राष्ट्रीय संगोष्ठी

"विज्ञान में नवीन प्रवृत्तियाँ"

(Emerging trends in Science)

1–2 फरवरी, 2019

आमंत्रण

प्रति, _____

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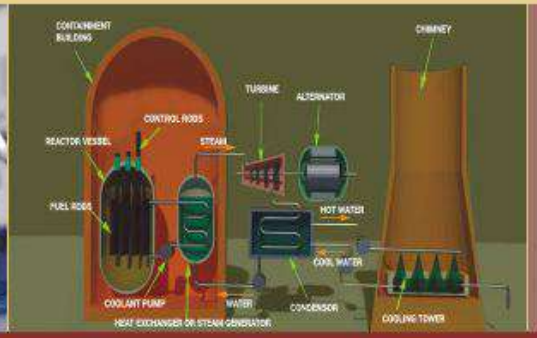



महाराणा प्रताप स्नातकोत्तर महाविद्यालय, जंगल धूसड़, गोरखपुर

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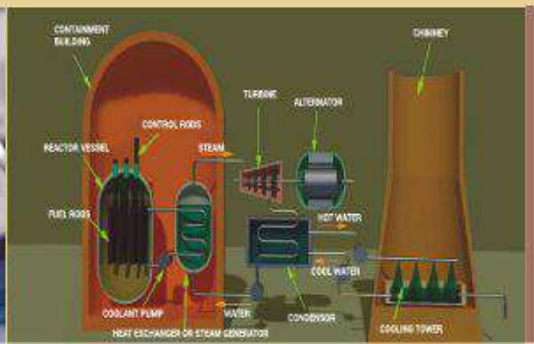
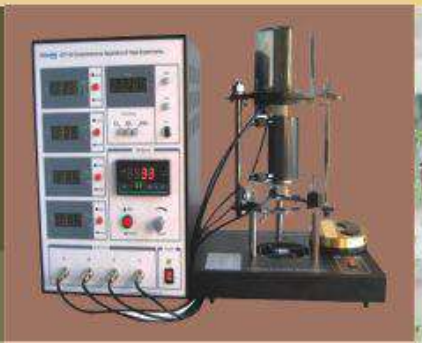
01 फरवरी 2019, शुक्रवार

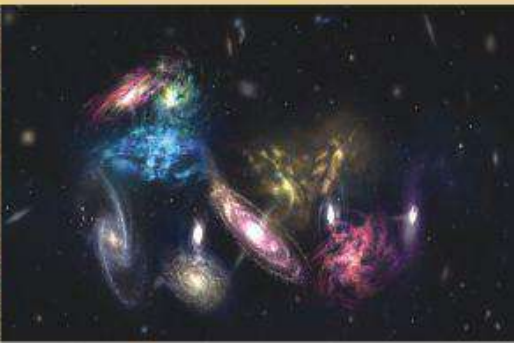
पंजीकरण	:	प्रातः	08.00 से 10.00 बजे
अल्पाहार	:	प्रातः	08.00 से 09.00 बजे
उद्घाटन	:	पूर्वाह्न	10.30 से 12.00 बजे
चाय	:	अपराह्न	12.00 से 12.30 बजे
विशेष व्याख्यान	:	अपराह्न	12.30 से 01.30 बजे
दोपहर भोज	:	अपराह्न	01.30 से 02.30 बजे
प्रथम सत्र	:	अपराह्न	02.30 से 04.00 बजे
चाय	:	अपराह्न	04.00 से 04.30 बजे
द्वितीय सत्र	:	अपराह्न	04.30 से 06.00 बजे
सांस्कृतिक संध्या	:	सायं	06.30 से रात्रि 08.30 बजे

02 फरवरी 2019, शनिवार

तृतीय सत्र	:	प्रातः	09.00 से 10.30 बजे
चाय	:	पूर्वाह्न	10.30 से 11.00 बजे
चतुर्थ सत्र	:	पूर्वाह्न	11.00 से 12.30 बजे
विशेष व्याख्यान	:	अपराह्न	12.45 से 01.30 बजे
सहभोज	:	अपराह्न	01.30 से 02.30 बजे
समारोप	:	अपराह्न	03.00 से 04.30 बजे
अल्पाहार	:	अपराह्न	04.30 से 05.00 बजे







राष्ट्रीय संगोष्ठी

"विज्ञान में नवीन प्रवृत्तियाँ"

(Emerging trends in Science)

1–2 फरवरी, 2019

उद्घाटन

01 फरवरी, शुक्रवार 2019, पूर्वाह्न 11.00 बजे

अध्यक्ष (प्रबन्ध समिति) : **प्रो. उदय प्रताप सिंह,** पूर्व कुलपति
वीर बहादुर सिंह पूर्वांचल विश्वविद्यालय, जौनपुर

अध्यक्ष : **प्रो. श्रीनिवास सिंह,** कुलपति
मदन मोहन मालवीय प्रौद्योगिकी विश्वविद्यालय, गोरखपुर

मुख्य अतिथि : **डॉ. ए. निनावें,** पूर्व सलाहकार
बायोटेक्नोलॉजी विभाग, भारत सरकार

बीज वक्तव्य : **प्रो. डी.के. सिंह,** पूर्व विभागाध्यक्ष, प्राणि विज्ञान विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **प्रो. कमान सिंह,** विभागाध्यक्ष, रसायन विज्ञान विभाग
बाबा साहेब भीमराव अम्बेडकर केन्द्रीय विश्वविद्यालय, लखनऊ

विशिष्ट अतिथि : **प्रो. ओ.पी. पाण्डेय,** विभागाध्यक्ष, रसायन विज्ञान विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **प्रो. सुग्रीव नाथ त्रिपाठी,** पूर्व विभागाध्यक्ष, भौतिक विज्ञान विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **प्रो. हरिजी सिंह,** पूर्व विभागाध्यक्ष, रसायन विज्ञान विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **प्रो. शीला मिश्रा,** विभागाध्यक्ष, सांख्यिकी विभाग
लखनऊ विश्वविद्यालय

समारोप

02 फरवरी, शनिवार 2019, अपराह्न 03.00 बजे

अध्यक्ष : **प्रो. वी.के. सिंह,** कुलपति
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

मुख्य अतिथि : **डॉ. अनन्त नारायण भट्ट,** वरिष्ठ वैज्ञानिक
इन्स्टीट्यूट ऑफ न्यक्लियर मेडिसीन एण्ड एलाईड साइंसेज (डी.आर.डी.ओ.), नई दिल्ली

मुख्य वक्ता : **प्रो. डी.के. सिंह,** पूर्व विभागाध्यक्ष, प्राणि विज्ञान विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **डॉ. वी. रामानाथन**
भारतीय प्रौद्योगिकी संस्थान (बी.एच.यू.), वाराणसी

विशिष्ट अतिथि : **प्रो. अजय सिंह,** विभागाध्यक्ष, प्राणिविज्ञान विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **प्रो. वी.एन. पाण्डेय,** विभागाध्यक्ष, वनस्पति विज्ञान विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **प्रो. सुधीर श्रीवास्तव,** विभागाध्यक्ष, गणित विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विशिष्ट अतिथि : **प्रो. दिनेश यादव,** विभागाध्यक्ष, बायोटेक्नोलॉजी विभाग
दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

आयोजक :-

महाराणा प्रताप स्नातकोत्तर महाविद्यालय, जंगल धूसड़, गोरखपुर

नैक द्वारा प्रत्यायित श्रेणी ''बी'' ☎ 7897475917, 9794299451 • Website : www.mpm.edu.in • E-mail : mpmpg5@gmail.com

National conference on

"Emerging trends in Science"

1-2 February, 2019

Circular-cum-Invitation

Organised by

Faculty of Science

Maharana Pratap P.G. College

Jungle Dhusar, Gorakhpur-273014

(Affiliated by Deen Dayal Upaddhyaya Gorakhpur University, Gorakhpur)

www.mpm.edu.in • Email : seminarmpm2019@gmail.com

Emerging trends in Science

We are pleased to inform you that "Maharana Pratap P.G. College, Jungle Dhusar, Gorakhpur" is going to organize a **"National conference on Emerging Trends in Science"** to be held on **1-2 February, 2019**. Organizing Committee would like to invite you to join the conference.

You along with your colleagues can requested to participate. Any one may attend this event without submitting an abstract. Selected papers will be published in the proceedings. Participation is confirmed only after registration fee, except our Invited guests and Subject experts. We hereby request you to please share this announcement to all, who may be interested for this event.

We will make sure to organize the event as an enriching experience for all of us and will leave everlasting memories to all the participants.

Preamble

20th century was a time of antibiotics, Jet planes, space travel and the internet. Early years of the 21st century have showed us the limits of our small world. The constraints on our resources and environment have raised several problems on the earth. Human race is at a unique turning point. Humans have to solve problems of population peak, energy solutions, the new face of disease, water, wealth, loss of biodiversity and ending poverty. The 21st century feels like a letdown.

Humanity were promised flying cars, space colonies; children were supposed to learn about disease from history books; fusion reactors and many more innovations were supposed to solve the problem of energy on earth with sustainable environment. There is no shortage of good ideas to solve the problem in the world. 21st century is shaping up as one of the most amazing periods in human history by new inventions and innovations in science and technology.

