peroxidation with significant decrease in the levels of cellular antioxidants following corresponding increase in exposure level of fluoride (1mg/l, 1.5 mg, 5 mg/L and 10 mg/L), irrespective of the duration of exposure. Similarly, significant increase in the micronucleated erythrocytes occurred at the highest level of fluoride exposure (10 mg/L) and not at any lower level of exposure. Low exposure levels of fluoride (1mg/L to 1.5 mg/L), therefore seem to produce no perceptible genetic damage in the fish as toxic consequence appears only at high levels of fluoride (i.e. 5 and 10 mg/L). Fluoride induced oxidative stress may therefore be linked as the biochemical basis of its genotoxic effect.

Keywords: Fish, Fluoride, Genotoxicity, Oxidative stress

Studies on dissolved oxygen and carbon dioxide of a perennial pond ecosystem of Shekhpura khajuri of Naubatpur block Patna, Bihar

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ABSTRACT

The dominating characteristics of aquatic environment results from the physical properties of water. A water molecule is composed of an oxygen atom which is slightly negatively charged bounded with two hydrogen atoms, which are slightly positively charged. This dipolar structure enables water molecules to attracts and dissolved more substance than any other liquid on the earth. On the other hand the solubility of oxygen an essential resource for both plants and animal decreases rapidly with a increasing temperature and oxygen diffuses only slowly in water.

The present study is aimed to investigate periodical variation of dissolved oxygen and carbondioxide of water of a perennial pond. The pond is situated in village Shekhpura of Naubatpur block of Patna district. The important result of the dissolved gases(O2 and Co2) analysis of the Shekhpura khajuri of Naubatpur block Patna, Bihar during the session 2018-2019. Pond had shown marked variation in the value of dissolved oxygen of water from 3.6 to 6.7 ppm and had shown variation in the value of free Co2 in the range of 16-47ppm

BIOTECHNOLOGY & BIOINFORMATICS

Fly ash impact on environment and it's utilization in agronomic activities.

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Abstract:

Coal based thermal power plants generate more than 100 billion tonne of ash per annum. Disposal of this huge amount of fly ash is difficult and a sensitive task. It is regarded as an enormous problematic solid waste all over the world .The final fraction of fly ash is potentially harmful as they get deposited in lungs/pulmonary tissues when inhaled. The common disposal methods for fly ash have lead to degradation of arable land making it barren and also contaminating the ground water. The effective use of this fly ash is being evaluated to minimize waste in the most economical, practically viable and in an environment friendly manner. From the environment point of view the fly ash is a useful substance that improves chemical and biological properties of soil and is a readily available plant macronutrient and micronutrient. It enhances plant biomass production from degraded soils .Detailed studies on physical properties and chemical composition of fly ash have helped in repeatedly confirming the various useful application of this neglected industrial waste.

The author has made an attempt to review the available information on various attributes of fly ash and explore the modern technology in thermal power plants to control the environmental pollution and to make use of this fly ash in agriculture sector.

Genetic algorithm applications to RSM-based models for production of phytase by heat-stressed *Rhizopus oryzae* under submerged fermentation

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Abstract:

The aim of this study was to determine the optimum levels of nutrients for the production of phytase by heat-stressed *Rhizopus oryzae* in submerged fermentation. Plackett-Burman design (PBD) was initially adopted for evaluating the medium components (mannitol, K_2HPO_4, Na_2HPO_4 and sodium phytate) affecting the phytase production. The optimum levels were estimated using the steepest ascent (descent) method followed by the central composite design (CCD) of response surface methodology (RSM). The interactive effects of phosphorus sources, on phytase yield, were determined to be significant. Application of Genetic Algorithm (GA)/ Nelder-Mead downhill simplex (NMDS) with RSM model proved to be an efficient approach for optimizing the phytase production by *Rhizopus oryzae*. A 7.95-fold increase in phytase production (12640 ± 1450 Ul^{-1}) was achieved at the GA-predicted optimum concentration of (gl^{-1}); mannitol 22.8, K_2HPO_4 5.18, Na_2HPO_4 3.25, and sodium phytate 9.68, compared with the phytase yield before optimization (1589 ± 135 Ul^{-1}). In the bioreactor studies, the enzyme yields were sustainable to that of the shake flask; however, the time required for

maximum phytase production was significantly reduced (288h to 96h), resulting in an increase in productivity by 3.32-fold. The unusual stability of phytase at low pH and physiological temperature (39°C) further demonstrates the enzyme's potential in food and feed applications. The results conclusively suggest that the RSM can be successfully integrated with GA/NMDS approach. The approach was found to be more efficient in determining the optimum combination of medium components leading to an overall economical production process.

Keywords: *Rhizopus oryzae*, Phytase, Submerged fermentation, Response surface methodology, Genetic Algorithm, Bioreactors.

Cyanobacterial composition under different agro-ecosystems in Patna (Bihar)

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Abstract:

Soil cyanobacteria perform essential roles in agro-ecosystems and may function as a bioindicator for determining the equality of soil. In this study, cyanobacterial communities were studied in three different agro-ecosystems *viz.* agro-ecosystem to cultivate only cereal crops, to cultivate cereals and then pulses crops, and to cultivate only vegetable crops. A total of 187 species of cyanobacteria, belonging to 45 genera, were recorded from three groups of agro-ecosystems investigation. The number of species in each soil group was found to vary with the ecological conditions. A comparatively large number of cyanobacterial species were recorded in soils of group A (138 species), followed by soils of Group B (135 species) and Group C (129 species). The total average density of cyanobacteria varied from 560×10^3 to 1650×10^3/g of soil (dry weight). In all the three groups, the population density of cyanobacteria was minimum in June (565×10^3/g in group A, 560×10^3/g in Group C and 650×10^3/g in group B) and maximum during rainy season (July to September).

The agro-ecosystems of Patna provide favorable conditions for the growth of wide range of cyanobacterial biodiversity. Cyanobacteria were found abundant in all the three groups of soils. Favorable temperature, pH and moisture content, as well as adequate light and abundant essential mineral nutrients seem to be important in favoring such high cell concentration. Cyanobacteria grow at any place and in any environment where moisture and sunlight are available. However, their distribution pattern, ecology, periodicity and occurrence differ widely. Ingress of industrial wastes, domestic wastes, sewage and plant debris etc, are the main factors in determining the dominance of cyanobacteria in soil. With onset of favorable climatic conditions, some cyanobacterial flora becomes dominant, increasing the fertility of soils. Cyanobacteria showed the most evident response in all the three agro-climatic conditions, and therefore, may be considered as a bioindicator for land use.

Keywords: Cyanobacteria, Agro-ecosystem, Population density, Bioindicator, Biofertilizers.

Effect of Lead on the sperm quality of male Swiss albino mice

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Abstract

Environmental toxicants are posing threat to male reproductive health. The sperm quality has continuously declined in the last few decades across the world as evident through various studies. Lead is a heavy metal which is found in the environment due to urbanisation and anthropogenic sources. It is suggested to cause many adverse health issues in human. Many studies have been conducted to find the effect of lead on animal model, mostly rat and mice. However, its effect on male reproductive system in animal model is yet not well established. This study was done with the aim to add more evidences for studies involving lead induced male reproductive disorders.

Keywords: male reproduction, environmental toxicant, lead nitrate, sperm count, sperm motility, sperm morphology

CHEMICAL SCIENCE

INVESTIGATION OF JANUS GREEN-B AND MANGANESE DIOXIDE USED AS A SUPRAVITAL STAIN

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Abstract

In this study effect of radiation induced degradation of janus green b (jgb), reactive black 5 (rb5) and apollofix red (ar) dye compounds has been investigated in textile industry. At first, dye solutions were bubbled with n_2, n_2o for 5 min prior to irradiation in pyrex glass tubes and irradiated with gamma rays of the 60cogamma source. The doses were determined by fricke dosimetry (g (fe3+))=15.6). A jasco v-550 uv–vis spectrophotometer was used to measure absorption spectra of the dye solutions. The decoloration as a function of dose at a dose rate of 2 kgy/h. Measurements were also carried out at dose rates of 0.5, 1 and 4 kgy/h and more or less similar results were obtained. In the inset the spectrum measured in 50 ppm aqueous rb5 solution (dose rate 2 kgy/h) in air is shown. Two maxima can be observed one at ~300nm and the other at ~600 nm. The decrease of the absorbance at 600nm was followed as a function of dose. The change in the height of the other maximum was similar. In n_2o saturated solution the decoloration was almost complete after 500 gy irradiation. In air the dose necessary for decoloration was about three times higher while in n_2 atmosphere the decoloration reached a plato value of about 90% after ~800 gy. Spectra with three maxima (535, 516 and 288 nm) were recorded in 50 ppm aqueous solutions of ar. The amplitude of all absorption bands decreased with the increasing dose and disappeared almost completely at a dose of 1.6 kgy. This dye was not sensitive to the atmosphere: the dose necessary for decoloration was the same in air, in n_2 and in n_2o atmosphere. A quick decrease in the g value for decoloration can be observed until 2 kgy and afterwards it decreases more slowly.

Keywords: Ganus green b, Manganese dioxide and Supervital stain.

Amino fluorination : transition-metal-free N-F bond insertion into diazocarbonyl Compounds

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Abstract :

Gem-aminofluroination of diazoncarbonyl compounds has been achieved. This reaction proceeds under mild conditions and does not require any transition-metal promoter or catalyst. Treatment of diazoesters with N-fluorobenzenesulfonimide (NFSI), which serves as both a flourine and nitrogen source, results in the facile construction of C-N bonds, providing aminofluorination products in moderate to excellent yields. Kinetic studies and DFT calculations have provided valuable insight into the potential mechanism for this novel N-F bond insertion.

Keyword: Aminofluorination, carbenoid, ylide, N-Fluorobenzenesulphonimide.

Modified Synthesis of Hydantoins under Microwave Irradiation

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Abstract:

Hydantoins have been synthesized by a very simple, fast and general procedure under microwave irradiation. Syntheses of material have been achieved only in few minutes instead of 2-3 hours. The beauty of the work is the denial of use of solvent. The yield of the products under solvent free condition was found satisfactory. The aim of the present work is to synthesise the different hydantoins of medicinal value under microwave irradiation, even in solvent free condition to minimise the cost of the product. Disubstituted -1, 2- diketones 1 (a-c) are heated with urea in the presence of 30% aqueous sodium hydroxide under microwave irradiation, intermediate heterocyclic pinacols , 2(a-c) are obtained which on cooling, diluted with water and on acidification with concentrated hydrochloric acid, give hydantoins 3 (a-c) as the result of pinacolic rearrangement. The reaction was successfully attempted with microwaves at 40% (320W) level of full power, 800W of the oven used. The traditional heating [14] requires for completion of reaction about 2-3 hours but only 2-3.5 minutes by microwave irradiation. TLC is used to check the purity of the compounds.

Keywords: Hydantoins, Microwave irradiation, Solvent free condition

Mixed metal oxides-synthesis, characterization and catalytic reactivity

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Abstract:

Mixed Transition metal oxides exhibit electrical as well as magnetic properties. Hence, used in the manufacturing of semiconductor, this may have areas of interest of different researchers. Semiconductors are mostly used for the production of high temperature resistant refractory, Ceramics, Pigments, Catalysts Electrical, Magnetic, Optical and Lesser materials etc. Rare Earth metal oxides, simple or mixed stoichiometric or non-stoichiometric oxides have been the subject of intensive investigation and the results recently obtained so far have proved fruitful in efforts to correlate solid state chemistry and catalysis, which shows that mixed metal oxides and their properties is of great relevance to the chemistry. Catalysis has made tremendous advance during the last few years in terms of fundamental understanding at microscopic level as well as in the technical round in order to meet the growing demand of new catalysis, perovskites have been rediscovered as excellent catalysts of great versatility and diversity. It forms iso-structural compounds of interesting solid state and catalytic properties. These compounds have been used as catalysts in oxidation of CO and hydrocarbons, Reduction of nitrogen oxide, Hydro treating of oil fractions and coal liquefaction, SO_2 reduction, Oxidation of ammonia. The objective of this study is to synthesis and characterized mixed metal oxides of perovskite type $ABO_3 \pm \delta$, excess surface oxygen, surface acidity, surface basicity, structure and activity correlation and surface area. The results obtained so far would be analyzed in terms of basic concepts of thermodynamics and chemical kinetics to provide the ground for the validity of the hypothesis stated to be the "family of catalysts" enunciated by earlier workers.

Keywords: Transition metal semiconductors Ceramics, Perovskites, Liquefaction.

Effect of aquo-Acetone Solvent Systems on the Biochemical Efficiency of Higher Format

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Abstract:
In order to study the solvent effect of dipolar-protic solvent on the biochemical properties of formate ester, The kinetics studies were carried out to determine the solvolysis of butyl formate in aquo-Acetone media varying acetone composition ranging from 30 to 80% in a range of varying temperatures from 20°C to 40°C. At first, kinetics was suddenly decreased then slowly depleted with addition of organic co-solvent in the reaction media with increase in temperature. The changes in the values of iso-composition and iso-dielectric activation energies of the reaction have been explained in the light of solvation and de-solvation of initial and transition states to different extent. It has been observed that Gibbs free energy (ΔG*) increase with decrease in the values of enthalpy of activation (ΔH*) and entropy of activation (ΔS*) of the reaction, which reveals that Acetone acts as entropy controller solvent. The The activation energy of iso-kinetic was found to be 280.8 to 281.0 kJ/mol , which reveals that there is weak interactions but appreciable solvent-solute interaction in aquo-Acetone reaction media was observed.
Keywords: Sharp and Smooth Depletion, Mechanism, Solvation, Iso-composition, Iso-dielectric, Iso-kinetic Temperature, Enhancement, Depletion, Interaction, Ion-Dipole Type

Anticandidal Activities of some Transition Metal Complexes

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Abstract:

The interaction of zinc acetate, nickel chloride and cobalt chloride with potential ligands such as cyclohexanone oxime HoN = c $(CH_2)_5$, benzoinaniline schiff base phN = c(ph)c(OH)ph and benzophenone oxime HoN = cph_2 resulted in formation of complexes of the type [zn $(acl_2\ L_2]$ where, L = HoN = c $(CH_2)_5$ or phN = c (ph) c (OH) ph) and $[Nicl_2\ L_2].6H_2O$, $[cocl_2\ L_2\ (H_2\ O_2].2H_2O$ (where L': = HoN = cph_2). The ligands were synthesized by green method using water as green solvent. The synthesized complexes were characterized on the basis of elemental analysis, 'H-NMR, IR spectroscopy and their spectra were compared with that of free ligands.

Anticandidal studies showed that all of there complexes are biologically active against fungal diseases.

Keywords: Cyclohexanone, ligands, benzoinaniline schiff

Traffic Induced Noise Pollution and its Effects on Human Health in Siwan Town

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Abstract:

Noise is unavoidable part of our daily lives and has increasingly become a major burden on the quality of lives. Noise is derived from the Latin word "nausea" implying unwanted sound

or sound that is loud, unpleasant or unexpected. Noise is playing an ever-increasing role in our lives and seems a regrettable but ultimately avoidable corollary of current technology. The trend toward the use of more automated equipment, sports and pleasure craft, high-wattage stereo, larger construction machinery, and the increasing numbers of ground vehicles and aircraft has created a gradual acceptance of noise as a natural byproduct of progress. noise can damage hearing immediately, and even at lower levels, there may be a progressive impairment of hearing. Motor vehicles are the principal source of noise pollution in the city. Noise pollution is a severe environmental problem in Siwan town. The level of noise pollution in Siwan town and its impacts on city dwellers. The noise level is measured at 25 locations of Siwan town road areas. The level of noise pollution is closely related with traffic volume, particularly with the number of heavy vehicles like trucks, buses as well as auto rickshaw have been observed during the study. During the study to determine the health impacts on the city dwellers. Most of the common problems, the dweller suffering from noise pollution are headache, bad temper, sleeplessness, aggravation, hearing problems etc.

Keywords: Noise pollution, Human health,

Air pollution caused by burning of firewood

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Abstract:

Air pollution has been with us since the first fire was intoxicated for over the century, although different aspects have been important at different times. On the small scale, point source releases of individual pollutants can cause localised responses ranging from annoyance to physical injury. In urban areas, high concentrations of gases and particles from coal combustion and, more recently, motor vehicles have produced severe loss of air quality and significant health effects. The World Health Organisation (WHO) estimates that 500 000 people die prematurely each year because of exposure to ambient concentrations of airborne particulate matter. The major role of air pollution caused by the burning of fireworks during the diwali festival in India. Fireworks contain chemicals such as potassium nitrates, potassium chlorate, potassium perchlorate, charcoal, sulfur, manganese, sodium oxalate, aluminum and iron dust powder, strontium nitrate, and barium nitrate, etc. Burning of fireworks releases pollutants, like sulfur dioxide, carbon dioxide, carbon monoxide, suspended particles, and several metals like aluminum, manganese and cadmium, etc., which are associated with serious health hazards. Fireworks often result in serious accidents and lethal injuries and the complex nature of firework particles with trace metals and organic compounds possess more threat to human health. The effects of the burning of fireworks on air quality the ambient concentrations of various air pollutants such as SO_2, NO_2, $PM_{2.5}$, $PM_{10,}$ and chemical components in the particles during the diwali festival. The eighteen ions, 20 elements, and black carbon were measured in $PM_{2.5}$, PM_{10}, and the levels of organic carbon could be well estimated from the concentrations of dicarboxylic acids. Air Samples Were Collected With and Without Fireworks around Thawe Temple Gopalganj and It Was Found That Fireworks Contribution towards air Pollution is Significant.

Keywords: Air pollution, Fireworks, Some metal ions and organic compounds

Henna as a green inhibitor for the corrosion control in non ferrous medium like aluminium and its alloys

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Abstract:

Aluminium and its alloys are extensively used in manufacturing of different materials such as house hold appliances, aeroplanes, rocketry and ships. Its interaction with highly corrosive medium like saline water, acid medium as well as the oxygen rich atmosphere makes it susceptible to extensive damage. In this study, corrosion behaviour of Aluminum in oxygen rich and acid medium has been investigated at different temperatures using weight loss measurement method. The heat of activation was measured at different temperature and subsequently nature of adsorption has been studied as Temkin's adsorption curve. Further, inhibitive behaviour of Henna has also been investigated on the different materials. The extract of Henna has been made by crushing, boiling and filtering. Result shows that Henna exhibits inhibitive behaviour in acid and oxygen condition as confirm by weight loss measurement, potentiodynamic and polarization methods. Finally, Tafel's slop has also been drawing.

Keyword : Henna, corrosion, Temkin's Adsorption, Tafel's slope.

Hazardous Effects of Persistent Organic Pollutants

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Abstract:

Persistent Organic Pollutants (POPs) are defined as organic substances, which are toxic as well as bioaccumulative in nature. It is persistent on long range transboundary atmospheric transport, deposition and exhibit harmful effects in man and the environment. Some of POPs have been deliberately produced by the industry for wide variety of applications and others are accidentally formed as a byproduct from various activities such as industrial combustion. The most hazardous POPs identified are DDT, Dioxins and Furans, Hexachlorobenzene, Polychlorinated Biphenyls, Pesticides etc. POPs are emitted into environment as complex mixtures.

Key words: Hazardous, Persistent, Pollutants, Pesticides, Dioxins, Hydraulic Fluids, Combustion, Herbicides

Efficacy OF Acridine on Aerobic dissimilation of sugars to citric acid by Aspergillus candidus NCIM – 883

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Abstract:

The effect of chemical mutagen, i.e., Acridine on aerobic dissimilation of sugars to citric acib by *Aspergillus candidus* NCIM -883 has been studied in this paper. It has been observed that the mutagen under trial, i.e. Acridine has stimulatory effect for the aerobic dissimilation of sugars

to citric acid by *Aspergillus candidus* NCIM – 883, when 15% sucrose solution is allowed to ferment at pH 2.2, temperature 28 ^{0}C and incubation period of 10 days. It has been reported that Acridine is stimulatory at all molar concentraton used during the course of citric acid fermentation, i.e., 1.0x10^{-5} M to 10x10^{-5} M. It is found that molar concentration of phase 1 to 7 of Acridine, i.e., 1.0x10^{-5} M to 7.0x10^{-5} M influences the productivity of citric acid in a regular manner enhancing yield from X to 1+X respectively where X is the % increase in the yield of citric acid.

Keywords: Aerobic dissimilation, citric acid, Acridine, Sucrose, *Aspergillus candidus* NCIM – 883.

Spectral study of the some complexes transition ion

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Abstract :

This study reports the nature of bonding in organometallic compounds considering the role of ligands. Organometallic compounds and its metal ion complexes are important tool for biochemical synthesis, anti-microbial activity etc. compounds of organometallic containing sulphur, nitrogen and oxygen atom donor have identical structure for biological natural system. In biological system due to presence of oxygen from hydroxy (OH) or carboxyl (COOH), nitrogen from amino (NH_2) donor atom properties of the complexes to a great extent as effective and stereo specific catalyst for oxidation, reduction and hydrolysis. The various type of organometallic compounds with metal ion complexes have been extensively studied and exhibit wide application, especially in biological system. In our research the mono, di, tri, tetra, penta dentate metal ion shows spectral properties. As usual these kind of complexes shows very important role for understanding for coordination chemistry of metal ions. They shows important role in numerous biological system.

Keywords: Organometallic, biological system, COOH, NH_2, OH

Biological and Anti-tubercular Activities of Heterocyclic Compounds

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Abstract:

The hetrocyclic compounds exhibit remarkable biological and anti-tubercular activities. Hence a beta diketone containg a heterocyclic moiety will be prepared and used for complexation with transition metal ions like Mn (II), Co (II) and Ni (II). B-diketone may be converted into Schiff-base and it will be complexed with metal ions. The mode of the coordination of the ligand will be ascertained by the study of their FTIR spectra in respect of that ligand. Their molar conductivities will ascertain the electrolytic or non-electrolytic nature of complexes. Their electronic spectra will be recorded in visible range to depict the tentative structure of the newly synthesized coordination compounds.

Keywords: Schiff-base, anti-tubercular activities, FTIR

Eco-Friendly and Efficient Synthesis, Characterization and Anti-Bacterial Activity of Schiff Bases Ligandsand & their Copper(II) Complexes

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Abstract:

Microwave Irradiation techniques have been used for synthesis of Schiff bases as a new ligands and their complexes with Cu(II) have been developed using condensation of pyridoxal and amoxicillin (L^1), cephalexin (L^2), sulphamethoxazole (L^3) and trimethoprim (L^4) efficiently in an alcoholic suspension medium using alkali catalyst. This process is very rapid, efficient, clean and also eco-friendly in nature. The results are compared with conventional methods for micro-analytical, thermo-gravimetric, magnetic and spectroscopic studies. All the Schiff bases were bidentate (NO Donor) ligands. All the complexes were found to be six co-ordinate dihydrates and ML_2[1:2(metal:ligand) ratio] type. The complexes are coloured and stable in air. All the complexes under investigation possess antibacterial activity. The antibacterial activity showed the following trend: *Cu(II) – complexes Schiff base ligands parent drugs*

Keywords: Microwave irradiation; Schiff bases, Coordination compounds; Antibacterial activity; Copper

Mitigation of AS and F^- from Ground Water / Surface water by the filtration through the special laterite soil with using AAS

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Abstract:

Everyone has birth right to take clean and purified water, germless, and contaminant less- potent water. The main source of drinking water is the rivers and ground water, which is available to the people by wells and hand pumps. Unfortunately most of the regions of the Ganga-Brahmaputra plains are affected by AS and F^- especially in UP, Uttarakhand, Bihar, Jharkhand, WB and Assam. The water of the tube wells and wells of these regions have been reported to carry arsenic and fluoride beyond the permissible limit. As and F^- percolates and mixed with ground water via natural and multiple anthropogenic pathways. Many health hazards are associated with exposer and elevated level of As and F^- are carcinogenesis lungs and urinary bladder cancer, black foot disease, diabetes, internal maladies, Gastrointestinal and melanin disorder, skeletal and dental fluorosis, U.T, nerve and muscular malfunction and sometimes it caused ultimate death. 50.4 millions of people of 3417 villages of 148 blocks of 12 districts of West Bengal are affected with extremely high level of As contamination and approximately 25 millions of people in 2013 districts of India are affected with Fluorosis and nearly 66 million including 6 million child below the age of 14 years are at risk according to UNICEF. For the removal of As and F^- many technological methods are there but no one is fruitful in large scale uses. In the present study, a new technological method, based on the principle of filtration and adsorption, has been adopted for the mitigation of As and F^- from the water samples of Hooghly, Paschim Medinipore and North 24 Paragana. This method is less expensive, easy to handle and safe. Amount of As and F^- are to be detected before and after the water treatment by

AAS/ Electro photometer. It will be observed that the amount of As and F^- in this treated water are within MCL of As and F^-. The MCL of As is 10µg/L and of F^- is 15µg/L as per WHO & EPA.

Keywords: As- Arsenic, F^- - Fluoride ion, MCL- Maximum contamination level, WHO- World Health Organization, EPA- Environmental Protection Agency, µg/L- Microgram / Litre

Structural studies of some Chelates of Cobalt(ii), Nickel (ii) and Copper (ii) Metals with Tetra-dentate Schief base

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Department of Chemistry, J P U Chapra

ABSTRACT

In this study, Schiff bases, prepared by reacting primary amine reacts with an aldehyde or a ketone under specific conditions. Metal complexes derived from polydentate Schief bases exhibit remarkable structural and magnetic properties. Pfeiffer and Pritzner were the first to study bis (Schiff base) as catenating ligand. The compound, Schiff base was discovered by H. Schiff in 1869 by the reaction of ethylene diamine on salicylaldehyde. It was found/ coordination compounds/chelates with different transition metals in different oxidatikn states. At least research works has been carried out in the field of coordination chemistry with schiff bases as ligands which have heterocyclic ring in its molecule. So we have undertaken to carry out the research work with the schiff bases containing heterocyclic ring in its molecule. This research work has been focused to preserve the present knowledge and answer that question which remained unanswered yet. A large number of researchers all over the world are suffering from curable/incurable diseases and they are not being given proper treatment in want of proper medicines. Formation of such chelates/complexes is an aid of human, animal and plant lives such as drugs, fungicides and insecticides.

Keywords: Reacts, structural, ligands, preserve, curable, incurable, fungicides, insecticides.

Studies of synthesis, Characterisation of mixed ligand complexes of Co (II) and Fe (III) ions with maleic acid and mine base as primary and secondary ligands

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Abstract:

In this paper, synthesis and characterisation of Co(II) and Fe(III) complexes with maleic acid and heterocyclic amines bases ligands was reported. The general formula of the complexes are as follows: $[M(ME)_2L_2]$ where M = Co(II), Fe(III), ME = $C_4H_2O_4$, $2C_4H_2O_4$; L = C_5H_5. H_2O, $C_5H_6N_2$. The complexes were prepared in the solid form and characterised by elemental analysis, conductivity and magnetic measurement, infrared and electronic spectroscopic studies. The infrared spectra of the complexes confirmed the co-ordination of metal ion with ligands. The Co(II) and Fe(III) complexes are assumed to have octahedral structure based on the electronic spectra and magnetic measurements.