Objective

The objective of the present conference **"Emerging trend in Science"** is to provide a major interdisciplinary forum for presenting new approaches from relevant areas of science and technology. To foster integration of the latest developments in scientific fields and facilitate the scientific knowledge from well tested ideas in to practical application. Academician, students, researchers, regulatory agents, policy makers, consultants and vendors will be benefitted from the opportunity to exchange information on emerging trends in scientific fields of 21st century. More specifically the expected target of the present conference is to serve as a link between practice science, policy and decision making. This will highlight the power of science to improve the quality of Environment, Agriculture, and Biological, Chemical and ayurveda science.

Conference theme

The conference will include lectures, invited talks, research papers and poster session covering areas:

- Environmental Awareness
- Global environmental issues like climate change, global warming
- Innovative research in agriculture and Biological areas
- Relevance of Vedic science in modern world
- Science of future for Human welfare
- Waste management
- Bio-diversity and Conservation
- Pollutants, Toxicants and Pollution control measures
- Social issues regarding Environmental protection
- Novel Approach to Chemical Synthesis
- Modern approach to Ayurveda (Concept to application)
- Application of sophisticated analytical instrument (HPLC, GC, GC-MS, LC-MS/MS, NMR)
- Education in Technology

Abstract/paper Submission

Abstract from original research paper are invited through E-mail (seminarmpm2019@gmail.com) as MS word document and should not be more than 500 words. Full paper should be within 5000 word in times new roman font with font size 14, author and text font size 12 and 1.5 spacing

All the submitted papers will be under peer review and accepted papers will be published in the conference proceedings. Academics, scientists, industries, governmental and non-governmental organizations and students of the relevant field are invited to present their papers/posters dealing with state of art research and future development. The main purpose of this conference is to give a common plateform for scientists, teachers, corporates executives and students to share their knowledge and expertise.

Registration Fees

- Faculty/Scientists : 1000
- Researchers Scholars/Students : 500
- Accompanying person : 500

Accompanying person should not be more than one

Payment mode : Payment can be made by Demand Draft/Debit/Credit/electronic transfer via NEFT/RTGS in favour of Pracharya, Maharana Pratap Snatkottar Mahavidyalya, Jungle Dhusar payable at United Bank of India, HPPS Cancer Hospital, Gita Vatika, Gorakhpur, A/C No.-497102010029817, IFSC Code-UBINO549711

Deadlines

- Submission of Abstract : 30 November, 2018
- Full paper/poster invitation : 15 January, 2019
- Registration : 15 January, 2019

About Location

Gorakhpur city is located along the bank of Rapti River in the north eastern part of the Indian State of Uttar Pradesh. It is situated about 273 kilometers east of the state capital Lucknow near Nepal border. The city is home of the Holy Gorakshanath temple. City is well connected through Bus, Rail and Air network.

Convener
Dr. Geeta Singh
Assistant Professor (Chemistry)
D.D.U. Gorakhpur University
Mobile No. : 9891819180

Co-ordinator
Dr. K. Sunita
Assistant Professor (Botany)
D.D.U. Gorakhpur University
Mobile No. : 8840235574

Organising Secretary
Mr. Manish Kumar Tripathi
Research Scholar (Chemistry)
IIT (BHU), Varanasi
Mobile No. : 9795471750

Email : seminarmpm2019@gmail.com

राष्ट्रीय संगोष्ठी

"विज्ञान में नवीन प्रवृत्तियाँ"

१-२ फरवरी, २०१९

परिपत्र-सह-आमंत्रण

आयोजक

विज्ञान संकाय

महाराणा प्रताप पी.जी. कालेज

जंगल धूसड़, गोरखपुर-२७३ ०१४

(दीनदयाल उपध्याय गोरखपुर विश्वविद्यालय, गोरखपुर से संबद्ध)

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विज्ञान में नवीन प्रवृत्तियाँ

ज्ञान–विज्ञान के आधार पर ही मानव सृष्टि की श्रेष्ठतम रचना माना जाता है। सभ्यता एवं संस्कृति के विकास के आरम्भिक काल में प्राकृतियों शक्तियों के आगे नतमस्तक मानव आज प्रकृति–विजय का सपना संजोए तेजी से आगे बढ़ा है। सूर्य–चन्द्रमा, आकाश–पृथ्वी, अग्नि–वायु, आँधी–पानी, इत्यादि को देवी–देवता मानने वाला मानव आज इनके वास्तविक स्वरूप का लगभग ज्ञाता है। विज्ञान ने ज्ञान को तर्क के साथ–साथ प्रामाणिक आधार दिया। आध्यात्मिक ज्ञान, आत्मा–परमात्मा, परलोक जैसे गूढ़ रहस्यों के अतिरिक्त लौकिक–जगत की लगभग सभी गुत्थियों को 20वीं शताब्दी इस्वी तक विज्ञान ने सुलझा लिया। प्रकृति पर विजय पाकर, उसे अपने अधीन कर लेने, धरती–आकाश–पाताल को क्षण भर में कदमों से नाप लेने, सृष्टि–प्रकृति की हर रचना का रहस्य खोल देने एवं उसे सृजित कर देने, मानवेच्छा के अनुरूप सभी सुख–सुविधाओं को उसके कदमों में रख देने की दिशा में बढ़ते विज्ञान ने 20वीं शताब्दी में अकल्पनीय ऊँचाई प्राप्त की है।

20वीं शताब्दी चिकित्सा क्षेत्र में एण्टीबायटिक दवाओं, मानव–अंगों के प्रत्यर्पण, लड़ाकू विमानों, अन्तरिक्ष–यात्रा और इण्टरनेट जैसे युग–परिवर्तनकारी वैज्ञानिक खोजों का युग है। एक तरफ यह वैज्ञानिक उपलब्धियाँ 'वसुधैव कुटुम्बकम्' की परिकल्पना को साकार करने और 'प्रकृति–विजेता' होने के मानव–भाव को तुष्ट करने में सफल हुयीं, तो दूसरी तरफ वैज्ञानिक खोजों के उपयोग स्वरूप दुष्प्रभावों, असीमित मानव–इच्छा के कारण प्राकृतिक संसाधनों की सीमटती दुनियाँ ने मानव–जगत को उसकी सीमाओं का एहसास कराया है। बढ़ती जनसंख्या और उसकी आवश्यकताओं की आपूर्ति, पर्यावरण संकट, आवश्यक ऊर्जा की उपलब्धता, नित–नूतन नयी–नयी बिमारियों का जन्म, शुद्ध हवा और पानी का संकट, जैव–विवधता में कमी, बढ़ती गरीबी, भूख से हो रही मौतें, मानसिक तनाव और यंत्रवत बेचैन जीवन, जीवन मूल्य में क्षरण, अनियंत्रित आतंकवाद जैसी चुनौतियाँ 21वीं शताब्दी के विज्ञान के समक्ष समाधान हेतु खडी हैं।

विज्ञान ने मानव–इच्छाओं को पंख लगाया है। उड़ती कारों, अंतरिक्ष कालोनियों, चन्द्रमा और मंगल पर मानव–घर, रोबोट द्वारा मानव जनित कार्यों का विकल्प, मानव क्लोन, मानव–रहित विमानों, कृत्रिम–वर्षा, कृत्रिम धूप, कृत्रिम हवा, निर्मूल बिमारियाँ, नाभिकायी ऊर्जा–सौर्य ऊर्जा से धरती पर ऊर्जा संकट का पूर्ण समाधान, शुद्ध–पर्यावरण हेतु विविध तकनीकों का विकास, जैसे विज्ञान द्वारा दिखाए गए सपने खूबसूरत 21वीं शताब्दी की रचना के लिए पूर्ण होने आवश्यक हैं। दुनिया में ऐसी विलक्षण प्रतिभाओं की कोई कमी नहीं, जो उत्पन्न होती समस्याओं के समाधान का रास्ता ढूंढने में अपना पूरा जीवन और पूरी क्षमता न लगा दें। ऐसी ही विलक्षण प्रतिभाओं ने आज खडी अनेक चुनौतियों के बावजूद आज का खूबसूरत और मनोरम संसार गढ़ने में अपनी महत्वपूर्ण भूमिका निभाई है। 21वीं शताब्दी की चुनौतियाँ हमारे लिए अभूतपूर्व अवसर उपलब्ध करा रही हैं जिनका समाधान इस सदी को अनेक नए आविष्कारों, नयी खोजों, नए स्वरूप में विज्ञान के जन्म लेने और अध्यात्म एवं विज्ञान के एकाकार होने तक के लिए नयी पहचान दे सकती है। यह प्रयत्न विज्ञान और प्रौद्योगिकी को 21वीं शताब्दी के नए आयाम दे सकता है।

महाराणा प्रताप पी.जी. कालेज जंगल धूसड़, गोरखपुर द्वारा उपर्युक्त परिप्रेक्ष्य में 'विज्ञान में नयी प्रवृत्तियाँ' विषय पर राष्ट्रीय संगोष्ठी कराने का निर्णय लिया गया। यह राष्ट्रीय संगोष्ठी विद्वानों/वैज्ञानिकों/शोधार्थियों के बीच विज्ञान की अब तक की उपलब्धियों, दिन–प्रतिदिन बदलते आयामों, नवीन प्रयत्नों, विज्ञान–प्रौद्योगिकी के क्षेत्र में हाल में हुए सभी बदलावों की जानकारी साझा करने में सहायक होगी। विज्ञान की प्रगति एवं उसकी दिशा तथा उसकी खोजों के उपयोग की जानकारी शिक्षाविदों, शोध–छात्रों, नियामक प्राधिकरणों, नीति–निर्माताओं, व्यापारियों, किसानों सहित राष्ट्र एवं समाज के विभिन्न घटकों को प्राप्त होगी और इसका लोक–कल्याण एवं विकास में लाभ मिलेगा।