Keywords: Co(II) and Fe(III) complexes, Maleic Acid, Heterocyclic Amines.

Studies of Thioamide Bands and Nature of Bonding in Metal Complexes

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Abstract:

The present study reports the nature of bonding in thioamide and metals complexes having amide functional group. The thioamide group provides both nitrogen and Sulphur donars in the same ligands and plays a vital role in the coordination chemistry. The ligands thiocarbohdrazide and N-mono substituted dithiocarbamates molecules contain a thioamide group (H-N-C=S). Since these ligands contain both nitrogen and Sulphur sites, there distinct possibilities for coordination occur as Coordination through Nitrogen, Coordination through Sulphur, and Coordination through both nitrogen and Sulphur donor atoms of ligands. Although several workers have tried to distinguish between Nitrogen coordination and Sulphur coordinated complexes of metal ions by means of positions of υ C=S band in the ligand and complexes their attempt has been mainly confined to mono dentate ligands containing nitrogen and Sulphur donars. Much less has been done in case of by dentate ligands with Nitrogen and Sulphur donars. Organic compounds containing a thioamide skeleton in their molecules give rise to four characteristics infrared bands which are known as thioamide bands. These four thioamide bands appear in following ranges- Band I – 1500 cm^{-1} to 1600 $cm^{-1,}$ Band II – 1200 cm^{-1} to 1300 $cm^{-1,}$ Band III – 700 $cm^{-1}$to 1000 $cm^{-1,}$ Band IV – 700 cm^{-1}to850 cm^{-1}

It is known as the Band IV is used as diagnose metal- Nitrogen / metal – Sulphur bonding in case of ligands which acts as monodentate and coordinate either through nitrogen or through Sulphur or through both. Thus, it is concluded that the studies of thioamide bands are the subject of much discussion.

Keywords: Thioamide bands, Metal Complexes, Ligands, Nitrogen, Sulphur

EIRTH AND ENVIRONMENTAL SCIENCES

Impact of Sand Mining on Water Resource : A Case Study of River Sone Basin of Bhojpur District, Bihar

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Abstract:

Sand is an important mineral for our society in protecting the environment ,where this practice of sand mining is becoming and environmental issue as the demand for sand increases in industry and construction. Sand mining and its associated activities can be responsible for considerable water resource damage. Unscientific, illegal and excessive sand mining in the riverbed of the Sone has led to the depletion of ground water level in the villages situated on the river bank and degradation of agricultural and drinking water. In this article we are discussing about the direct and indirect impacts due to sand mining to the water resource of Bhojpur district. Pollution of the water is evident by the colouration of water which varies from brownish to reddish orange in the mining area. Low pH (between 2-3) ,high electrical conductivity , high concetration of ions of sulphate and iron and toxic heavy metals , low dissolved oxygen (DO) and high BOD are some of the physico – chemical and biological parameters which characterize the degradation of water quality .

Keywords: Mining , resource ,ground water , water quality.

Effects of Environmental Pollution on Human Health

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Abstract :

Numerous studies have exposed that environmental particulate exposure has been linked to increased risk of morbidity and mortality from many diseases, organ disturbances, cancers, and other chronic diseases. Therefore it is time to take action and control the pollution. Otherwise, the waste products from consumption, heating, agriculture, mining, manufacturing, transportation, and other human activities will degrade the environment. Thus billions of people living on the mother earth affect the environment adversely through their anti-environmental behaviour. Though immediate threats due to environment pollution is not perceived, it has long-term adverse effect on beings. It is thus a fact that human actions are producing dangerous and harmful effects on the environment where we are born, and brought up and where we live and die. Everyone should therefore be personally responsible for the upkeep of the environment through cooperation and active participation in making the atmosphere pollution free.

Keywords: Environment , Pollution , Human , Atmosphere and Participation.

Dynamic of macrobenthic community of River Ganga (Hajipur) to their biomass content.

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Abstract:

The benthic organism often found in the plethora of its number and diversity. At lotic station (I) the benthic quantum was maximum in February, 2018 (285.365g/m^2) therefore it gradually decreased and finally reached the minimum quantum in August, 2018 (11.300g/m^2) in first year.

During the period of second year, the maximum biomass observed in June, 2019 (448.363g/m^2) and the minimum is in October, 2019(12.032g/m^2). The drybiomass of the total macrobenthic community at station (II) was lies in comparison to the station (I).

Keywords: Benthic, Community, biomass, river Ganga, minimum, maximum, quantum, etc

Environmental degradation in Bihar: Issues and Challenges

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Abstract:

Environment may be defined as our immediate surroundings which is closely associated with the prevailing ecosystem. It may be abiotic or biotic in nature. On the other hand, environmental degradation means the reduction of the capacity of the environment to meet social and ecological objectives and needs. It is a process through which the natural environment is compromised in some way, reducing biological diversity and general health of the environment. Environmental degradation is one of the `Ten Threats` officially cautioned by the High Level Threat Panel of the United Nations. Actually this degradation are mostly caused by human intervention, particularly at the time of exploitation of different types of resources from the earth surface. Unscientific query in mining areas, depletion of forest resources for purposes like collection of forest products, urbanization industrialization and also to meet industrial as well as domestic needs, use of pesticide to combat pests and insects in agricultural fields, etc cause environmental degradation.

The rising population in Bihar has tremendous impact on the environment. The density of population in Bihar is 1102 per sq. Km. is higher than the national average 382 per sq km. Total forest cover geographical area of Bihar is 5.90 percent in compared of national 20.64 percent. Geographically 40 percent land in Bihar is badly affected by flood as a result of which the trend of population falls heavily on natural resources.

Though several committees have been formed for effective environmental management and various movements and programmes have also started for awareness of environmental protection among people of the state like "Jal-Jivan- Hariyali". State government has also taken measures for management and monitoring of environment which has shown some positive result but are unable to reduce environmental problems.

Keywords : Degradation, Surroundings, Jal-Jivan-Hariyali

Environmental Aspects in Neighbourhood Design

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Abstract:

Environmental science is an interdisciplinary field as it deals with various domains in which engineering and environmental problems are the primary ones. The subjective approach of neighbourhood design help to enhance the resident's personality and social development. Neighbourhood design includes many factors, out of them residential satisfaction is a very important aspect. The satisfaction of residents can be evaluated by the quality of the neighbourhood environment. Residential satisfaction is more focused on occupant's behaviour towards their residence and neighbourhood i.e. location and design of housing, and public

facilities that come under physical satisfaction criteria; neighbourhood environment, security and housing tenure have come under social satisfaction criteria. Neighbourhood design can be classified in tangible and intangible aspects. The tangible aspects are dwelling units, quality of dwelling units, physical infrastructure etc. The intangible aspects are social relevance of the built environment, flexibility, social interaction, dwelling unit quality etc. Neighbourhood satisfaction is pseud by neighbour's overall satisfaction, including satisfaction with the impalpable aspects in which they live. The aspects that come under environmental science in the neighbourhood are built environment, safety, degree of flexibility, healthy social interaction, sense of belonging, sense of place, the reputation of the community, environmental quality etc. The objective of this paper is to identify the subjective or intangible aspects of the neighbourhood design in low-income group public housing. The analysis has been done by developing conceptual and theoretical models. Further, the paper classifies the attributes into two categories, which are neighbourhood measures and social environment. The context of this study is limited to the environment of neighbourhood design in the low-income group public housing.

Keywords: Social environment, Intangible aspects, Residential satisfaction, Subjective approach.

Ecological study on the distribution and abundance of Oligochaetic of a Lentic ecosystem at Siwan, Bihar.

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Abstract:

Present paper aims at evaluating the seasonal distribution and abundance of a tropical lentic ecosystem (Mahendra Nath Pond) at Siwan. Oligochates showed their definite seasonality at site1. The total Oligochaetes population was highest in December, 2018 and January, 2019(2742 and 3572 indulm^2), white low cost in August 2018(42 indv/m^2), dowing the both annual cycals. Tubitere SP was the most dominant spewis present throushout the study period, their maximum number was recorded in December, 2018(240 indv/m^2) and minimum in July, 2018(21 indv/m^2) in the irst annual cycle.

Oligochaetes population at site was comparatively large thn that of Bite(I). The maximum density was recorded in October, 2018(8659 indv/m^2) while minimum in April, 2018 (9918 indv/m^2) during first annual cycle. Brachiura sowerbyii was the second dominate Oligochaetes, their largest number were recorded in December, 2018(303 indv/m^2) and lowest(21 indv/m^2) in March, 2018 in first annual cycle.

Keywords: Oligochaetes, lentic ecosystem, Tubifex SP, Mahendra Nath Pond, etc…

ARSENIC IN FOOD CROPS AND ASSESSMENT OF POPULATION HEALTH RISKS IN SAHIBGANJ, JHARKHAND

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Abstract:

Excessive use of arsenic contaminated groundwater has caused serious health implication globally with maximum effect in India and Bangladesh. Although numerous studies have been undertaken on West Bengal in India, specific reports on Jharkhand state is limited. The present

study was based on the arsenic pollution of Sahibganj district in Jharkhand state, located in middle Gangetic plain with reference to its heterogeneity in groundwater, associated physicochemical parameters influencing its possible release mechanism and arsenic induced non-carcinogenic and carcinogenic health risk to children and adults consuming groundwater in the affected area. Health risk analysis of consuming the locally cultivated crops were also carried out to have an idea about the potential health risk on children and adults of the study area. Results indicated groundwater to be Ca-$HCO3^-$ type with low ORP and high TDS. Arsenic concentration ranged from 1.3 ± 0.02 to 133 ± 19 µg L^{-1} in groundwater. Arsenic exhibited positive correlation with depth, Fe and $PO4^{3-}$ in groundwater suggesting reductive dissolution of iron oxyhydroxide the probable mechanism of arsenic release. Health risk assessment revealed high to very high non-carcinogenic and carcinogenic risk for both adults and children using the groundwater of the study area for drinking purpose. Moreover, it was observed that rice, wheat and potato which are the main staple food in this area, their consumption accounted for almost 35% of the total HRI value indicating very high health risk associated with consumption of these crops. Victims of arsenicosis were visible in all age groups of the local inhabitants.

Keywords: Arsenic, Health Risk Index, Crops, Groundwater

Allelopathic effect of *Eichhornia spp.* against selected strain of microbes

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Abstract:

The present study deals with preliminary screening of phytocompounds from the leaf extract of Eichhornia spp. Qualitative and quantitative analysis of the sample showed the presence of major phytocomponents like alkaloids and flavonoids in aqueous extract, and alkaloids, flavonoids, phenol and tannin in ethanolic extract. FTIR result showed the presence of alcoholic and phenolic groups in ethanolic extract. Result of HPLC indicates the presence of many phenolic compounds like gallic acid, protocatechuic acid, tyrosol etc. Anti-microbial properties of the sample against the test organisms Escherichia coli (bacteria) showed zone of inhibition ±4mm and against Rhizopus spp(fungus) shows zone of inhibition ±5mm. Hence the research work suggests that samples possess allelopathic properties.

Keywords: Eichhornia spp, Phenol, Flavonoid, Escherichia, Rhizopus, HPLC.

Assessment of physicochemical properties of groundwater in and around Patna, Bihar

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Abstract:

Groundwater degradation has been one of the serious environmental problems around the globe in recent years due to the increased pace of industrializations, urbanization and the overexploitation of groundwater. The present study was carried out to assess the seasonal and spatial changes in the quality of groundwater in and around Patna district of Bihar, India. Total 60 samples of groundwater during pre-monsoon, monsoon and post-monsoon season in the year

2019-2020 from 20 different sites were collected and analyzed for physicochemical parameters such as pH, Electrical Conductivity (EC), Total Hardness (TH), Ca^{2+}, Mg^{2+}, Total Dissolved Solids (TDS), Total Alkalinity, Na^{+}, K^{+}, Cl^{-}, SO_4^{2-}. All the Physicochemical parameters were compared with the Standard values of the Bureau of Indian Standards (2012). All the studied parameters were within the permissible limit, although Total alkalinity, EC, TH, TDS were found to be more than the desirable limit at Tripolia, Sultanganj, Lodipur, Ranipur Bypass and South Patna Sahib sites. Analysis of Variance showed that pH, TH, Ca^{2+}, Mg^{2+} and Na^{+} varied significantly between seasons (p=0.0006; 0.016; 0.000; 0.0009; 0.028). Correlation between different physicochemical parameters was also computed by developing a correlation matrix. Electrical conductivity showed positive correlation with Ca^{2+} (r=0.848), TDS (r=0.965), Cl^{-} (r=0.898) and SO_4^{2-} (r=0.824); Total Hardness was strongly correlated with Mg^{2+} (r=0.0830), TDS (r=0.924) and Cl^{-} (r=0.903); Ca^{2+} showed positive correlation with TDS (r=0.889) and SO_4^{2-} (r=0.845). TDS strongly correlated with Cl^{-}(r=0.888) while pH showed negative correlation with EC (r=0.588). The present study concluded that several groundwater samples of Patna were not suitable for direct consumptions and it requires appropriate treatment before use.

Keywords: ANOVA, Correlation coefficient, Correlation matrix, Groundwater, Physicochemical parameters.

Geochemical characterization of coals of Barka Sayal area, South Karanpura coalfield, India, the implication to paleodepositional settings and environmental impact

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Abstract:

The coal seams exposed in the Barka Sayal area of South Karanpura coalfield were sampled using the pillar sampling method to investigate the genesis of these coals based on petrographic, mineralogical as well as geochemical characteristics. Mode of occurrence and the environmental significance of major and trace elementshave also been discussed. Banded dull coal is the dominant lithotype of these coals. XRD, FTIR and organic petrographic analyses reveal that the Sayal seam contains a high amount of hematite,Bansgarha seam shows the dominance of clay minerals whereas Hathidari seam has a high amount of quartz. XRF analysis supports the same outcome. The comparison of the concentration of major oxides and trace elements of these coals with that of the upper continental crust (UCC) shows that most of the major oxides are depleted compared to UCC except TiO_2, Al_2O_3 and FeO. Most of the trace elements are comparatively enriched than UCC except strontium in Bansgarha and Hathidari seams. The geochemical constituents show that the coal seams of Barka Sayal area had deposited due to terrestrial sedimentation in a hot and humid paleoclimate in semiarid condition under a marine-terrestrial suboxic environment having provenance intermediate to felsic igneous rocks. The inorganic components present in Sayal seam are more prone to weathering while other seams had suffered the recycling process. High concentration of environmentally sensitive minor and trace elements present in these coals as compared with world average need concern during the utilization of these coals.

Keywords: trace element; paleodepositional; Karanpura; mineralogy; environmental significance; health impact.

Assessing the impacts of sand mining activities on zooplanktondiversity of River Ganga in and around Patna, Bihar, India

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BSC19-EES-RI-587

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Abstract:

The River Ganga and its tributaries, mainly southern tributaries, are the main source of coarse sand in Bihar. The demand of coarse sand is soaring with a rapid increase in building and other activities of infrastructural development. This led to an increase in sand mining activities in rivers throughout India, especially in the last 3-4 decades. The present seasonal study was carried out to assess the impacts on zooplankton in the main stem of the Ganga in and around Patna at three sand mining sites, Lodhi Ghat downstream River Son-Ganga confluence near Maner, Digha Ghat near Jai Prakash Bridge and Gai Ghat upstream Gandak- Ganga confluence and close to Mahatma Gandhi Bridge at Patna between March 2016 and December 2017. Sand mining increases the concentration of suspended materials which ultimately increases the turbidity of the water. Student's *t*-test results show that mean turbidity and transparency level at reference and impact sites at Lodhi Ghat (p=0.001, p=0.0006) and Digha Ghat (p=0.016, 0.001) differed significantly. The statistical analyses including the *t*-test also showed the number of species and average Shannon-Weiner diversity index of zooplankton at reference and impact sites of Lodhi Ghat (p=0.004, p= 0.016) and Digha Ghat (p=0.001, p=0.0005) differed significantly, except at Gai Ghat. The most important effects of sand mining on zooplankton were the reduction in species diversity and abundance, in the River Ganga.

Keywords: River Ganga, Sand mining, Shannon-Weiner diversity index, Transparency, Turbidity.

Earth its environment and its challenges

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Abstract:

Earth and environment is more or less one thing which include the Earth science. Science has always been a part of life right from human existence. Environment is included inside our earth following the path of each and every subject. Surrounding can be studied forming the part of our climate change, environmental impact, pollution disease, toxicology and so on. Environment just include Physics, Chemistry, Biology, Social Science which all are interdependent upon each other. Our earth include the different interaction with our human and systems prevailing here. Today life is considered to be a hard and facing a tough competition not only with itself but with prevailing situation.The environment influence from the beginning of human life till today have face a lot of challenges and evolution has caused its challenge to accept through our knowledge of Science. Today science has made many thing easier to understand and have found the solution to existing problem. Not only to fight for ourselves but to fight against prevailing situation which we all have been creating. Instead of that we are solution maker because we human are most beautiful and knowledgeable animal at present on this planet Earth.

Keywords : Environment, Pollution, Disease, Toxicology.

Benthic macroinverteberates as bioindicator of water quality of a pond ecosystem

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Abstract:

With ever growing urbanization, water pollution poses major challenge. There is urgent need to setup pertinent bio-monitoring and conservation strategies to retain sustainable freshwater environment including ponds. Biological Water Quality Criteria (BWQC) using benthic macro-invertebrates, proposed by Central Pollution Control Board, India (CPCB, 1999) is used to assess the actual health of Sanjay Gandhi Jaivik Udhyan (SGJU) pond, Patna, India (25°35' 49" N 85°05' 57" E). BWQC calculated based on saprobic values and diversity of benthic macro-invertebrates families with respect to water quality. A total of 17 taxonomical families belonging to 6 taxonomical groups of benthic macro-invertebrates were identified. For BWQC of SGJU pond, Saprobic score ranged between 3 to 6 and diversity score ranged between 0.3 to 0.9. The calculated indices suggest that pond is moderately polluted. Presence of pollution tolerant families like *Chironmidae* indicate that pond water could only be used recreational purposes. The pond water quality may be improved by stopping the influx of sewage water and proper management of pet and animal waste. If pond condition is maintained no doubt a better yield of fishes can be obtained and it will be financial support to the concerned people.

Keywords: Benthic macro-invertebrates, Bio-monitoring, BWQC, Pollution, Pond

HEALTH SCIENCES

Calcium homeostasis in fluoride intoxicated and low calcium fed rats

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Abstract:

Chronic exposure to excess fluoride (above 1.0 mg/L of water) has adverse effects on several body tissues, especially the dental and skeletal system producing fluorosis. Many epidemiological and experimental studies had shown that nutritionally compromised population had higher degree of fluorosis as compared to nutritionally protected counterparts.

The study was undertaken to know the effect of fluoride on calcium homeostasis in low calcium fed rats. Thirty Wistar NIN weanling male rats were divided in four groups. Group 1 received normal Ca diet (NCD i.e. 0.5 % Ca) + fluoride free water (FFW) (n=6), group 2 low Ca diet (LCD i.e. 0.25 % Ca) + FFW (n=8), group 3 NCD + 100 ppm fluoride (NCD+F, n=8) and group 4 LCD +100 ppm fluoride (LCD +F, n=8). The treatment was continued for six months. Blood and urine were collected at interval of 30 days. Serum calcium, urinary calcium excretion, serum 25(OH) vitamin D_3 and serum 1, 25$(OH)_2$ vitamin D_3 were determined by standard methods.

Results revealed that dietary calcium intake and serum calcium in group 2 and 4 were significantly lower as compared to group 1 and 3. Group 3 also showed lower serum calcium as compared to group 1. Urinary calcium excretion of group 4 was significantly lower as compared to group 1. Group 4 had significantly lower serum 25(OH) vitamin D_3 levels as compared to group 1 and 3. Group 2 showed significantly reduced serum 25(OH) vitamin D_3 with respect to group 3 only. Group 2 and 4 had significantly higher serum 1, 25$(OH)_2$ vitamin D_3 as compared to group 1 and 3. Further, Group 4 showed significantly increased 1, 25$(OH)_2$ vitamin D_3 as compared to group 2. In conclusion, chronic fluoride toxicity along with inadequate calcium showed adverse effects on calcium homeostasis.

Keywords: Fluorosis, calcium homeostasis, malnutrition

Role of heat energy in health management

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Abstract:

Healthy life is the form of balance energy, which is maintained 24×7 in between organism and environment. Heat is one of the symbolic measurements of life. "Cool is dead". Heat is measured by temperature and this temperature is an essential factor in the metabolism of body. In general by food and in disease, medicine is used to regulate and maintain this heat, which is the energy of life. Energy is represented by AGNI in Ayurveda. In Ayurveda 13 AGNI is defined-5 Bhuta Agni, 7 Dhatwa Agni and 1 Jathara Agni. In **Dravya** (either food or medicine), with combination of Panchmahabhuta and Bhutagni six types of Rasa is generated i.e., **Madhura**- Jala + Prithavi, **Amla-** Prithavi + Agni, **Lawan**- Jala + Agni, **Katu** – Vayu + Agni, **Tikta** – Vayu + Akash, **Kashaya** – Vayu + Prithavi . As food is Rasa pradhan and medicine is virya pradhan, which is also explained on the basis of rasa i.e., **Ushna virya** – Amla, Lavana, Katu and **Shita virya** – Madhura, tikta, Kashaya. **Jatharagni** convert food in Rasa, which is metabolized in Dhatus by Dhatwagni and converted into further dhatus, updhatus, mala and energy. This energy cycle goes on 24×7 for whole life time, without interruption. If any of 13

Agni is disturbed, the sequence of energy generation is affected, due to which disease is caused. For treatment, the reserved energy in dravya, is in the form of Rasa and virya, which is used to adjust that excess or deficient energy and balance the energy-mass ratio in stable form.

Keywords: Bhutagni, dhatwagni, jatharagni, bhesaj, virya, energy-mass ratio.

Biomedical waste management in Hospitals

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Abstract:

Hospital waste is a special type of waste which carries high potential of infection and injury.It is essential that all medical waste materials are segregated at the point of generation , appropriately treated and disposed safely. This paper focuses on the identification and classification of biomedical waste. It also focuses on Steps involved in Bio-medical waste management, water segregation, colour coding for waste segregation and its collection, treatment and disposal as per rules, 2016. This paper also comprises how to keep record of all waste material disposal. On the basis of this data we can get various options for reuse and recycle of waste material. Today, Current disposal techniques adopted for hospital wastes are- sewage/drains, incineration and land fill. But these methods are having some merits as well as demerits. This review create interesting areas for future research too. Research should focus on the usage of effective micro-organism and solar energy in waste disposal. The waste to energy concept should be further developed to conserve the fossil fuels. So it is ethical and social responsibility of health care professionals to do proper identification, segregation and disposal of bio medical waste.

Keyword: Bio-medical waste, segregation, incineration

MATHEMATICAL SCIENCES

The equation of continuity and junction theorem In fluid dynamics

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Abstract:

In this research paper we have described some special conditions of the equation of continuity in fluid dynamics. If we take then the equation of continuity becomes . We have given a theorem, which we named as junction theorem of fluid dynamics. This theorem is based on the concept of the law of conservation of mass. In this research paper we have derived a general concept, how to find the equation of continuity when the fluid particle, describes circle in plane.

Keywords: Equation of continuity, Junction theorem, Law of conservation of mass, Logarithmic form of continuity equation.

Parametric complexity analysis of some sorting algorithms under skewed distributions

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Abstract:

This paper presents the relative performance analysis of sorting algorithms namely quick sort, k-sort, heap sort and merge sort having similar average case complexities $O(n\log_2 n)$ where n is the input size. The parametric complexity analysis of the above mentioned sorting algorithms was conducted on the basis of the statistical bounds also known as empirical 'O'. These sorting algorithms were executed on arrays generated from two skewed distributions namely skew normal distribution and skew t distribution. In order to investigate the effect of the factors, responsible for modeling skewness in the data, on the complexity of sorting algorithms, computer experiments were conducted. The purpose of the study was to examine the effect of skewness in the data on the execution time of the sorting algorithms.

Keywords: Sorting algorithms, statistical bound, skew normal distribution, skew t distribution, parametric complexity

Discussion on brans -dicke theory of gravitation in general relativity

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Abstract:

In this article, we have discussed Brans-Dicke theory of gravitation in general theory of relativity . The Brans- Dicke theory of gravitation is one of the modified theories of gravitation. In order to generalize the equations of general relativity, Brans and Dicke (1961) formulated their variational principle and postulated that G behaves as the reciprocal of a scalar field ϕ. It is concluded that Brans-Dicke theory does not conflict with observations, provided that a coupling constant (dimensionless constant) $\omega \geq 6$. The Brans-Dicke theory is often referred to as scalar- tensor theory of gravitation.

Keywords: Mach's principle, Newtonian gravitational constant, Variation principle, Metric tensor, Curvature tensor, Scalar curvature, Einstein field equation, Energy momentum tensor, coupling constant etc.

Numerical simulation of boundary layer flow of a bingham fluid over a rotating disk

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Abstract:

In this paper, we have discussed the simulation of boundary layer flow of a Bingham fluid over a rotating disk. In this paper, the results of numerical solution of boundary layer flow of a Bingham fluid over a rotating disk are presented. Special attention is paid to the velocity field, the torque exerted on the disk, the boundary layer thickness and the volumetric flow rate produced by the rotation of the disk. The numerical solution of resultant represents a three dimensional flow field in the vicinity of the rotating disk. The numerical predictions compare well with the observation given by earlier results. The Bingham Number has a significant effect on the flow behaviour. It decreases the magnitude of the radial and axial velocity components and increases the magnitude of tangential velocity component. Moreover, the wall shear stress in the tangential direction increases monotonically with increasing B_y, thereby increasing the torque required to maintain rotation of the disk at the prescribed rotational speed. On the other hand, the volumetric flow rate, Q, is reduced with increasing B_y.

Keywords : Boundary-layer, Bingham fluid, Power-law fluid

Conjuctive and Disjuctive Models

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ABSTRACT:

In some cases, small-scale low complexity environment, decision based on intuition with minimal quantitative basis may be reasonably acceptable and practical in achieving the goal of the organization. However, for a large-scale system, both quantitative and qualitative (i.e. intuition, experience, common sense) analyses are required to make the most economical decision. Using Operations Research techniques including Linear Programming, Discrete Event Simulation and Queueing Theory, organization leaders can make high quality decisions. Operations managers are not expected to be experts in any decision science tools; however, he or she must have fundamental knowledge of such tools to acquire right resources and to make the most economically sounding decisions for the company as a whole.