उपर्युक्त परिप्रेक्ष्य में किसी भी विषय पर शोध–पत्र प्रस्तुत किया जा सकता है। यद्यपि कि शोधार्थियों की सुविधा के लिए निम्न विषय प्रस्तावित हैं :–

- वैदिक ज्ञान–विज्ञान और उसकी प्रासंगिकता
- पर्यावरण जागरूकता
- पर्यावरण की वैश्विक समस्या
- भविष्य का विज्ञान तथा मानव कल्याण
- कचरा प्रबन्धन
- जैव विविधता तथा संरक्षण
- पर्यावरण सुरक्षा के संदर्भ में सामाजिक समस्या
- रसायनिक संश्लेषण
- चिकित्सा पद्धति में नए प्रयत्न
- आयुर्वेद में नवीन प्रयास और भविष्य की दिशा
- स्वास्थ्य और योग
- अंतरिक्ष के क्षेत्र में नए प्रयत्न एवं उसकी दिशा
- प्रौद्योगिकी
- अभिनव अनुसंधान

सार/सारांश/शोध पत्र

सार/सारांश/शोध पत्र हिन्दी/संस्कृत/अंग्रेजी में से किसी भाषा में ई–मेल (seminarmpm2019@gmail.com) द्वारा प्रस्तुत किया जा सकता है। शोध पत्र सार अधिकतम 500 शब्द तथा पूर्ण शोध पत्र अधिकतम 5000 शब्दों में होना उपयुक्त होगा। हिन्दी/संस्कृत भाषा के शोध पत्र वॉकमैन चाणक्य तथा अंग्रेजी भाषा के शोध पत्र टाईम्स न्यू रोमन में ही भेजें।

अनुवीक्षण समिति की समीक्षा एवं उसकी संस्तुति पर ही शोध पत्र ग्रन्थ के रूप में प्रकाशित किया जाएगा। 30 नवम्बर 2018 तक शोध सार तथा 15 जनवरी तक पूर्ण शोध पत्र राष्ट्रीय संगोष्ठी के ई–मेल पर प्राप्त हो जाना चाहिए।

पंजीकरण

15 जनवरी तक प्रतिभागी शुल्क भुगतान कर अपना पंजीकरण करा लें। विभाग/वैज्ञानिक/शिक्षक के लिए पंजीकरण शुल्क रू. 1000/– तथा शोध–छात्र एवं विद्यार्थियों के लिए रू. 500/– है। शुल्क **'प्राचार्य, महाराणा प्रताप स्नातकोत्तर महाविद्यालय, जंगल धूसड़'** के नाम ड्राफ्ट द्वारा अथवा उक्त नाम के ही खाते में जमा किया जा सकता है। बैंक/खाता का विवरण निम्न है–

खाता सं.– 497102010029817, IFSC Code-UBINO549711, **बैंक** – यूनियन बैंक ऑफ इण्डिया, हनुमान प्रसाद पोद्दार स्मृति कैंसर हास्पिटल, गीता वाटिका, गोरखपुर।

गोरखपुर

महायोगी गुरु श्री गोरखनाथ के नाम पर स्थापित गोरखपुर श्री गोरखनाथ मन्दिर, गीता प्रेस एवं महन्त दिग्विजयनाथ जी महाराज की प्रेरणा से स्थापित दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर, महात्मा बुद्ध, संत कबीर की कर्मस्थली तथा विश्व में प्रथम गणतंत्र की स्थापना के कारण जाना जाता है। रेल एवं वायुमार्ग से जुड़े इस शहर को इण्टरनेट की दुनिया में देखा जा सकता है।

संयोजक
डॉ. गीता सिंह
सहायक आचार्य (रसायन)
दी.द.उ. गोरखपुर विश्वविद्यालय
मो. नं. : ९८६९८९६१८०

समन्वयक
डॉ. के. सुनीता
सहायक आचार्य (वनस्पति)
दी.द.उ. गोरखपुर विश्वविद्यालय
मो. नं. : ८८४०२३५४७४

आयोजक सचिव
मनीष कु. त्रिपाठी
शोध–छात्र (रसायन)
आई.आई.टी. (बी.एच.यू.)
मो. नं. : ७७६५४७१७५०

Email : seminarmpm2019@gmail.com

मुख्य संरक्षक

श्री योगी आदित्यनाथ : माननीय मुख्यमन्त्री, उत्तर प्रदेश
प्रबन्धक/सचिव प्रबन्ध समिति

प्रो. यू.पी. सिंह : पूर्व कुलपति, वीर बहादुर सिंह पूर्वांचल विश्वविद्यालय, जौनपुर
अध्यक्ष प्रबन्ध समिति

संरक्षक

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2. **प्रो. श्रीनिवास सिंह**, कुलपति, मदनमोहन मालवीय प्रौद्योगिकी विश्वविद्यालय, गोरखपुर

परामर्श समिति

1. **प्रो. राम अचल सिंह**, पूर्व कुलपति जी. गामनोहर लोहिया अवध विश्वविद्यालय, फैजाबाद
2. **प्रो. कैलाशचन्द्र शर्मा**, कुलपति, कुरुक्षेत्र विश्वविद्यालय, कुरुक्षेत्र
3. **प्रो. एम.पी. सिन्हा**, कुलपति, सिद्धू कानू मुर्मू विश्वविद्यालय, पुरुलिया झारखण्ड
4. **प्रो. हरिजी सिंह**, पूर्व विभागाध्यक्ष, रसायनशास्त्र, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
5. **प्रो. शिवसरन दास**, अ.प्रा. रसायनशास्त्र विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
6. **प्रो. निजामुद्दीन**, अ.प्रा. रसायनशास्त्र विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
7. **प्रो. ओ.पी. पाण्डेय**, अध्यक्ष, रसायनशास्त्र विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
8. **प्रो. सुधीर नाथ त्रिपाठी**, अध्यक्ष, भौतिकी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
9. **प्रो. सुधीर श्रीवास्तव**, अध्यक्ष, गणित एवं सांख्यिकी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
10. **प्रो. वी.एन. पाण्डेय**, अध्यक्ष, वनस्पतिशास्त्र विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
11. **प्रो. आर.आर. सिंह**, अ.प्रा. वनस्पति विज्ञान विभाग, लखनऊ विश्वविद्यालय, लखनऊ
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अनुवीक्षण समिति

- **अध्यक्ष**
  1. **प्रो. डी.के. सिंह**, पूर्व विभागाध्यक्ष, प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
- **सदस्य**
  1. **प्रो. रविशंकर सिंह**, भौतिक विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
  2. **प्रो. उमा श्रीवास्तव**, गणित एवं सांख्यिकी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
  3. **डॉ. परीक्षित सिंह**, वनस्पति विज्ञान विभाग, दिग्विजयनाथ पी.जी. कालेज, गोरखपुर
  4. **डॉ. आलोक कुमार श्रीवास्तव**, रसायन विज्ञान विभाग, महात्मा गांधी पी.जी. कालेज, गोरखपुर
  5. **डॉ. सीमा मिश्रा**, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
  6. **डॉ. सिन्टू कुमार**, भौतिकी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

आयोजन समिति

- **अध्यक्ष**
  डॉ. प्रदीप कुमार राव, प्राचार्य, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर
- **संयोजक**
  डॉ. गीता सिंह, असि प्रो. रसायन विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
- **सह संयोजक**
  डॉ. नवनीत कुमार, असि प्रो. प्राणि विज्ञान विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर
  श्री संजय जायसवाल, असि प्रो. रसायन विज्ञान विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर
  सुश्री अंजली सिंह, असि प्रो. वनस्पति विज्ञान विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर
- **समन्वयक**
  डॉ. के. सुनीता, असि प्रो. वनस्पति विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर
- **आयोजन सचिव**
  श्री मनीष कुमार त्रिपाठी, शोध छात्र, रसायन विज्ञान, आई.आई.टी. बनारस हिन्दू विश्वविद्यालय, वाराणसी
- **आयोजन सह–सचिव**
  डॉ. शिव कुमार, असि प्रो. प्राणि विज्ञान विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर
  डॉ. अभिषेक वर्मा, असि प्रो. भौतिक विज्ञान विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर
  डॉ. अखिलेश कु. गुप्ता, असि प्रो. वनस्पति विज्ञान विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर
- **सदस्य**

डॉ. आर.एन. सिंह, प्राणि विज्ञान	**डॉ. एस.के. बर्नवाल**, रसायन विज्ञान	**डॉ. ए.के. श्रीवास्तव**, वनस्पति विज्ञान
श्रीमती मनीता सिंह, भौतिकी	**डॉ. रामसज्जन**, रसायन विज्ञान	**श्री श्रीकान्त मणि त्रिपाठी**, गणित
डॉ. ए.के. राव, सांख्यिकी	**डॉ. कुसुमलता सिंह**, सांख्यिकी	**डॉ. शैलेन्द्र ठाकुर**, भौतिकी
श्री प्रतीक दास, गणित	**सुश्री प्रियंका मिश्रा**, रसायन विज्ञान	**श्री प्रखर वैभव सिंह**, इलेक्ट्रानिक्स
श्री प्रदीप कु. वर्मा, रसायन विज्ञान	**श्री गौरव तिवारी**, रसायन विज्ञान	**सुश्री अंजली वर्मा**, वनस्पति विज्ञान