NANO SCIENCE & NANO TECHNOLOGY (NSNT)

Nano thin films for device application

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Abstract:

Thin film materials are the key elements of continued technological advances made in the fields of optoelectronic, photonic and magnetic devices. Thin film studies have directly or indirectly advanced many new areas of research in solid state physics and chemistry which are based on phenomena uniquely characteristic of the thickness, geometry and structure of the film. The processing of materials into thin films allows easy integration into various types of devices. Thin films are extremely thermally stable and reasonably hard, but they are fragile. On the other hand organic materials have reasonable thermal stability and are tough, but are soft. Thin film mechanical properties can be measured by tensile testing of freestanding films and by the micro beam cantilever deflection technique, but the easiest way is by means of nano indentation. Optical experiments provide a good way of examining the properties of semiconductors. Particularly measuring the absorption coefficient for various energies gives information about the band gaps of the material. Thin film materials have been used in semiconductor devices, wireless communications, telecommunications, integrated circuits, rectifiers, transistors, solar cells, light emitting diodes, photoconductors and light crystal displays, lithography, micro-electromechanical systems (MEMS) and multifunctional emerging coatings, as well as other emerging cutting technologies.

Keywords: Nano, optoelectronic, Optical, semiconductors, rectifiers, transistors electromechanical systems

A novel synthesis of cobalt ferrite nanoparticles from lemon juice via sol-gel route

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Abstract

Cobalt ferrite (CoFe2O4) nanoparticles were successfully synthesized by sol-gel route. Metal nitrates (Fe3+, Co2+) and lemon juice were taken as precursor materials. The amorphous material thus obtained by sol gel route, was further annealed at 750oC for 3 hr to get pure cobalt ferrite nanomaterial. The annealed sample was further characterized by XRD, FTIR, PL Spectroscopy and SEM. The XRD studies identified that the phase formation started from 400oC. The final crystalline phase formation of CoFe2O4 was obtained at 750oC for 3 hr. The crystallite size was calculated using Scherrer's formula and found to be 40 nm, approximately. Molecular bending and stretching vibrations were identified from FTIR spectroscopy and confirm the presence of characteristic bonds of cobalt ferrite. The PL spectroscopic studies revealed strong electronic emissions in the visible range between 480-502 nm. The surface morphology of the annealed sample was observed by SEM. The SEM micrograph suggested porous and agglomerated microstructure of the prepared cobalt ferrite.

Keywords: Cobalt Ferrite, Lemon juice, Phase analysis, PL Spectroscopy, Microstructure

PLANT SCIENCE

Estimation of chlorophyll content in the seedling raised from the lauki seeds stored for two-month period at varying temperature

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Abstract:

The magnitude of photosynthetic product remaining everything normal depends upon the amount of chlorophyll of the leaf. The collected lauki seed lots were stored at10oC, 20oC, 30oC and 40oC with and without fungus for a period of two months. After the expiry of storage period, the seeds were germinated separately and quantitative measurement of the chlorophyll content was worked out. In the present experiment, chlorophyll a, b and total chlorophylls were estimated in the cotyledonary leaves by the method described by Witham *et al.* (1971). Increase in the chlorophyll a, b and total chlorophylls in the cotyledonary leaves of the seedlings raised from the seeds stored at varying temperatures for two-month period was observed with increase in temperature from 10oC to 30oC while they decreased thereafter. The minimum chlorophyll content was observed in the seedlings from the seeds stored at 10oC while maximum was observed in the seedlings raised from the seeds stored at 30oC for two-month period.

Keywords: Lauki seeds, chlorophyll a, b and total chlorophyll, seedlings and temperature.

Effect of amended soil on the growth of seddling raised from the chilli seeds for one month period

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Abstract:

Chilli is an important cash crop in India and is grown for its pungent fruits. It is world renowned spice that is used in many cuisines and recipes of various cultures to add a tingy taste to them. The world production of chilli crops sums upto around seven million tones that is cultivated on approximately1.5 million hectors of land. India is the world leader in contest of chilli production followed by China and Pakistan. In modern day agricultural practices attempts have been made to elucidate the impact of organic amendment of soil on various crops. Chilli crop is much simpler crop to cultivated .It can survive on different soil types of several climatic condition. During recent years various technological preludes have been applied to foster the need to ever increasing population .It was with this perspective that present work was undertake. In the present study morphogenesis of the seedling grown for one month period. Germinating seeds exhibited marked difference in the plain soil and in amended soil .

The length of root and shoot, number of leaf, node and internode and average of leaf area which emerge after one month of growth of the seedling were recorded . This study was initiated to explore the possibility of improving productivity of chilli through yield target based fertilizer application.

Keywords: Chilli, tingy, technological, internode, germinating

Impact of vermicompost amended soil on germination and growth of tomato plant

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Abstract:

Tomato belongs to family Solanaceae, which is one of the important vegetable crops with wide spread production. Tomato is used to produce sauce, chutney juice, ketchup, paste and powder besides fresh consumption. Tomato is grown worldwide for its edible fruits with thousands of cultivars.

With the progressive increase in the size of the world's population and the adoption of intensive animal husbandry production, large volumes of organic waste produced all over the world are creating a serious disposal problem and major source of environmental pollution.

In modern day, agricultural practices attempts have been made to elucidate impact of organic amended soil on various crops. Tomato seeds were germinated in plain and vermicompost amended soil and seedlings were cultured for 90 days. On 7th day after sowing the seeds 100% germinations was recorded in vermicompost amended soil while only 90% in the plain/normal? soil. The length of root, shoot, number of nodes and internodes and the number of leaves in the seedling was more when grown in vermicompost amended soil in comparison to plain/normal soil.

Keywords: Tomato plant, vermicompost, plain soil, length of root, shoot, nodes & internodes.

Impact of relative humidity on the biomass of the tomato seedling

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Abstract:

Tomato is widely grown in India. Tomato belongs to Solanaceae family and is cultivated in almost all types of soil. The farmers of India especially Bihar store the tomato seed in an environment which might not prove scientific for sustaining the normal seed health due to lack of knowledge. Unscientific storage condition such as high relative humidity (RH) is observed naturally due to rains in the major parts of the country and in specific regions due to geographical location.

The biomass of the plant depends upon a number of growth factors such as storage environment where seeds are stored, storage of seeds varieties, nature of seed coat etc. In the present study, tomato seeds were stored at 52%, 63.3%, 71.4% and 80.0% RH for one and two months period. After expiry of storage period, seeds were germinated and cultured for 15 days. It was observed that increase in the RH level up to 71.4% increased the biomass of the seedlings raised from the seeds stored for one month significantly while the biomass of the seedlings was reduced when stored at 80% RH. It was further observed that there was more reduction in the biomass of the seedlings when the seeds were stored for two months period. The biomass of the seedlings raised from the seeds inoculated with fungus was quite less than the biomass of the seedlings raised from the control seeds.

Keywords: Tomato, Solanaceae, relative humidity, biomass, fungus

Antitoxic effect of *Solanum nigrum* (Black berry) leaf on growth and aflatoxin production by *Aspergillus flavus*

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Abstract:

Solanum nigrum (Black berry) belongs to family Solanaceae and is one of the important medicinal plants. It has been used in traditional Indian medicines. We have used the leaf of the plant to observe the antitoxic property of *Aspergillus flavus,* a fungus, that produces a very toxic compound aflatoxin having carcinogenic, mutagenic and teratogenic effects both on animals and human beings.

In the Present study, the aqueous extract of *Solanum nigrum* was prepared and used against the growth and aflatoxin production by *Aspergillus flavus.* Five different concentration viz.,5%, 10%, 15%, 20% and 25% were tested using SMKY liquid medium, in which the inoculums of *A. flavus* was put under sterilized laboratory condition. A control was maintained for each treatment. The study was conducted in replicates and final result is presented here. The dry mycelial weight of *A. flavus* at 5%, 10%, 15%, 20% and 25% concentrations of the plant extract were 920, 830, 780, 640 and 580 mg/ flask, showing an inhibition of 10.7%, 13.7%, 24.5%, 31.5% and 41.4% respectively. The suppression in aflatoxin production was 31.2%, 40.5%, 51.8%, 64% and 68.5% respectively.

Keywords: *Solanum nigrum*, Aspergillus flavus, fungus and aflatoxin.

Seasonal variation of algal vegetation in Adri river at Aurangabad, Bihar

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Abstract :

Present paper deals with the seasonal variation of algal vegetation growing in Adri river at Aurangabad town of Aurangabad district. This is the first attempt to document the algal flora of the Adri river. Algal samples were collected from the river seasonally during the study period from March, 2018 to February, 2019. Altogether 35 algal taxa belonging to four different classes viz – Cyanophyceae (9), Chlorophyceae (17), Euglenophyceae (2) and Bacillariophyceae (8) were recorded in the present study. Present results suggested Chlorophyceae to be dominant followed by Cyanophyceae, Bacillariophyceae and Euglenophyceae respectively. Important genera recorded in the present study included Gloeotrichia, Nostoc, Scenedesmus, Ulothrix, Cladophora, Zygnema, Sirogonium etc. Maximum algal density was recorded during winter season and minimum during rainy season.

Keywords: Algal vegetation, Adri river, seasonal variation, exploration.

Influence of preharvest seedborne moulds on the growth of seedlings of pearl millet

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Abstract:

Voluminous literature is available on different aspects of the seedborne storage moulds (fungi) of the crop (Chirstensen, 1957;1965; Anderson et al. , 1970; Agarwal and Sinclair, 1997; Prasad, 2004) but the report on the pre-harvest seed borne moulds of the crop plant is very scanty (Doupnik Jr, 1974; Prasad, 1987; Narain, 1992; Kiran, 2002). Most recently Singh et al. (2008)

isolated the pre-harvest seedborne moulds of paddy var Sita and observed their effect on the symptoms of diseases in the seeds and seedlings and their growth. They further observed the cellulolytic and pectolytic enzyme activity of the pre-harvest seedborne moulds of the noted nature. The present paper deals with the total growth of the seedlings of pearl millet due to the effect of pre-harvest seedborne moulds.

The rate of elongation of the radical and plumule of pearl millet raised from the seeds stored with storage moulds was slower as compared to control at all the RH levels opted here of the three selected pre-harvest seedborne moulds basd on their high frequency. *Aspergillus flavus* proved most deleterious with respect to the noted physiology followed in succession by *Aspergillus niger* and *Fusarium moniliforme*. In the same way 80% RH of storage of the seed with mentioned moulds appeared most injurious followed in succession by 70% and 60% RH.

Keywords: fungi, seedborne, plumule, injurious

Induction of callus from nodal explants of *Asparagus racemosus* an important medicinal plant.

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Abstract:

Asparagus racemosus WILLD, commonly known as Shatavari, is very important medicinal plant that belongs to family *Liliaceae*. Because of its multipurpose application the plant is being harvested brutally and due to which it is facing severe threats. Its conservation is essential and tissue culture techniques are the best alternative. Healthy seeds were collected from the plants growing in the garden of B R A Bihar University guest house. It was treated with liquid detergent for 15 minutes and placed in a conical flask. These seeds were taken in another flask and rinsed properly with distilled water. Finally seeds were treated with 0.1% Mercuric chloride for 4 minutes with vigorous shaking. These seeds were taken out and rinsed with distilled water several times to remove even the trace of the chemical. MS (Murashige and Skoog,1962) Agar medium without plant growth hormones was used for the seed germination. They were subcultured in the same medium for multiple branching. After 40 days of incubation, healthy shoots were taken and cut into small pieces that were containing at least one node. These explants were inoculated in MS basal medium supplemented with six different concentrations of Naphthalene acetic acid (NAA), 2,4-Dichloro phenoxy acetic acid 2,4-D, Kinetin (KN), Benzyl Amino Purine (BAP) alone and NAA+BAP, NAA+KN. The percentage response, growth rate and colour as well texture of the calli were noted. From the data collected for the above culture conditions, it was observed that explants inoculated in MS + 0.2 mg/l NAA, gave highest percentage of response for callusing which was 91.56, the growth rate was excellent, the texture was compact and colour greenish yellow. This was followed by the explants inoculated in MS + 0.5 mg/l NAA which was 83.72%. Here also the growth was excellent, texture was friable and colour green. The explants induced callus in similar concentrations of BAP in MS medium but the percentage of response was only 63.42 and 61.75 only. Here the growth rate was also slow, the colour of calli was light brownish and texture friable. It was further noted that MS + 2.0 mg/l KN, however induced callusing which was 89.34%, the growth rate was excellent, the colour brown and texture friable. MS + 0.5 mg/l 2,4-D induced callus in 74.52% of explants, but the growth was excellent, the texture was compact and colour greenish yellow. Maximum percentage of callus induction 88.25 was observed among the explants inoculated in

MS + 1.0 mg/l NAA + 0.5 mg/l BAP, where as the percentage of response for callus induction in MS + 0.5 mg/l NAA + 0.5 mg/l KN was 78.54 but the growth rate was excellent the texture was compact and colour brown. It may be concluded that same explant of *Asparagus racemosus* responded in different way in different culture condition. While it gave better response to lower concentration of NAA, but KN alone at higher concentrations gave the higher percentage of response. Further MS + NAA 1.0 mg/l + 0.5 mg/l BAP induced maximum callusing than BAP alone at the same concentration. The calli are maintained through sub culturing for further study.

Keywords: *Asparagus racemosus*, Nodal explants, Callus induction, Friable, Compact, Light brownish, Green brown, Excellent.

Selection of composition and concentrations of plant growth regulator for efficient callus induction from different explants of Heliotropium indicum Linn., an important medicinal herb.

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BSC19-PLS-SI-521

Abstract:

An efficient callus induction system has been generated for an important ethno medicinal plant Heliotropium indicum of the family Boragenaceae. From its wild habitat plants are harvested by the agents of Vaidya or traders. Due to which its population is badly affected. In the present study Murashige and Skoog (MS) basal medium was supplemented with 3% sucrose and gelled with 0.8% Agar powders. This was supplemented with different concentrations of 2,4-D, IBA, NAA with either KN or BAP. Here the auxins concentrations were 1.0, 1.5, 2.0, 2.5 mg/l while the concentrations of BAP and KN was 2.0 mg/l. Separate medium was prepared with 2.0 mg/l KN + all the four concentrations of auxins and similarly 2.0 mg/l BAP with the various concentrations of auxins. The dinternodal and leaf explants were inoculated separately in the aforesaid media. Induction of callus in internodal segments was observed on 9th day of incubation while leaf explants first revealed swelling and then callusing on 14th day of incubation. Among the plant growth regulators 2.0 mg/l BAP + 2.5 mg/l NAA induced the callusing in 68.48% of internodal explants. This was followed in MS + 2.0 mg/l BAP + 2.5 mg/l IBA, where percentage of response for callusing was 62.34% in the internodal explants. Highest percentage of response for callusing in leaf explants was in MS + 2.0 mg/l BAP + 2.0 mg/l NAA that was 56.88, which was followed in MS + 2.0 mg/l BAP + 2.5 mg/l IBA 52.46 respectively. In the present study it was noted that callus induction was found in both the explants in all the above culture condition but with different rate of induction and growth. The growth was best in the medium where higher percentage was obtained. The callus colour ranged from Brow to White, and texture- compact to friable. These calli shall be subcultured for further study.

Key Words: Plant growth regulator, Callus induction, Friable, Compact, Explants, Heliotropium indicum, Ethnomedicinal.

Mixed infection causing frequent emergence of begomovirus

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Abstract

Begomovirus, a single-stranded DNA plant virus is known to cause infection in diverse range of plant families like Solanaceae, Malvaceae, Fabaceae, and Brassicaceae. In different set of studies, Tomato leaf curl virus is reported to infect pea, similarly Pedilanthus leaf curl virus is reported to infect turnip. Productivity of many crops is severely challenged by whitefly-transmitted begomoviruses that leads to significant yield loss. Vegetables such as tomato, potato and cucurbits are cultivated in overlapping seasons which maintain the virus inoculums throughout the year; this led to current scenario of mixed infection under natural conditions. Mixed infections have biological and epidemiological effects which provide appropriate opportunities for recombination, synergism, mutation and pseudo-recombination events resulted into adaptation in diverse environment. This led to the evolution of new species. Many new species of Begomovirus are reported in recent years.

In the present study, detailed symptoms studies were done in different vegetable growing fields of Bihar and Gujarat. We found plants showing disease symptoms characteristics of more than one species. PCR results showed presence of more than one species together. In tomato plants various samples showed mixed infection of Tomato leaf Curl New Delhi Virus (ToLCNDV) and Tomato Leaf Curl Gujarat Virus (ToLCGV). Betasatellite molecules are also found to have compatible relation with more than one DNA-A species of begomovirus. Virus specie ToLCNDV has characteristics vein swelling symptoms, in addition to leaf curling and mosaic. ToLCGV shows characteristic curling, crumpling and mottling of leaf. Both the virus specific symptoms were found on same plant, during infected field study in districts of Bihar, this suggests the condition of mixed infection.

These recurrent incidences of infections and the co-infecting nature of begomovirus may cause emergence of new species in recent future around vegetable growing areas. In the field conditions, polyphagous nature of whitefly vector, genetic variation properties of viruses, association with other satellite molecules, increases the emergence of new strain/species of begomovirus.

PHYSICAL SCIENCES

A first principle approach of modeling the pyramidal composite gamma detector

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Abstract:

A way of obtaining high photopeak detection efficiency without deteriorating the energy resolution in high resolution gamma-ray spectroscopic studies is the use of composite detectors. A basic example is the Clover detector, composed of four high purity germanium (HPGe) crystals arranged in a compact way.

In the present work, a probabilistic model has been presented for understanding the operation of a composite gamma-ray detector having detector modules arranged in the shape of a four level pyramid. Using the simplifying assumptions of the isotropic scattering of gamma-rays, equal absorption probabilities of successive gamma scatterings inside the detector, and up to fourth order interactions of gamma-rays, the gamma-ray absorptions in each module of the composite detector are studied. This basic study gives us a quantitative estimate of the contribution of each module to the full energy peak efficiency during the addback mode. Predictions have been compared with that of the four elements stacked detector.

Our present approach is an extension of our previous experimentally verified works [4] for parallel combination of gamma-ray detectors. In the present paper, we have further explored the generalized concept of detector modeling in terms of a single parameter, which was introduced in our recent works.

Keywords: Gama detector, Pyramidal composite, photopeak, spectroscopic and addback.

About elastic cable-connected satellites system under several influences of general nature

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BSC19-PS-PI-638

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Abstract:

A set of non-linear, non-homogeneous and non-autonomous differential equations for the motion of a system of two cable-connected artificial satellites under the influence of shadow of the earth, solar radiation pressure, oblateness of the earth and earth's magnetic field is obtained. We study about motion of the system of two cable-connected artificial satellites relative to its centre of mass which has been assumed to move along a Keplerian elliptical orbit. The cable is elastic in nature. We obtain equation of relative motion of the system. We obtain equations of motion in rotating frame of reference as well as in Nechvile's co-ordinate system.

Keywords: Cable-connected satellites system, Elastic cable, Equations of motion, Elliptical orbit, Nechvile's co-ordinate system.

PHYSICAL PROPERTIES OF QUANTUM WIRE

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Abstract:

With the advancement in technology and improved experimental facilities nanostructure materials have come into reality. These materials are in demand of the modern day science and technology because of its enormous application in optoelectronics, microelectronics and other semiconductor devices. Earlier, we had only bulk materials which intrinsic properties are independent upon the shape and size of the materials. If some defects are created while fabricating the bulk materials than those defects will be always there whatever because of its size and shape of the materials acquires. On the other hand, nanostructure materials intrinsic properties depends upon its shape and size even the processing condition in which the materials has been built up. Among the nanostructure material, the prominent are quantum well(QWs),quantum wire(QWRs) and quantum dots (QDs).

Therefore we have theoretically studied the physical properties of Quantum wire as well as we have attracted considerable attention in view to their uses.

Theoretical study of physical properties of QWR is done with excitonic properties in semiconductor. Therefore , theoretical investigations of excitons in QWRs is a strong theoretical tool to provide valuable information about QWR characteristics, as size uniformity and dimensions.

Keywords: Exciton , optoelectronics.

Interfacial magnetization in $BiFeO_3/La_{2/3}Sr_{1/3}MnO_3$ Heterostructures

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Abstract:

$BiFeO_3/La_{2/3}Sr_{1/3}MnO_3$ (BFO/LSMO) heterostructures were grown on (001) oriented $SrTiO_3$ substrate by pulsed laser deposition (PLD) technique. The deposition conditions (substrate temperature and oxygen partial pressure) for LSMO layer were identical for all the samples whereas BFO layer was grown under different conditions. Reciprocal space mapping (RSM) of selected Bragg reflections reveals that the monoclinic phase (M_A-type) of $BiFeO_3$ thin film stablizes to a tetragonal phase with giant c/a = 1.24 (1), when deposited at reduced temperature under lower oxygen partial pressure. The atomic force microscopy (AFM) study of the surface of BFO films reveals the island growth when deposited at lower temperatures. The island growth of BFO layer leads to the manifestation of excess local strain. This additional local strain may be responsible for the stablization of the super tetragonal phase of BFO deposited at lower temperatures. The magnetization measurements on $BiFeO_3/La_{2/3}Sr_{1/3}MnO_3$ heterostructure reveals a significant enhancement in the magnetization of M_A-type $BiFeO_3$ layer. The improvement in ferromagnetic component of $BiFeO_3$ may be due to the ferromagneic (FM) superexchange (SE) interaction between Fe and Mn magnetic sublattices mediated through the oxygen (Fe-O-Mn chains) in the vicinity of the interfacial region. The reduction in the induced magnetization of BFO due to the change in its growth conditions may be possible due to altered oxygen content in the interfacial region, which has a direct impact on the FM SE Fe-O-M coupling at the interface

Keyword: Heterostructures pulsed laser deposition, manifestation, sublattices

Energy Scavenging

Rakhi BSC19-PS-PI-556

Abstract:

Energy harvesting (also known as power harvesting or energy scavenging or ambient power) is the process by which energy is derived from external sources (e.g., solar power, thermal energy, wind energy, salinity gradients, and kinetic energy, also known as ambient energy), captured, and stored for small, wireless.

Constantly Evolving Technology

Energy harvesting technology is based on the idea that devices can harvest the energy present in their ambient environment in *real time* and use it immediately, so that energy only ever needs to be stored temporarily. This could allow devices to achieve a theoretically infinite lifetime, limited only by the lifetimes of their components [CHA 08]. However, it remains to be shown that this new technology is applicable to real-time systems, as their operation is subject to the requirement that they must strictly observe specific response times.

The term energy harvesting is generally used in connection with supplying power to small electronic components described as *low-power* [PRI 09]. Connected objects including wireless sensors and wearable electronic equipment are the most important domains of application of energy harvesting. The implementation of these new technologies has notably prompted a shift in the design approach of electronic systems. It introduces new challenges for system designers who must now also attempt to optimize the utilization of the available ambient power to achieve energy self-sufficiency in each device. This challenge will arguably become easier to solve over time. Indeed, the power consumption of electronic circuits and wireless connections has steadily decreased. This has led to a dizzying expansion of energy harvesting technology in every field of application: home automation, medicine, military, transport, etc. By 2024, the global market of devices powered by ambient energy is expected to total 2.6 billion units. However, energy harvesting presents a new set of challenges, the majority of which can be traced back to the uncontrollable and unpredictable character of most sources of ambient energy.

Energy Harvesting Sources

Energy harvesting sources are those available in the surrounding environment; which has the potential to provide energy for powering in full or in part sensor networks in smart spaces. Energy harvesting sources can be classified into two groups according to characteristics of its source:

• Natural sources are those available readily from the environment such as sun light, wind, and geothermal heat.

• Artificial sources are those generated from human or system activities. They are not part of the natural environment. Examples are human motion, pressure on floors/shoe inserts when walking or running, and system vibration when operating.

Keyword:

Photovoltaic Solar Cell a Renewable Energy Perspective: Theoretical Modelling and Simulation Study

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Abstract:

As we are living in 21st century and using tremendously the conventional and natural energy resources around the globe. But we must aware of that the natural resources are very limited and even excessive use of these resources are causing most of the environmental issues as global warming, pollutions which causes many health issues, irregularity in seasons cycles etc. Even the demand and need to use energy to meet our daily needs are too large as population is increasing rapidly. This is the reason why we must get attention on research studies towards alternative and renewable energy sources such as solar energy, wind power, bio masses, thermal and hydro power etc. in near future. As we know in our solar system the sun is abundant of free energy source and this tremendous energy could fulfil our energy desire in our daily life routine. Thus, the present research is dedicated to solar energy as an assistant to our designers, scientists and researchers working in the same field to design photovoltaic solar cell systems. In our opinion optimisation study of any system save precious time, efforts, man power and excessive experimental expenses in designing and building the desired system. The present optimisation study helps to design photovoltaic solar cell system by knowing the absolute specifications of the systems which must help the designers and physicist to improve their systems. By this theoretical modelling and simulation study using dedicated software the plots of voltage, current and power obtained which gives the specification of the photovoltaic solar cell system accurately.

Keywords: Photovoltaic Solar cell, theoretical modelling, optimisation study, simulation.

Study of Theorem Bekenstein-Hawking Entropy black hole

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Abstract:

This paper consists of three parts; in the first part, we prove that the Bekenstein Hawking entropy is the unique expression of black hole entropy. Our proof is constructed in the framework of thermodynamics without any statistical discussion. In the second part, intrinsic properties of quantum mechanics are shown which justify the Boltzmann formula to yield a unique entropy in a statistical machanics. These properties clarify three conditions one of which is necessary and others are sufficient for the validity of Boltzmann formula. In the third part, by combining the above results, we find a reasonable suggestion from the sufficient condition that the potential of gravitational interaction among microstates of under lying quantum gravity may not diverge to negative infinity such as Newtonian gravity but is bounded below at a finite length scale. In addition to that from the necessary condition, the interaction has to be repulsive within the finite length scale. The length scale should be Llanck size. Thus, quantum gravity may become repulsive at Planck length. Also a relation of this location with action integral of gravity at classical level is given. These suggestion about quantum gravity are universal in the sense that they are independent of any existing model of quantum gravity.

Keywords : Bblack hole entropy, black hole thermodynamics, quantum gravity,axiomatic thermodynamics, Boltzmann formula, thermodynamic limit of quantum mechanics

Multiwall Carbon Nanotube Enhance the Invisibility Effect from Radar

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Abstract:

Nowadays, lightweight and high durability becoming a new goal for microwave absorbers. Earlier microwave absorbers were normally made of higher density magnetic metal and alloy materials that readily oxidized and hamper their practical application at the last minute. We rendered microwave absorption composites by integrating polypyrrole (PPy) nanospheres with uniformly sandwiched MWCNTs between reduced graphene oxide (rGO), along with fullerene sediment (FS), fullerene dark (FB) and carbon nanoparticles compounds of onion-like shape (which coalesce when oxygen occurs) over chemical-lowering nanoparticles self-assembly PPy. However, like the two-fold conjugate structures, the rGO and PPy nano circles are effectively coordinating through the interaction between π–π. In this case, when the mass proportion of rGO to the PPy nanospheres is 1:0.6, we find that our composite has predominant reflective incident characteristics, relative to those appealing metals and their related graphene-based composites that are used in the past. Also the fullerene sediment (FS), fullerene dark (FB) paramagnetic effects offer good permeability for electromagnetic waves.