विज्ञान में नवीन प्रवृत्तियाँ

(Emerging trends in Science)

Editor

Prof. D.K. Singh

Co-Editor

Dr. R.N. Singh

–: प्रकाशक :–

महाराणा प्रताप स्नातकोत्तर महाविद्यालय

जंगल धूसड़, गोरखपुर

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Two days National Seminar
01-02 February, 2019

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Emerging Trends in Science

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क्षण-अनुक्षण

01 फरवरी, शुक्रवार

अल्पाहार	:	प्रातः 08:30 से 09:30 बजे
पंजीकरण	:	प्रातः 08:00 से 10:30 बजे
उद्घाटन	:	पूर्वाह्न 11:00 से 12:30 बजे
चाय	:	अपराह्न 12:30 से 12:45 बजे
व्याख्यान	:	अपराह्न 12:45 से 01:30 बजे
दोपहर भोज	:	अपराह्न 01:30 से 02:30 बजे
प्रथम सत्र–1	:	अपराह्न 02:30 से 04:00 बजे
प्रथम सत्र–2	:	अपराह्न 02:30 से 04:00 बजे
चाय	:	अपराह्न 04:00 से 04:30 बजे
द्वितीय सत्र–1	:	अपराह्न 04:30 से 06:00 बजे
द्वितीय सत्र–2	:	अपराह्न 04:30 से 06:00 बजे
सांस्कृतिक संध्या	:	सायं 06:30 से 08:30 बजे
रात्रि भोज	:	रात्रि 08:30 से 09:30 बजे

02 फरवरी, शनिवार

अल्पाहार	:	प्रातः 08:00 से 09:00 बजे
तृतीय सत्र–1	:	प्रातः 09:00 से 10:30 बजे
तृतीय सत्र–2	:	प्रातः 09:00 से 10:30 बजे
चाय	:	पूर्वाह्न 10:30 से 11:00 बजे
चतुर्थ सत्र–1	:	पूर्वाह्न 11:00 से 12:30 बजे
चतुर्थ सत्र–2	:	पूर्वाह्न 11:00 से 12:30 बजे
विशेष व्याख्यान	:	अपराह्न 12:45 से 01:30 बजे
सहभोज	:	अपराह्न 01:30 से 02:30 बजे
समारोप	:	अपराह्न 03:00 से 04:30 बजे
अल्पाहार	:	अपराह्न 04:30 से 05:00 बजे

Minute to Minute

01 February, Friday

Snacks	:	08:30-09:30 A.M.
Registration	:	08:00-10:30 A.M.
Inauguration	:	11:00-12.30 P.M.
Tea	:	12:30-12:45 P.M.
Lecture	:	12:45-01:30 P.M.
Lunch	:	01:30-02:30 P.M.
1st Session-1	:	02:30-04:00 P.M.
1st Session-2	:	02:30-04:00 P.M.
Tea	:	04:00-04:30 P.M.
2nd Session-1	:	04:30-06:00 P.M.
2nd Session-2	:	04:30-06:00 P.M.
Cultural Event	:	06:30-08:30 P.M.
Dinner	:	08:30-09:30 P.M

02 Feburary, Saturday

Snacks	:	08:00-09:00 A.M.
3rd Session-1	:	09:00-10:30 A.M.
3rd Session-2	:	09:00-10:30 A.M.
Tea	:	10:30-11:00 A.M.
4th Session-1	:	11:00-12:30 P.M.
4th Session-2	:	11:00-12:30 P.M.
Special lecture	:	12:45-01: 30 P.M.
Sahabhoj	:	01:30-02:30 P.M.
Samarop	:	03:00-04:30 P.M.
Snacks	:	04:30-05:00 P.M.

दो दिवसीय राष्ट्रीय संगोष्ठी

01–02 फरवरी, 2019

विज्ञान में नवीन प्रवृत्तियाँ

उद्घाटन

01 फरवरी, शुक्रवार, पूर्वाह्न 11:00 बजे से

सान्निध्य	:	**प्रो. उदय प्रताप सिंह** पूर्व कुलपति वीर बहादुर सिंह पूर्वांचल विश्वविद्यालय, जौनपुर
अध्यक्ष	:	**प्रो. श्रीनिवास सिंह** कुलपति, मदन मोहन मालवीय प्रौद्योगिकी विश्वविद्यालय, गोरखपुर
मुख्य अतिथि	:	**डॉ. ए. निनावें** पूर्व सलाहकार, बायोटेक्नोलोजी विभाग, भारत सरकार
बीज वक्तव्य	:	**प्रो. डी. के. सिंह** पूर्व विभागाध्यक्ष, प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
विशिष्ट अतिथि	:	**प्रो. हरिजी सिंह** पूर्व विभागाध्यक्ष, रसा. विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
	:	**प्रो. कमान सिंह** विभागाध्यक्ष, रसायन विज्ञान विभाग, बाबा साहेब भीमराव आंबेडकर केन्द्रीय विश्वविद्यालय, लखनऊ
	:	**प्रो. ओ. पी. पाण्डेय** विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
	:	**प्रो. सुग्रीवनाथ त्रिपाठी** पूर्व विभागाध्यक्ष, भौ.विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
	:	**प्रो. शीला मिश्रा** विभागाध्यक्ष, सांख्यकीय विभाग, लखनऊ विश्वविद्यालय, लखनऊ
संचालक / समन्वयक	:	**डॉ. कु. सुनीता** सहा. आचार्य, वनस्पति विज्ञान वि., दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

Two Days National Conference

01-02 February, 2019

Emerging Trends in Science

Inaguration

01 Febraury, Friday, 11:00 AM

Sannidhya	:	**Prof. Uday Pratap Singh** Ex- Vice Chancellor Veer Bahadur Singh Purvanchal University, Jaunpur
President	:	**Prof. Sriniwas Singh** Vice Chancellor Madan Mohan Malviya Technical University, Gorakhpur
Chief Guest	:	**Dr. Arun Ninawe** Ex. Advisor, Bio-technology, Govt. of India
Key Note	:	**Prof. D.K. Singh** Ex. Head Zoology Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Special Guest	:	**Prof. Hariji Singh** Ex Head Chemistry Dept. Deen Dayal Upadhyay University, Gorakhpur.
	:	**Prof. Kaman Singh** H.O.D. Chemistry Dept. Baba Sahab Bhim Rao Ambadekar Central University, Lucknow.
	:	**Prof. O.P. Pandey** H.O.D. Chemistry Dept. Deen Dayal Upadhyay University, Gorakhpur
	:	**Prof. Sugreeve Nath Tripathi** Ex Head Physics Dept. Deen Dayal Upadhyay University, Gorakhpur.
	:	**Prof. Sheela Mishra** H.O.D. Statistics Dept. Lucknow University, Lucknow.
Coordinator	:	**Dr. Km. Sunita** Asst. Prof., Botany Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

दो दिवसीय राष्ट्रीय संगोष्ठी

01–02 फरवरी, 2019

विज्ञान में नवीन प्रवृत्तियाँ

समारोप

02 फरवरी, शनिवार, अपराह्न 03:00 बजे से

अध्यक्ष : **प्रो. वी. के सिंह**
कुलपति, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

मुख्य अतिथि : **डॉ. अनन्त नारायण भट्ट**
वरिष्ठ वैज्ञानिक, इन्स्टीट्यूट ऑफ न्यूक्लियर मेडिसिन एण्ड एलाईड साइंसेज (डी.आर.डी.ओ.) नई दिल्ली

मुख्य वक्ता : **प्रो. डी. के. सिंह**
पूर्व विभागध्यक्ष, प्राणिविज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

विशिष्ट अतिथि : **डॉ. वी. रामानाथन**
भारतीय प्रौद्योगिकी संस्थान (बी.एच.यू.) वाराणसी

: **प्रो. वी. एन. पाण्डेय**
विभागाध्यक्ष, वनस्पति विज्ञान वि., दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. सुधीर श्रीवास्तव**
विभागाध्यक्ष, गणित विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. अजय सिंह**
विभागाध्यक्ष, प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. दिनेश यादव**
विभागाध्यक्ष, बायोटेक्नोलॉजी विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. रवि शंकर सिंह**
आचार्य, भौतिकी विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

संचालक / समन्वयक : **डॉ. गीता सिंह**
सहा. आचार्य, रसा. विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

Two Days National Conference

01-02 February, 2019

Emerging Trends in Science

Valedictory Session

02 Febraury, Saturday, 03:00 PM

President	:	**Prof. V.K. Singh** Vice Chancellor, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Chief Guest	:	**Dr. Anant Narayan Bhatt** Sr. Scientist, Int. of Nuclear Medicine & Allied Sciences (D.R.D.O), New Delhi
Chef Speaker	:	**Prof. D.K. Singh** Ex. Head Zoology Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Special Guest	:	**Dr. V. Ramanathan** I.I.T. (B.H.U), Varanasi
	:	**Prof. V.N. Pandey** H.O.D Botany Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.
	:	**Prof. Sudheer Srivastav** H.O.D Mathematics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.
	:	**Prof. Ajay Singh** H.O.D. Zoology, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
	:	**Prof. Dinesh Yadav** H.O.D. Biotechnology, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
	:	**Prof. Ravi Shankar Singh** Professor, Physics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Coordinator	:	**Dr. Geeta Singh** Asst. Prof., Chemistry Dept. Deen Dayal Upadhyay University, Gorakhpur

तकनीकी सत्रों का विवरण

प्रथम तकनीकी सत्र

(दिनांक 01 फरवरी, समय– दोपहर 02:30 से 04:00)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. हरिजी सिंह
पूर्व विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय, गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. सुधीर श्रीवास्तव
विभागाध्यक्ष, गणित विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. संजय द्विवेदी
विभागाध्यक्ष, प्लान्ट इकोलोजी एण्ड क्लाइमेट कंट्रोल डिविजन सी. एस. आई. आर., लखनऊ

शोध–पत्र :

1. वसन्त नारायण सिंह
अधीक्षक, प्रताप आश्रम

2. शुभम सिंह
एम.एस–सी., एमिटी विश्वविद्यालय, नोयडा

3. डॉ. एल. के. ओझा
रीजिनल इन्स्टिट्यूट ऑफ इजूकेशन रिर्सच भोपाल

4. डॉ. ठाकुर प्रसाद यादव
हाइड्रोजन ऊर्जा केन्द्र बी.एच.यू., वाराणसी

5. डॉ. यशवन्त पटेल
प्राणि विज्ञान, बी.एच.यू. वराणसी

6. डॉ. नवनीत कुमार
सहा. आचार्य, प्राणि विज्ञान, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

7. डॉ. आकाश केडिया
सहा. आचार्य, वनस्पति विज्ञान विभाग, राजकीय महाविद्यालय, वर्धवान, पं. बंगाल

संचालन/समन्यवक :

डा. विनय कुमार सिंह
सहा. आचार्य प्राणि विज्ञान, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. एस. के. सेनगुप्ता
पूर्व विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय, गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. देवदत्त चतुर्वेदी
विभागाध्यक्ष, रसायन विज्ञान विभाग, महात्मा गांधी केन्द्रीय विश्वविद्यालय, बिहार

डॉ. शशिप्रभा सिंह
सहायक आचार्य, रसायन विज्ञान विभाग, दिग्विजयनाथ पी.जी. कॉलेज, गोरखपुर

शोध–पत्र :

1. डॉ. वी. के बर्नवाल
वनस्पति विज्ञान, एस.डी.पी.जी., मठलार, देवरिया

2. कृतिका राव
महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर

3. एस. भाव्या
सेण्ट जोसेफ कॉलेज, तमिलनाडू

4. डॉ. आर. पी. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र चौकमाफी, पीपीगंज

5. एकता सोनकर
रसायन विज्ञान, बी. एच. यू. वाराणसी

6. डॉ. स्मिता तिवारी
रीजनल एग्रीकल्चरल रिर्सज स्टेशन, सागर

7. डॉ. अरूण कुमार राव
सांख्यिकी विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर

संचालन/समन्यवक :

डा. अनुपमा श्रीवास्तव
सहा. आचार्य गणित, महाराणा प्रताप पी.जी. कालेज

Particular of Technical Session

1st Technical Session

(Date 01st February, Time 02:30 P.M-04:00 P.M.)

I – Jagat Janani Sita Sabhagar

President:

Prof. Hariji Singh
Ex Head Chemistry Dept., Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Prof. Sudheer Srivastav
H.O.D Mathematics, Deen Dayal Upadhyay University, Gorakhpur.

Dr. Sanjay Dwivedi
Plant Ecology & Climate Control Division CSIR Lucknow.

Research Paper Presentation:

1. Basant Narayan Singh
Warden Pratap Ashram

2. Shubham Singh
M.Sc, AMITY, NOIDA

3. Dr. A.L. Ojha
Regional Institute of Education and Research, Bhopal

4. Dr. Thakur Prasad Yadav
Hydrogen Energy Centre, BHU

5. Dr. Yashwant Patel
Deptt. of Zoology, BHU, Varanasi

6. Dr. Navneet Kumar
Deptt. of Zoology, Maharana Pratap PG College, Jungle Dhusan, Gorakhpur

7. Dr. Akash Kedia
Asst. Prof., Deptt. of Botary, Govt. College, Bardwan, West Bengal

Coordinator :
Dr. Vinay Kumar Singh
Deptt. of Zoology, Maharana Pratap PG College, Jungle Dhusan, Gorakhpur

II – Sri Ram Sabhagar

President:

Prof. S.K. Sengupta
Ex Head Chemistry Dept., Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Prof. Devdutt Chaturvedi
H.O.D. Chemistry, Mahatama Gandhi Central University, Bihar

Dr. Shashi Prabha Singh
Asso. Prof., Chemistry, Digvijay Nath PG College, Gorakhpur

Research Paper Presentation:

1. Dr. V.K. Vernaval
Botany Deptt., SDPG, Mathlar, Deoria

2. Kritika Rao
Maharana Pratap P.G. College, Jungle Dhusar

3. Dr. S. Bhavya
St. Joseph College, Tamil Nadu

4. Dr. R.P. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi

5. Ekta Sonkar
Dept. of Chemistry, BHU, Varanasi

6. Dr. Smita Tiwari
Regional Agricultural Res. Stat., Sagar

7. Dr. Arun Kumar Rao
Statistic Deptt., Maharana Pratap P.G. College, Jungle Dhusar, Gorakhpur

Coordinator :
Dr. Anupama Srivastava
Asst. Professor, Mathematics, Maharana Pratap P.G. College, Jungle Dhusar

द्वितीय तकनीकी सत्र

(दिनांक 01 फरवरी, समय– सायं 04:30 से 06:00)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. शीला मिश्रा
विभागाध्यक्ष, सांख्यिकी विभाग, लखनऊ विश्वविद्यालय, लखनऊ

विषय विशेषज्ञ :

प्रो. विनय कुमार सिंह
आचार्य प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. यशवन्त पटेल
साइटोजेनेटिक्स लैब, प्राणि विज्ञान
बी.एच.यू., वाराणसी

शोध–पत्र :

1. डॉ. ए. के. पाण्डेय
वैज्ञानिक एन.बी.एफ.जी.आर. (आई.सी.ए.आर.)

2. डॉ. सतीश सहाय
सेण्ट जोसेफ कॉलेज, तमिलानाडु

3. डॉ. वी. थंगरांजन
सेण्ट जोसेफ कॉलेज, तमिलानाडु

4. डॉ. विमला
सेण्ट जोसेफ कॉलेज, तमिलनाडु

5. डॉ. बी. बी. मिश्रा
वेकटेर कन्ट्रोल रिसर्च सेनटर (एनआईवी) गोरखपुर

6. डॉ. टी. एन. गिरीश
श्री साईंनाथ इन्स्टिट्यूट ऑफ हायर स्टडीज, पूटापार्थी, भारत

7. डॉ. अजित कुमार तिवारी
सहा. आचार्य, प्राणि विज्ञान, बुद्ध पी.जी. कॉलेज, कुशीनगर

संचालन / समन्यवक :

डा. अंजलि सिंह
सहा. आचार्य, वनस्पति विज्ञान, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. रविशंकर सिंह
आचार्य भौतिकी विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

डॉ. आर. एन. सिंह
विभागाध्यक्ष, प्राणि विज्ञान विभाग, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

डॉ. प्रदीप कुमार
प्राणि विज्ञान विभाग, एस.जी.एन. राजकीय महाविद्यालय, गोहाना, मऊ

शोध–पत्र :

1. डॉ. कु. सुनीता
सहा. आचार्य, वनस्पति विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

2. डॉ. सिन्टू कुमार
सहा. आचार्य, भौतिकी विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

3. डॉ. गीता सिंह
सहा. आचार्य, रसायन विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

4. डॉ. अखिलेश कुमार गुप्ता
सहा. आचार्य, वनस्पति विज्ञान, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़ गोरखपुर

5. डॉ. अरूण कुमार मौर्या
सहा. आचार्य, वनस्पति विज्ञान, वौधरी चरण सिंह विश्वविद्यालय, मेरठ

संचालन / समन्यवक :

डा. सिन्टू कुमार
सहा. आचार्य, भौतिकी विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

2nd Technical Session

(Date 01st February, Time 04:30 P.M-06:00 P.M.)

I – Jagat Janani Sita Sabhagar

President:

Prof. Sheela Mishra
H.O.D. Statistics, Lucknow University, Lucknow.

Subject Specialist :

Prof. Vinay Kumar Singh
Zoology Dept., Deen Dayal Upadhyay University, Gorakhpur.

Dr. Yashwant Patel
Ctogenetics Laboratories, Zoology, Varanasi.