Keywords : Electrical conductivity, Fullerene, Multiwall carbon nanotubes.

Comparative study of refractive index sensors and their applications

Saraswati Kumari and Taran Kumari BSC19-PS-PI-568
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Abstract:

In this paper, a comparative study of refractive index sensor and its applications has been presented., Here, we study the refractive index sensor on the basis of broadband reflector as well as **m**ultipoint broadband reflector**.** The broadband reflector arises in the set of sensors on the basis of intensity in addition to these are most primitive detecting approaches as well as are the topology involving their multiplexing and the principal uses that are practically proven. While in Multipoint broadband reflector, Calculations at multiple point are frequently energetic for numerous uses where altered data at countless location is required at single time. The multiplexing method can effortlessly be attained by consuming Fibre Bragg Gratings. A number of multiplexing topologies that are dissimilar which can be operated as fibre Bragg grating multiplexing on the basis of sensor arrays.

Keywords : Refractive Index (RI), Refractive Index Unit (RIU), Broadband Reflector (BR), Multipoint broadband reflector (MBR), Refractive Index Sensors (RIS).

Structural and Electrical Conductivity studies of Zr^{4+} doped ceria Ceramics

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Centre for Nanoscience and Nanotechnology
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Abstract:

CeO_2 stabilized zirconia is also known to have excellent thermal stability and high toughness compared to other stabilized zirconia systems [1,2].Replacement of cerium ions by cations of a different size modifies the ion mobility insideand the changed lattice. The solid solutions of

zirconia doped oxide of many divalent and trivalent metals (e.g., lanthanum, cerium, yttrium, scandium etc.) are known to be good anionic conductors at elevated temperatures [3]. In the zirconiadoped ceria system, Zr^{4+} does not affectthe electro-neutrality (of the overall system) and the total amount of the oxygen vacancies in cubic zirconia matrix. In this system, the cerium enters the solid solution with the same valence (4) as zirconium.

In this work, a structure-property correlation for the $Ce_{1-x}Zr_xO_2$ ceramics has been illustrated. Zr^{4+}-doped CeO_2nanopowders were synthesized via co-precipitation process and densified using conventional sintering at 1580 °C (2 h). All sintered samples depict high density (>98%) and their microstructures showed nearly-equiaxed grains. Structure-property correlation was obtained for the Zr^{4+}-doped ceria ceramics in relation to the sintering parameters. The ionic conductivities of the doped-ceria ceramics increased with temperature and frequency and a maximum of ~ 2×10^{-3} S/cm was measured at 600 °C at 1 MHz for the $Ce_{0.4}Zr_{0.6}O_2$ceramic

Keywords: Ceria, ZirconiaCo-precipitation, Ionic conductivity X-ray diffraction

A theoretical study of transport property of heterojunction and evaluation of electric fields ofthe space charge region and energy band of the heterojunction under applied bias voltage

Sanjay Kumar BSC19-PS-PI-572

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Abstract

This paper presents a theoretical study of transport property of heterojunction and evaluation of electric fields of the Space charge region and energy band of the heterojunction under applied bias voltage. The study exhibits atypical XRD patternofa 500 thick LSMO film growin gdirectly on the Si (001)s ubstrate.Theplanelatticeparameterisabout5.43A forSi. Andabout 3.86 A for LSMO. With the LSMO unit cell rotating 45 around the S surface normal (100) axis, the lattice mismatch between LSMO and Si is about 0.55 %. The small lattice mismatch allows a nearly epitaxial growth of LSMO on Si substrate. The study presents the experimental and theoretical results of I-V curves of the LSMO/Si heterostructure over the temperature range of250-300K. The solid, dashed, dotted lines represent the theoretical current-voltage characteristics at the temperature of 300 K, 275 K and 250 K respectively and the experimental data obtained at 300 K. 275 K and 250 K are denoted by solid squares, solid stars and solid triangles respectively The exponential data clearly present asymmetric f-V curves of the LSMO/ Si heterojunction The theoretical calculation results show the currents increased rapidly with the increasing forward-bias voltages, which was in good agreement with the experimental data in the forward-bias case. The diversion between the calculation results and experimental results in the reverse-bias case is mainly due to the neglect of the leakage current and the tunneling current in the calculation.

Keywords: Heterojunction, Bias Voltage, Space Charge, Energy Band, Degree of freedom

An evaluation of thermal conductivityof high-temperature super conductors

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Abstract

The paper presents a method of evaluation of thermal conductivity of high T_c superconductivity as a function of temperatures. The high Tc superconductors are La_{2-x} Sr_xCuo_4 of difference volumes of x (as x=0.15, T_c=38k and x=0.20, T_c =30k) and $YBa_2Cu_3O_{7-s}$ (T_c =92k) we have compared our theoretical results with that of **Graebner[20] and Morelli[21]**. Our theoretically evaluated results are in good influent with these workers. Our theoretical results indicate that thermal conductivities of the above superconductors increases with temperature. As it was pointed out by **Uheret al[22]** that phonons contribute close to 90% of the thermal conductivity in $YBa_2Cu_5O_{7-8}$ at T_c. Given the relatively large magnitude of T_c for $YBa_2Cu_3O7_-$ (Tc/ debye^{2}0.25). It is possible that the transition occurs in a region were the thermal conductivity's is limited mainly by phonon-phonon and carriers-phonon scattering. The enhancement of the thermal conductivity above the normal state conductivity for T<Tc in $YBa_2Cu_5O7_-$ in consistent with this interpretation. It indicates that the phonons make a major contribution to the thermal conductivity and that carrier phonon scattering is important in limiting the phonon contribution to the thermal conductivity at T_c. On the other hand the data for $La_{2-x}Sr_nCuO_4$ are less conclusive. Although phonon makes major contribution to the thermal conductivity at T_c, no clear enhancement is observed as for $YBa_2Cu_3O7_-$ only a slight change in shape is noticeable at T_c. An outstanding of the scattering mechanisms which lead to the low magnitude of the thermal conductivity for $LaCuO_4$ will be important for **explains[24,25]** the magnitude and temperature behaviour of the thermal conductivity of$La_{2-x}Sr_xCuO_4$.

Keywords: Thermal conductivity,High T_c Superconductor, Scattering mechanism, Phonon-Phoron scattering, Phonondefect.

PSYCHOLOGY

The Impact of Student's Socio-Economic Status on Self Concept - A Study of Patna District Students

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Abstract:

Socio-economic status has a clear impact on developing self-concept during the important stage of adolescence. The self-concept of student's experience important change not only influenced by the socio-economic status at this period of life but also by other intrapersonal, interpersonal and socio-cultural determinants.The Present study is undertaken for making a study of relationship between the self-concept of Student's belonging to high, middle and lower socio economic status. Self-concept is an important concept in development of child and differs as the secondary school student's creates a view that they are growing up within the environment. Baumeister and Heary(1995) argue that the social self is based on a fundamental "need to belong" that is genetically based characteristic of humans. Because self-concept develops in a cultural context, one would expect differences across cultures. One of the most interesting lines of research on the self however has focused on cultural influences-the questions of whether our self-concept is shaped in part by the culture to which we belong. This study looked for to establish the relationship between the student's socio-economic status and their self-concept in Government & Private secondary schools. A personal data sheet was used to collect information on the student's background factors. The sample of 400 subjects was used in this study in which 200 male and 200 female was taken for each group. The sample was taken from the different schools and colleges located in Patna District. The self-concept Scale by Deo was used to collect data on self-concept of the student's. The obtained data were analyzed with t-test method .The obtained result supports the hypothesis which means that student's belonging to high and middle socio economic status comparatively had higher level of self-concept as compared to Students of lower socio economic status. The mean of self-concept of student's belonging to high and middle socio- economic status was much higher than the mean of self-concept of Students of lower socio economic status.

Keywords: Self-Concept, Socio economic status, Income, Student, Occupation, Income.

SUB THEME (ST)

Developments in the theory of Topological tensor products of locally convex spaces.

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BSC19-ST24X7E-PI-608

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Abstract:

An express portrayal of the n-folds symmetric tensor results of the limited direct whole of locally convex spaces is displayed. Additionally features the basic thoughts of locally convex space and limited sets, topologies on the spaces, t-spaces, atomic space. Additionally focuses on the properties of tensor items. In this paper classes of control arrangement of locally convex spaces is contemplated.

Keywords: locally convex spaces, topologies, *t*-spaces, nuclear space, classes of control system

Role of Ethics in Science for quality Research

Kanhaiya Singh BSC19-ST-EL-PI-561

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Abstract:

Ethics means norms for conduct research work. It is central to scientific research. These are moral principles that govern a person's behavior- the things that are considered to be right or wrong. Scientific research and technology are changing society and the way of life. Scientist can no longer claim that science is neutral but must consider the ethical norms and social aspect of their work for quality research. It is clear that ethics in science or other is a set of moral obligation that define right and wrong in our practices and decisions, production of unbiased scientific knowledge which is critical when others try to build upon or extended research finding.

Ethical norms also serve the aims or goals of research and apply to the people who conduct scientific research or other scholarly or creative activities. Good ethics promote the aims of Quality research such as knowledge, truth, Avoidance of error, social responsibility, carefulness etc.

Ethics in science research includes standards of methods and process that address quality research design, producers, data analysis, interpretation and reporting.

On the basis of above discussion it is clear that good ethics leads quality research in science.

Keywords: Ethics, Norms, research design, Data Analysis, reporting, Carefulness, Moral Obligation, Objectivity, Integrity.

Water analysis of dug wells of Lakshmipur - Bhagwati panchayat of Madhepura District.

Sanjay Kumar BSC19-ST-WRM-RI-532

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Abstract

Ground water and dug wells are the main sources of water for the peoples of Lakshmipur-Bhagwati panchayat. Almost every household of Lakshmipur-Bhagwati panchayat used its own dug wells to fulfil the demand of water. Therefore, it is necessary to analyse the quality of water

used by people of Lakshmipur-Bhagwati panchayat. Various physico-chemical parameters such as water, temperature, pH, turbidity, acidity, alkalinity salinity, total hardness ,iron, calcium, fluoride, total solid , dissolved oxygen, B.O.D and C.O.D were analysed monthly for a period of one year i.e. from February 2014 to January 2015 to assess the water quality status of the 10 dug wells from different location of Lakshmipur- Bhagwati panchayat. The objective of the present investigation is to investigate the quality of water in Lakshmipur- Bhagwati panchayat. Analysis result shows that amount of fluoride was below desirable level and the water quality index revealed that water was partially clean. However, proper treatment and mass community action plan are suggested as remedial measures. Arhar belongs to pulses yielding crop of our country. Amino acids are specific category of biochemicals that play very important role in various biosynthesis and disease resistance. A scheme was undertaken with a view to observe the amino acid contents in the seed leachate of arhar seeds on artificially created faulty storage of the seed i.e. high relative humidity (RH). The RH of the storage was maintained at 52.0, 63.3, 71.4 and 80.0% for one and two months period at $30^{o} \pm 1^{o}$ C. Pentose and hexose sugar in the seed leachate of measured colorimetrically at 480 and 490 mm respectively using phenol-sulphuric acid method. The pentose and hexose sugar in leachate of inoculated seed and control seeds significantly increases with the increase in the level of RH from 52.0 to 80.0%. At all the RH levels, the fungus inoculated seeds show significantly increases in the pentose and hexose sugar as compared to the control seeds. Pentose and hexose sugar in the leachate of control seeds significantly increases after two months of storage in comparison to one month of storage. These observations can be manipulated for the determination of the seed health and can be utilized as a parameter in the certification of seed health.

Keywords – Lakshmipur–Bhagwati panchayat,dug well,water,analysis,quantity,Madhepura.

Treatment of Hospital Wastewater through Vermifiltration unit

Neha Verma[1], Ashok K. Ghosh[2] BSC19-ST-WRM-RI-688

Department of Botany, A. N. College, Patna[1], Bihar State Pollution Control Board, Patna

Abstract

A huge amount of water is consumed in hospitals. Consequently, considerable amount of hospital wastewater is generated and cannot be released without treatment because such water carries so many pathogens and harmful toxic substances. There are so many methods for treatment of wastewater, vermifiltration technique is one of them. Vermifiltration is one of the cheaper, environmentally sustainable, and acceptable treatment processes. In this study, earthworm's species *Eiseniafatida* has been used for the treatment of hospital wastewater. The gut of the earthworm acts as a bioreactor. Earthworm can ingest the solid and liquid organic wastes and eject them as vermicompost. Wastewater analysis was done by vermifilter collected from Mahavir Cancer Sansthan& Research Center and PMCH, Patna. Efficiency of the system, variations of pH value, Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BODs), Total suspended solid (TSS), and Turbidity were measured in this study. A significant decrease in the level of BODs, COD, TSS, Turbidity, and neutralized pH of water was found using vermifiltration. Vermifiltration technology can be applied as an environment friendly method for the treatment of hospital wastewater. It also reduces the environmental risk.

Keywords: Vermifiltration (VF), Hospital wastewater from Mahavir Cancer Sansthan& Research Center(HWW1),Hospital wastewater from PMCH (HWW2), Vermiaqua of Mahavir Cancer Sansthan& Research Center (VA1), Vermiaqua of PMCH (VA2), *Eiseniafatida*, Total Suspended Solid (TSS), Biochemical Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD).