Research Paper Presentation:

1. Dr. A.K. Pandey
Scientist, NBFGR, (ICAR)

2. Dr. Satish Sahay
St. Joseph College, Tamilnadu

3. Dr. V. Thangrajan
St. Joseph College, Tamilnadu

4. Dr. Vimala
St. Joseph College, Tamilnadu

5. Dr. B.B. Mishra
Vector Control Research Centre (NIV), Gorakhpur

6. Dr. T.N. Girish
Sri Shainath Inst. of Higher Learning, Puttaparthi, India

7. Dr. Ajeet Kumar Tiwari
Asst. Prof. Zoology
Buddha P.G. College, Kushinagar

Coordinator :
Dr. Anjali Singh
Asst. Professor, Botany, Maharana Pratap P.G. College

II – Sri Ram Sabhagar

President:

Prof. Ravi Shankar Singh
Physics Dept., Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Dr. R.N. Singh
Zoology Dept. Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

Dr. Pradeep Kumar
SGN Government College, Gohana, Mau

Research Paper Presentation:

1. Dr. Km. Sunita
Asst. Prof. Botany, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

2. Dr. Sintu Kumar
Asst. Prof. Physics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

3. Dr. Geeta Singh
Asst. Prof. Chemistry, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

4. Dr. Akhilesh Kumar Gupta
Asst. Prof. Botany Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

5. Dr. Arun Kumar Maurya
Assist. Prof., Botany, Chaudhary Charan Singh University, Meerut

Coordinator :
Dr. Sintu Kumar
Asst. Professor, Physics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

तृतीय तकनीकी सत्र

(दिनांक 02 फरवरी, समय– प्रातः 09:00 से 10:30)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. वी. एन. पाण्डेय
विभागाध्यक्ष वनस्पति विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. विजय शंकर वर्मा
आचार्य गणित विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

प्रो. रवि प्रकाश
एमेरिटस प्रोफेसर, रोहतक

शोध–पत्र :

1. डॉ. सी. बी. तिवारी
सहा. आचार्य, एस.एम.डी., जलालपुर, बिहार

2. आर. के. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी, गोरखपुर

3. एस. पी. उपाध्याय
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी, गोरखपुर

4. डॉ. चन्द्रकला लम्बोड
एम.डी. विश्वविद्यालय, रोहतक, हरियाणा

5. आम्रपाली वर्मा
महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

6. डॉ. वी. पी. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी, गोरखपुर

7. डॉ. दीपक बिशला
आई.टी. हेड, अम्बेडकर विश्वविद्यालय, नई दिल्ली

संचालन / समन्यवक :

डा. शिव कुमार
सहा. आचार्य, प्राणि विज्ञान, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. ओ.पी. पाण्डेय
विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. विजय कुमार
आचार्य गणित विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. यू. बी. सिंह
सहा. आचार्य, भौतिकी विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

शोध–पत्र :

1. डॉ. संजय कुमार विश्वकर्मा
बायोटेक्नोलोजी, मो. हुसैन महाविद्यालय, जौनपुर

2. डॉ. शिवांगी राव
फारेन्सिक सांइस, बी.एस.बी.ए. विश्वविद्यालय, लखनऊ

3. डॉ. स्मिता पूरी
रीजिनल ऐग्रीकल्चरल रिसर्च स्टेशन, सागर

4. डॉ. वन्दना सिंह
वर्मी बायोटेक्नोलोजी लैब, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

5. डॉ. योगेन्द्र कुमार
वर्मी बायोटेक्नोलोजी लैब, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

6. डॉ. संजय द्विवेदी
सी.एस.आई.आर., लखनऊ

संचालन / समन्यवक :

डा. अभिषेक वर्मा
सहा. आचार्य भौतिकी, महाराणा प्रताप पी.जी. कालेज

3rd Technical Session

(Date 02nd February, Time 09:00 AM-10:30 AM)

I – Jagat Janani Sita Sabhagar

President:

Prof. V.N. Pandey
H.O.D. Botany, Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Prof. Vijay Shankar Verma
Mathematics Dept. Deen Dayal Upadhyay University, Gorakhpur.

Prof. Ravi Prakash
Emeritus Prof., Rohtak

Research Paper Presentation:

1. Dr. C.B. Tiwari
Assitt. Prof. Zoology, SMD, Jalalpur, Bihar

2. R.K. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi, Gorakhpur

3. S.P. Upadhyay
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi, Gorakhpur

4. Dr. Chandrakala Lambhod
M.D. University, Rohtak, Haryana

5. Amrapali Verma
Asstt. Prof., Maharana Pratap P.G. College, Jungle Dhusar, Gorakhpur

6. Dr. V.P. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi, Gorakhpur

7. Dr. Deepak Bishla
IT Head, Ambedkar University, New Delhi

Coordinator :
Dr. Shiv Kumar
Asst. Professor, Zoology, Maharana Pratap P.G. College

II – Sri Ram Sabhagar

President:

Prof. O.P. Pandey
H.O.D., Chemistry Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Subject Specialist :

Prof. Vijay Kumar
Mathematics Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Dr. U.B. Singh
Asst. Prof., Physics Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Research Paper Presentation:

1. Dr. Sanjay Kumar Vishwakarma
Bio-Technology Mohd. Hussain P.G. College Jaunpur

2. Dr. Shivangi Rao
Forensic science Baba Saheb Bheemrao Ambedkar University, Lucknow.

3. Dr. Smita Puri
Regional Agricultural Research Station, Sagar

4. Dr. Vandana Singh
Vermi Biotechnology Lab, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

5. Dr. Yogendra Kumar
Vermi Biotechnology Lab, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

6. Sanjay Dwivedi
CSIR, Lucknow

Coordinator :
Dr. Abhishek Verma
Asst. Professor, Physics, Maharana Pratap P.G. College

चतुर्थ तकनीकी सत्र

(दिनांक 02 फरवरी, समय– पूर्वाह्न 11:00 से 01:00)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. अजय सिंह
विभागाध्यक्ष प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

डॉ. केशव सिंह
सह आचार्य प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

प्रो. एस.सी. लखोटिया
साइटोजेनिटिक लेब्रोटेरी, बी.एच.यू. वाराणसी

शोध–पत्र :

1. डॉ. अन्नु सिंह
माइकोपेथोलोजी लैब, झांसी

2. डॉ. अनुपमा श्रीवास्तवा
सहा. आचार्य, गणित, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

3. डॉ.चन्द्रभूषण तिवारी
सहा. आचार्य, प्राणि विज्ञान, गोपालगंज

4. डॉ.डी. के गौड़
सी.एम.पी. महाविद्यालय, इलाहाबाद

5. डॉ. दीपक कुमार भारती
वर्मी बायोटेक्नोलोजी लैब, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

6. डॉ. कुसुमलता सिंह
सहा. आचार्य, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

7. डॉ. मनमोहन कृष्ण उपाध्याय
राजकीय महाविद्यालय, कुशीनगर

संचालन/समन्यवक :

डा. अखिलेश गुप्त
सहा. आचार्य वनस्पति, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. दिनेश यादव
विभागाध्यक्ष, बायोटेक्नोनोलॉजी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. अनिल द्विवेदी
आचार्य, वनस्पति विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. अभय कुमार श्रीवास्तव
विभागाध्यक्ष, वनस्पति विज्ञान विभाग, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

शोध–पत्र :

1. डॉ. एस.के. बर्नवाल
विभागाध्यक्ष, रसायन विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर

2. ए.के. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी

3. डॉ. ममता सिंह
वैज्ञानिक प्लान्ट ब्रिडींग एण्ड जेनेटिक्स

4. डॉ. आशुतोष पाण्डेय
सी.एस.आई.आर., राष्ट्रीय वनस्पति अनुसंधान संस्थान, लखनऊ

5. डॉ. एम.के. उपाध्याय
राजकीय महाविद्यालय, हाटा, कुशीनगर

6. डॉ. दिलप्रीत कौर
राजकीय महाविद्यालय, हाटा, कुशीनगर

7. डॉ. दीपा श्रीवास्तव
सहा. आचार्य, वनस्पति विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

संचालन/समन्यवक :

डा. नवनीत कुमार
सहा. आचार्य, प्राणि विज्ञान, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

4th Technical Session

(Date 02nd February, Time 11:00 AM-01:00 PM)

I – Jagat Janani Sita Sabhagar

President:

Prof. Ajay Singh
H.O.D. Zoology, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Subject Specialist :

Dr. Keshav Singh
Asso.Prof. Zoology Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Prof. S.C. Lakhotia
Cytogenetic Laboratory, BHU Varanasi

Research Paper Presentation:

1. Dr. Anu Singh
Mycopathology Lab, Jhansi

2. Dr. Anupama Srivastava
Asst. Prof., Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

3. Dr. Chandra Bhusan Tiwari
Asst. Prof. Zoology, Gopalganj.

4. Dr. D.K. Gond
CMP Degree College, Allahabad

5. Dr. Deepak Kumar Bhartiya
Vermi Biotechnology Lab, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

6. Dr. Kusum Lata Singh
Asst. Prof., Statistics, Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

7. Dr. Manmohan Krishna Upadhyay
Govt. Degree College, Kushinagar

Coordinator :
Dr. Akhilesh Gupta
Asst. Professor, Botany, Maharana Pratap P.G. College

II – Sri Ram Sabhagar

President:

Prof. Dinesh Yadav
H.O.D., Biotechnology, Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Subject Specialist :

Prof. Anil Diwedi
Botany Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Dr. Abhay Kumar Srivastav
H.O.D. Botany, Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

Research Paper Presentation:

1. Dr. S.K. Vernwal
H.O.D., Chemistry, Maharna Pratap P.G. College, Jungle Dhusar, Gorakhpur

2. A.K. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi

3. Dr. Mamta Singh
Scientist, Plant Breeding & Genitcs

4. Dr. Ashutosh Pandey
CSIR, National Botanical Research Institute, Lucknow

5. Dr. M.K. Upadhyay
Govt. Degree College Hata, Kushinagar

6. Dr. Dilpreet Kaur
Govt. Degree College Hata, kushinagar

7. Dr. Deepa Srivastava
Asst. Prof., Botany, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Coordinator :
Dr. Navneet Kumar
Deptt. of Zoology, Maharan Pratap P.G. College, Jungle Dhusan, Gorakhpur