Glympses


PATNA UNIVERSITY


host problems: Kala
Former President APJ Abdul Kalam and CM Nitish Kumar inaugurate the 3rd Bihar Science Conference in Gaya on Thursday


H.E. Dr. A.P.J. Abdul Kalam


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JANUARY 30 - FEBRUARY 1, 2009


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PATNA UNIVERSITY

Patna University is the seventh oldest University in the Indian subcontinent and the first in Bihar. It was founded by the Act of Legislature that was passed by the Governor General of India in the Imperial Legislative Council on 31st October, 1917, and was established as an examining body forconducting examinations from matriculation to post graduation. Its jurisdiction mapped Bihar, Orisa and Nepal and for forty years since its inception, Patna University was the arbiter of the academic destiny of these territories. The Patna University Act, 1951, which received the assent of the Governor on 6th July 1951, was passed with a view to establish a Teaching cum Residential University at Patna. The Act defines the purpose and powers of the university, shall be to provide instruction to such branches of learning as the University may think fit including professional studies and technology, and for research and for the advancement and dissemination of knowledge. It remained the only university in Bihar until January 1952 and continued to be the examining body of educational institutions in Nepal also until Tribhuvan University was founded at Kathmandu. With the inception of Utkal University, this University ceased to be the examining body for institutions of Orisa.

The history of Patna University is parallel to the education, cultural, political and economic growth of modern Bihar. It is the only teaching cum residential university in the state with truly national character that transcends linguistic, cultural, political and other denominational boundaries.The development of a state is invariably linked to the growth of its intellectual quotient, its education, its creativity. Bihar's tryst with its intellectual destiny has commenced in earnest and the contribution of Patna University and the goals that it has set for itself is foundational to that end.

The University is in the process of revitalizing its potential for excellence to provide students, researchers and teachers opportunities to excel in their disciplines and establish partnerships with Indian and off-shores universities to enhance scholarship and sharing of technology.

Patna University is committed to transforming education as per the needs of the needs of the present and future generations. It is a student's-centric seat of learning equipped with the modern methods of teaching and pedagogy. The University provides a conducive environment for pursuing quality research, and is in the process of revitalizing its potential for excellence to provide students, researchers and teachers opportunities to excel in their disciplines and establish partnerships with Indian and off-shores university to enhance scholarship and sharing of technology.

The University completed its "100 years of Excellence"in 2017 and its centenary celebration was inaugurated by Hon'ble Prime Minister of India Shri Narendra Modi. It provides undergraduate, Postgraduate and Doctoral Degrees invarious disciplines under the Faculties of Science, Social Science, Humanities, Education, Commerce and Law. In 2019, the University has been accredited B+ Grade by National Assessment and Accreditation Council (NAAC).

AIMS AND OBJECTIVES OF BIHAR SCIENCE CONFERENCE

Preamble

India is a land of spiritual gurus, exponents of natural sciences and ancient centers of learning, with a deep rooted philosophy! Bihar is one of the states in India which was the cynosure and paradise for the intellectuals and blessed with scholars of international fame who spread the knowledge and wisdom throughout the world. Unfortunately, the pace of research and development in Bihar has gone down in modern India despite producing high number of graduates, but the genius of Bihar has remained.

The fact is that the new Bihar after partition in 2000 still remains one of the most resourceful states in India, contributing huge human resources for the rest of the nation in all sectors of blue and white collar jobs. Such a major contribution for generating national wealth via manufacturing and service sector has had to be sustained with the meagerest of support in education and health, for the last 25 years. Higher education infrastructure has been in decline, little research or industrial consultancy is being carried out, within the Universities of Bihar. This lack of research is however not due to the incapacity of academic intellect – far from it! Financial investment in research infrastructure has suffered a major and sustained drought. In contrast with the adverse working condition – the academicians of Bihar have shown great tenacity despite many years of social injustice and have continued to serve in the best possible way. However, a ray of hope has appeared from BiharBrains Scholastic Center, a Gyan Kendra (under BBrains Development Society, a registered society of India). BBrains Development Society, commonly known as BIHARBRAINS is a nonprofit organization registered under society Act with a special focus on education and creating an environment for research and development in Bihar. The society came in to existence in 2004 and has established its office in Patna. It is being run by NRIs, NRBs and educated people of Bihar.

In this direction, BBrains Development Society commonly known as BiharBrains Organizes Bihar Science conference, "an international conference on science & technology" every year in association with Bihar based universities/colleges on the pattern of Indian Science congress. Earlier conferences were organized in different universities of Bihar namely

The main aim of this conference is to bring together experts from various fields to evaluate the existing information, to interpret the presented data, to discuss the suitable measures for clear and useful results and finally to explore if the collective efforts are promising to achieve favorable working environment for research and development in the state.

On this occasion, national and international Scientists, Research Fellows and Eminent Personality from different fields come to present and discuss their work. This three – days conference is attended by huge number of college students and professional from various science and technology fields.

This initiative is first of this kind in Bihar where around 1000 research Scientist, Professors, Students/budding scientists from difference universities of India and abroad are expected to participate & discuss about their outcome of scientific research/idea project.

Subject area

1. Physical Sciences
2. Chemical Sciences
3. Plant sciences

4. Animal Sciences
5. Biotechnology & Bioinformatics
6. Mathematical sciences
7. Earth and Environmental Sciences (Earth Science, Geophysics, Atmospheric Science, Meteorology, Climate Change, Hydrology, Oceanography, Geography, Geology, Remote Sensing and GIS).
8. Health Sciences (Ayurvedic/Homeopathy/Allopath/Unani medicine)
9. Electronics and Electrical technology
10. Computer science and Information Technology.

The subject of the workshop will be announced every year on the basis of availability of the experts on above mentioned topic application areas.

Conference Session: The conference is divided in to following sessions

1. Inaugural Session: Inaugural session will be of maximum tow hours. Inaugural keynote will be given by renowned scientist of India and the world. The Chief Guest of this session can be Head of the state/Governor/Chief minister/DST Minister/MHRD Minister (of central govt./State govt.). The inaugural keynote will be of maximum 45 minutes. No Q&A will be allowed in this session. "Aryabhatta Samman for Scientific Excellence" will be given to the renowned scientist/group by the Chief guest.
2. Plenary session: This is the combined session for all delegates. This session will be addressed by renowned persons/scientist/ Industry experts/Achievers whose scientific contribution gave inspiration to the scientific world. This session will be maximum 45min +15 min Q&A. Each day will start from Plenary session and end with plenary session.
3. Technical Session: The technical session is divided into maximum two sessions of each subject areas. Each session will be having one keynote address. Every keynote address will be of 25 minutes+ 5 min Q&A. Keynote address is followed by oral paper presentation by delegates of selected abstracts. Delegates will be giving oral power point presentation for maximum 10 min + 2 min Q&A. Maximum 10 paper can be presented in one technical session. Each Technical session will be having Jury members-2, Repertoire-1, session chairperson-1. Poster presentation is vital part of the conference. Poster presentation in each subjects will be held after end of the each technical session. Every one present in the oral discussion must be present in the poster presentation. Presenter can paste their poster in the fixed space provided. Poster can be handmade or computer design printout in A3 Size of paper.
4. Panel Discussion: Panel discussion will be held on developmental issues/Socio environmental and Research. Topic of the discussion will be decided in each conference. Panel Discussion can also be held for the conference in combined session in which conference report will be presented and advice will be taken from audience/delegates.
5. Project exhibition: Exhibition of the project will be done by Graduate/ Post graduate/Ph.d students. They will be provided stall or fixed space where they can show demo of their projects. The assessment of the projects will be done by three jury members. Best Five project finalist will be awarded by the conference organizing committee.
6. Special Session on Theme and Sub-themes: Special session will be organized in one combined session to discuss on Themes and sub themes of the conference.
7. Concluding session: The concluding session will be addressed by renowned person of the society; Governor /any govt. minister can be invited to conclude and give parental words

to the audience. Five Young scientist award, one Best oral presenter award in each subject category and one best poster award in each subject categories, Best three exhibitors and other awards of appreciation can be given in the session before concluding the session. Major sponsors will also be given chance to address the audience

Awards and Certification: Following awards can be given during the conference.

Aryabhatta Samman for Scientific Excellence: Nomination can be filed online on Science conference portal. Six member Search committee will be formed whose members can be from Global Scientific council-2, Society members-2 and eminent scientist of India and abroad-2). The search committee will assess and review the achievements of all nominations and then decision will be taken unanimously. This award may or may not be given each year. The committee will have right to decide on this issue.

Dr. Kalam Award for Scientific Innovations

BBrains Development Society commonly known as BiharBrains announced "Dr. Kalam Award for Scientific Innovation" during first press conference of announcement of 8th Bihar Science Conference 2019 at Patna University aimed at helping young entrepreneur whose innovative idea can make a different in the society and can have ability to become "Product of the masses".

This award can also be given to those who have already developed prototypes which require to be scaled up . This award may boost confidence in the entrepreneur to move forward and enhance their competitiveness for the domestic as well as global markets. Society may also help entrepreneur in providing technical assistance and play advisory role in scaling up the project though its worldwide network

Eligibility criteria

1. He/she should submit an Complete Innovation idea detail / prototype PPT online

2. Project should be marketable and should have the ability to affect scientific society and the common mass.

3. He/she should be any Indian having a minimum Graduation degree in Science & technology.

4. Idea should be from any streams of science & technology

Prize amount: Rs. 1 Lakh + plaque, Medal, citation and certificate

Fund management: Society will create award fund and look for sponsors and donors.

Young Scientist Award: Two names from each session will be taken from jury members. Best three will be given Young Scientist Award. The young scientist awardee can be given Rs. 20000/- cash and memento.

Criteria

1.Selected abstract and best presentation on the basis of marks obtained during corressponding year conference

2. Reviewed full papers and reviewer Assessment report for coreesponding year conference

3.complete profile Assessment.and paper published in the other journals etc.

4. Maximum age: 35 Years

Best Presenter (Oral/Poster) Award: One best presenter in each subject will be awarded with Rs. 10000/- cash and memento.

Criteria

1. Selected Abstract and best presentation in the basis of marks obtained during corresponding year conference

2. Reviewed full papers and reviewer Assessment report

Cash amount for the Awards may be increased or decreased each year.

Call for Papers

Papers/Abstracts are invited for oral and poster presentation. Abstract should not have been submitted for presentation to another conference. Abstract must be prepared in MsWord in not more than 300 words and must contain a title, author/s name, affiliation, keywords and complete contact address with email. Abstract should be submitted by "on-line on website" only.

Use of Hindi is allowed in sending abstract and presentation in Bihar Science Conference 2018.

Abstract and Full Paper Submission Guidelines

1. Click on "register yourself" link of the website and fill up the form. After Submission of completed registration Form with registration fee details, Ref id will be generated.
2. Registration can't be complete without paying registration fee. Paid Registration fee details must be clearly mentioned in the form. After verification from Bank account, Ref id will be generated and sent to the participants email id. Therefore,It is advised to pay registration fee first and then register.
3. The Registration amount can be paid online /Cash or Demand Draft to any Conference offices in favour of "Bihar Science Conference , Punjab National Bank Muradpur Patna Branch, A/C:0394005504731548, IFSC Code: PUNB0039400
4. For any further communication, Ref id is required to present before the organizing committee.
5. After Registration, Participant can submit their abstract. Abstract should be on a separate page in MsWord in not more that 300 words containing title, Authors name, address with email and submit your abstract online on http://www.biharbrains.org/scienceconference and click on call for papers menu or Submit your abstract link.
6. Guideline and format of abstract submission will be provided on website which must be downloaded by the participant. Participant has to submit their abstract strictly on the same format. Disobeying or sending abstract in other format will liable to be rejected.
7. No hardcopy of abstract submission is allowed. Submitted hardcopy will be liable to be rejected.
8. All participants must be registered in advance. No on spot registration is allowed. Registration fee does not include accommodation charges.
9. List of accepted abstract will be updated on the conference website within 10 days of your abstract submission. Participants are advised to view website in regular fashion.
10. After Acceptance of abstract, participant must submit their full paper in " Full paper Submission" link of the website. Separate guidelines will be provided on the website which should downloaded by the participants. Participants should strictly follow the rules, guidelines and format. Any comments, suggestion or modification made by editorial board members will be directly conveyed to the participants.
11. Selected Full paper will be published in Manthan - An International journal of Scientific Research and innovation http://www.bbmanthan.in publsihed by B.Brains Development Society.
12. After abstract and full paper submission, Selected list of oral presenter must upload their presentation on website 7 days before the conference.

7. Registration Fee

Category	Indian	Foreigner
Graduate /Post Graduate Student:	Rs.1000/-	USD 50/-
Research Student (Ph.d/Mphil):	Rs.1500/-	USD 75/-
Delegates (Scientist/Professor/working staff):	Rs.2000/-	USD 100/-

(For Society members and hosting Institution, 25% concession in registration fee)

The registration fee will include the scientific program, tea/coffee, lunch and proceedings of the conference. The accommodation for international and national delegates will be arranged in hotels, University guest houses and dormitory, which will be within 3 km distance from the conference venue. Tariffs for the accommodation will be soon announced and updated on the website.

Registration fee can be paid by any of the following modes

1. Online Transfer to the Mentioned Bank account.: Generated Receipt by Bank can be scanned and uploaded on the Registration page. Alternatively Receipt no. details can also be written on registration page
2. Cash Deposit to Bank Account : Receipt no. must be scanned and uploaded into registration page.
3. Cash Deposit at BiharBrains Office andCollege of Commerce, Arts & Science, Patna. : Cash Receipt can be scanned and uploaded on registration page. Alternatively CASH Receipt no, can also be written on Registration page
4. Demand Draft Deposit at BiharBrains Office and Dept. of Electronics , Patna: Demand Draft Receipt can be scanned and uploaded o registration page. Alternatively DD Receipt no, must be written on Registration page

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