विशेष व्याख्यान

दिनांक 01 फरवरी, 2019 दोपहर 12.45 से 01.30 बजे
जगत जननी सीता सभागार

अध्यक्षता : **प्रो. सुग्रीव नाथ तिवारी**
पूर्व विभागाध्यक्ष, भौतिक विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

मुख्य वक्ता : **प्रो. कमान सिंह**
विभागाध्यक्ष, रसायन विज्ञान विभाग, बाबा साहेब भीमराव आंबेडकर केन्द्रीय विश्वविद्यालय, लखनऊ

दिनांक 02 फरवरी, 2019 दोपहर 12.45 से 01.30 बजे
जगत जननी सीता सभागार

अध्यक्षता : **प्रो. मालविका श्रीवास्तव**
विभागाध्यक्ष, माइक्रोबायोलोजी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

मुख्य वक्ता : **प्रो. राणा प्रताप सिंह**
संकायाध्यक्ष, अकादमिक अफेयर्स, बाबा साहेब भीमराव आंबेडकर केन्द्रीय विश्वविद्यालय, लखनऊ

SPECIAL LECTURE

01 February, 2019, 12:45 PM - 01:30 PM
Jagat Janani Sita Sabhagar

President : **Prof. Sugreeve Nath Tiwari**
Ex Head Physics Dept.
Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Chief Speaker : **Prof. Kaman Singh**
H.O.D Chemistry Dept., Baba Sahab Bhimrao Ambadekar Central University, Lucknow

02 February, 2019, 12:45 PM - 01:30 PM
Jagat Janani Sita Sabhagar

President : **Prof. Malavika Srivastava**
H.O.D., Microbiology,
Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Chief Speaker : **Prof. Rana Pratap SIngh**
Dean, Academic Affairs, Baba Sahab Bhimrao Ambadekar Central University, Lucknow.

विज्ञान में नवीन प्रवृत्तियाँ

(Emerging Trends in Science)

Souvenir cum Abstracts

–: प्रकाशक :–

महाराणा प्रताप स्नातकोत्तर महाविद्यालय

जंगल धूसड़, गोरखपुर

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विज्ञान में नवीन प्रवृत्तियाँ

(Emerging Trends in Science)

Editor

Prof. D.K. Singh

Co-Editor

Dr. R.N. Singh

Souvenir cum Abstracts

–: प्रकाशक :–

महाराणा प्रताप स्नातकोत्तर महाविद्यालय

जंगल धूसड़, गोरखपुर

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Two days National Seminar
01-02 February, 2019

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Emerging Trends in Science

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क्षण-अनुक्षण

01 फरवरी, शुक्रवार

अल्पाहार	:	प्रातः 08:30 से 09:30 बजे
पंजीकरण	:	प्रातः 08:00 से 10:30 बजे
उद्घाटन	:	पूर्वाह्न 11:00 से 12:30 बजे
चाय	:	अपराह्न 12:30 से 12:45 बजे
व्याख्यान	:	अपराह्न 12:45 से 01:30 बजे
दोपहर भोज	:	अपराह्न 01:30 से 02:30 बजे
प्रथम सत्र–1	:	अपराह्न 02:30 से 04:00 बजे
प्रथम सत्र–2	:	अपराह्न 02:30 से 04:00 बजे
चाय	:	अपराह्न 04:00 से 04:30 बजे
द्वितीय सत्र–1	:	अपराह्न 04:30 से 06:00 बजे
द्वितीय सत्र–2	:	अपराह्न 04:30 से 06:00 बजे
सांस्कृतिक संध्या	:	सायं 06:30 से 08:30 बजे
रात्रि भोज	:	रात्रि 08:30 से 09:30 बजे

02 फरवरी, शनिवार

अल्पाहार	:	प्रातः 08:00 से 09:00 बजे
तृतीय सत्र–1	:	प्रातः 09:00 से 10:30 बजे
तृतीय सत्र–2	:	प्रातः 09:00 से 10:30 बजे
चाय	:	पूर्वाह्न 10:30 से 11:00 बजे
चतुर्थ सत्र–1	:	पूर्वाह्न 11:00 से 12:30 बजे
चतुर्थ सत्र–2	:	पूर्वाह्न 11:00 से 12:30 बजे
विशेष व्याख्यान	:	अपराह्न 12:45 से 01:30 बजे
सहभोज	:	अपराह्न 01:30 से 02:30 बजे
समारोप	:	अपराह्न 03:00 से 04:30 बजे
अल्पाहार	:	अपराह्न 04:30 से 05:00 बजे

Minute to Minute

01 February, Friday

Snacks	:	08:30-09:30 A.M.
Registration	:	08:00-10:30 A.M.
Inauguration	:	11:00-12.30 P.M.
Tea	:	12:30-12:45 P.M.
Lecture	:	12:45-01:30 P.M.
Lunch	:	01:30-02:30 P.M.
1st Session-1	:	02:30-04:00 P.M.
1st Session-2	:	02:30-04:00 P.M.
Tea	:	04:00-04:30 P.M.
2nd Session-1	:	04:30-06:00 P.M.
2nd Session-2	:	04:30-06:00 P.M.
Cultural Event	:	06:30-08:30 P.M.
Dinner	:	08:30-09:30 P.M

02 Feburary, Saturday

Snacks	:	08:00-09:00 A.M.
3rd Session-1	:	09:00-10:30 A.M.
3rd Session-2	:	09:00-10:30 A.M.
Tea	:	10:30-11:00 A.M.
4th Session-1	:	11:00-12:30 P.M.
4th Session-2	:	11:00-12:30 P.M.
Special lecture	:	12:45-01: 30 P.M.
Sahabhoj	:	01:30-02:30 P.M.
Samarop	:	03:00-04:30 P.M.
Snacks	:	04:30-05:00 P.M.

दो दिवसीय राष्ट्रीय संगोष्ठी

01–02 फरवरी, 2019

विज्ञान में नवीन प्रवृत्तियाँ

उद्घाटन

01 फरवरी, शुक्रवार, पूर्वाह्न 11:00 बजे से

सान्निध्य	:	**प्रो. उदय प्रताप सिंह** पूर्व कुलपति वीर बहादुर सिंह पूर्वांचल विश्वविद्यालय, जौनपुर
अध्यक्ष	:	**प्रो. श्रीनिवास सिंह** कुलपति, मदन मोहन मालवीय प्रौद्योगिकी विश्वविद्यालय, गोरखपुर
मुख्य अतिथि	:	**डॉ. ए. निनावें** पूर्व सलाहकार, बायोटेक्नोलोजी विभाग, भारत सरकार
बीज वक्तव्य	:	**प्रो. डी. के. सिंह** पूर्व विभागाध्यक्ष, प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
विशिष्ट अतिथि	:	**प्रो. हरिजी सिंह** पूर्व विभागाध्यक्ष, रसा. विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
	:	**प्रो. कमान सिंह** विभागाध्यक्ष, रसायन विज्ञान विभाग, बाबा साहेब भीमराव आंबेडकर केन्द्रीय विश्वविद्यालय, लखनऊ
	:	**प्रो. ओ. पी. पाण्डेय** विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
	:	**प्रो. सुग्रीवनाथ त्रिपाठी** पूर्व विभागाध्यक्ष, भौ.विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर
	:	**प्रो. शीला मिश्रा** विभागाध्यक्ष, सांख्यकीय विभाग, लखनऊ विश्वविद्यालय, लखनऊ
संचालक / समन्वयक	:	**डॉ. कु. सुनीता** सहा. आचार्य, वनस्पति विज्ञान वि., दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

Two Days National Conference

01-02 February, 2019

Emerging Trends in Science

Inaguration

01 Febraury, Friday, 11:00 AM

Sannidhya	:	**Prof. Uday Pratap Singh** Ex- Vice Chancellor Veer Bahadur Singh Purvanchal University, Jaunpur
President	:	**Prof. Sriniwas Singh** Vice Chancellor Madan Mohan Malviya Technical University, Gorakhpur
Chief Guest	:	**Dr. Arun Ninawe** Ex. Advisor, Bio-technology, Govt. of India
Key Note	:	**Prof. D.K. Singh** Ex. Head Zoology Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Special Guest	:	**Prof. Hariji Singh** Ex Head Chemistry Dept. Deen Dayal Upadhyay University, Gorakhpur.
	:	**Prof. Kaman Singh** H.O.D. Chemistry Dept. Baba Sahab Bhim Rao Ambadekar Central University, Lucknow.
	:	**Prof. O.P. Pandey** H.O.D. Chemistry Dept. Deen Dayal Upadhyay University, Gorakhpur
	:	**Prof. Sugreeve Nath Tripathi** Ex Head Physics Dept. Deen Dayal Upadhyay University, Gorakhpur.
	:	**Prof. Sheela Mishra** H.O.D. Statistics Dept. Lucknow University, Lucknow.
Coordinator	:	**Dr. Km. Sunita** Asst. Prof., Botany Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

दो दिवसीय राष्ट्रीय संगोष्ठी

01–02 फरवरी, 2019

विज्ञान में नवीन प्रवृत्तियाँ

समारोप

02 फरवरी, शनिवार, अपराह्न 03:00 बजे से

अध्यक्ष : **प्रो. वी. के सिंह**
कुलपति, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

मुख्य अतिथि : **डॉ. अनन्त नारायण भट्ट**
वरिष्ठ वैज्ञानिक, इन्स्टीट्यूट ऑफ न्यूक्लियर मेडिसिन एण्ड एलाईड साइंसेज (डी.आर.डी.ओ.) नई दिल्ली

मुख्य वक्ता : **प्रो. डी. के. सिंह**
पूर्व विभागध्यक्ष, प्राणिविज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

विशिष्ट अतिथि : **डॉ. वी. रामानाथन**
भारतीय प्रौद्योगिकी संस्थान (बी.एच.यू.) वाराणसी

: **प्रो. वी. एन. पाण्डेय**
विभागाध्यक्ष, वनस्पति विज्ञान वि., दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. सुधीर श्रीवास्तव**
विभागाध्यक्ष, गणित विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. अजय सिंह**
विभागाध्यक्ष, प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. दिनेश यादव**
विभागाध्यक्ष, बायोटेक्नोलॉजी विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

: **प्रो. रवि शंकर सिंह**
आचार्य, भौतिकी विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

संचालक / समन्वयक : **डॉ. गीता सिंह**
सहा. आचार्य, रसा. विज्ञान विभाग, दीनदयाल उपाध्याय गो.वि.वि., गोरखपुर

Two Days National Conference

01-02 February, 2019

Emerging Trends in Science

Valedictory Session

02 Febraury, Saturday, 03:00 PM

President	:	**Prof. V.K. Singh** Vice Chancellor, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Chief Guest	:	**Dr. Anant Narayan Bhatt** Sr. Scientist, Int. of Nuclear Medicine & Allied Sciences (D.R.D.O), New Delhi
Chef Speaker	:	**Prof. D.K. Singh** Ex. Head Zoology Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Special Guest	:	**Dr. V. Ramanathan** I.I.T. (B.H.U), Varanasi
	:	**Prof. V.N. Pandey** H.O.D Botany Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.
	:	**Prof. Sudheer Srivastav** H.O.D Mathematics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.
	:	**Prof. Ajay Singh** H.O.D. Zoology, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
	:	**Prof. Dinesh Yadav** H.O.D. Biotechnology, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
	:	**Prof. Ravi Shankar Singh** Professor, Physics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur
Coordinator	:	**Dr. Geeta Singh** Asst. Prof., Chemistry Dept. Deen Dayal Upadhyay University, Gorakhpur

तकनीकी सत्रों का विवरण

प्रथम तकनीकी सत्र

(दिनांक 01 फरवरी, समय– दोपहर 02:30 से 04:00)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. हरिजी सिंह
पूर्व विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय, गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. सुधीर श्रीवास्तव
विभागाध्यक्ष, गणित विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. संजय द्विवेदी
विभागाध्यक्ष, प्लान्ट इकोलोजी एण्ड क्लाइमेट कंट्रोल डिविजन सी. एस. आई. आर., लखनऊ

शोध–पत्र :

1. वसन्त नारायण सिंह
अधीक्षक, प्रताप आश्रम

2. शुभम सिंह
एम.एस–सी., एमिटी विश्वविद्यालय, नोयडा

3. डॉ. एल. के. ओझा
रीजिनल इन्स्टिट्यूट ऑफ इजूकेशन रिर्सच भोपाल

4. डॉ. ठाकुर प्रसाद यादव
हाइड्रोजन ऊर्जा केन्द्र बी.एच.यू., वाराणसी

5. डॉ. यशवन्त पटेल
प्राणि विज्ञान, बी.एच.यू. वराणसी

6. डॉ. नवनीत कुमार
सहा. आचार्य, प्राणि विज्ञान, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

7. डॉ. आकाश केडिया
सहा. आचार्य, वनस्पति विज्ञान विभाग, राजकीय महाविद्यालय, वर्धवान, पं. बंगाल

संचालन/समन्यवक :

डा. विनय कुमार सिंह
सहा. आचार्य प्राणि विज्ञान, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. एस. के. सेनगुप्ता
पूर्व विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय, गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. देवदत्त चतुर्वेदी
विभागाध्यक्ष, रसायन विज्ञान विभाग, महात्मा गांधी केन्द्रीय विश्वविद्यालय, बिहार

डॉ. शशिप्रभा सिंह
सहायक आचार्य, रसायन विज्ञान विभाग, दिग्विजयनाथ पी.जी. कॉलेज, गोरखपुर

शोध–पत्र :

1. डॉ. वी. के बर्नवाल
वनस्पति विज्ञान, एस.डी.पी.जी., मठलार, देवरिया

2. कृतिका राव
महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर

3. एस. भाव्या
सेण्ट जोसेफ कॉलेज, तमिलनाडू

4. डॉ. आर. पी. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र चौकमाफी, पीपीगंज

5. एकता सोनकर
रसायन विज्ञान, बी. एच. यू. वाराणसी

6. डॉ. स्मिता तिवारी
रीजनल एग्रीकल्चरल रिर्सज स्टेशन, सागर

7. डॉ. अरूण कुमार राव
सांख्यिकी विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर

संचालन/समन्यवक :

डा. अनुपमा श्रीवास्तव
सहा. आचार्य गणित, महाराणा प्रताप पी.जी. कालेज

Particular of Technical Session

1st Technical Session

(Date 01st February, Time 02:30 P.M-04:00 P.M.)

I – Jagat Janani Sita Sabhagar

President:

Prof. Hariji Singh
Ex Head Chemistry Dept., Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Prof. Sudheer Srivastav
H.O.D Mathematics, Deen Dayal Upadhyay University, Gorakhpur.

Dr. Sanjay Dwivedi
Plant Ecology & Climate Control Division CSIR Lucknow.

Research Paper Presentation:

1. Basant Narayan Singh
Warden Pratap Ashram

2. Shubham Singh
M.Sc, AMITY, NOIDA

3. Dr. A.L. Ojha
Regional Institute of Education and Research, Bhopal

4. Dr. Thakur Prasad Yadav
Hydrogen Energy Centre, BHU

5. Dr. Yashwant Patel
Deptt. of Zoology, BHU, Varanasi

6. Dr. Navneet Kumar
Deptt. of Zoology, Maharana Pratap PG College, Jungle Dhusan, Gorakhpur

7. Dr. Akash Kedia
Asst. Prof., Deptt. of Botary, Govt. College, Bardwan, West Bengal

Coordinator :
Dr. Vinay Kumar Singh
Deptt. of Zoology, Maharana Pratap PG College, Jungle Dhusan, Gorakhpur

II – Sri Ram Sabhagar

President:

Prof. S.K. Sengupta
Ex Head Chemistry Dept., Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Prof. Devdutt Chaturvedi
H.O.D. Chemistry, Mahatama Gandhi Central University, Bihar

Dr. Shashi Prabha Singh
Asso. Prof., Chemistry, Digvijay Nath PG College, Gorakhpur

Research Paper Presentation:

1. Dr. V.K. Vernaval
Botany Deptt., SDPG, Mathlar, Deoria

2. Kritika Rao
Maharana Pratap P.G. College, Jungle Dhusar

3. Dr. S. Bhavya
St. Joseph College, Tamil Nadu

4. Dr. R.P. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi

5. Ekta Sonkar
Dept. of Chemistry, BHU, Varanasi

6. Dr. Smita Tiwari
Regional Agricultural Res. Stat., Sagar

7. Dr. Arun Kumar Rao
Statistic Deptt., Maharana Pratap P.G. College, Jungle Dhusar, Gorakhpur

Coordinator :
Dr. Anupama Srivastava
Asst. Professor, Mathematics, Maharana Pratap P.G. College, Jungle Dhusar

द्वितीय तकनीकी सत्र

(दिनांक 01 फरवरी, समय– सायं 04:30 से 06:00)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. शीला मिश्रा
विभागाध्यक्ष, सांख्यिकी विभाग, लखनऊ विश्वविद्यालय, लखनऊ

विषय विशेषज्ञ :

प्रो. विनय कुमार सिंह
आचार्य प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. यशवन्त पटेल
साइटोजेनेटिक्स लैब, प्राणि विज्ञान
बी.एच.यू., वाराणसी

शोध–पत्र :

1. डॉ. ए. के. पाण्डेय
वैज्ञानिक एन.बी.एफ.जी.आर. (आई.सी.ए.आर.)

2. डॉ. सतीश सहाय
सेण्ट जोसेफ कॉलेज, तमिलानाडु

3. डॉ. वी. थंगरांजन
सेण्ट जोसेफ कॉलेज, तमिलानाडु

4. डॉ. विमला
सेण्ट जोसेफ कॉलेज, तमिलनाडु

5. डॉ. बी. बी. मिश्रा
वेकटेर कन्ट्रोल रिसर्च सेनटर (एनआईवी) गोरखपुर

6. डॉ. टी. एन. गिरीश
श्री साईंनाथ इन्स्टिट्यूट ऑफ हायर स्टडीज, पूटापार्थी, भारत

7. डॉ. अजित कुमार तिवारी
सहा. आचार्य, प्राणि विज्ञान, बुद्ध पी.जी. कॉलेज, कुशीनगर

संचालन/समन्यवक :
डा. अंजलि सिंह
सहा. आचार्य, वनस्पति विज्ञान, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. रविशंकर सिंह
आचार्य भौतिकी विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

डॉ. आर. एन. सिंह
विभागाध्यक्ष, प्राणि विज्ञान विभाग, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

डॉ. प्रदीप कुमार
प्राणि विज्ञान विभाग, एस.जी.एन. राजकीय महाविद्यालय, गोहाना, मऊ

शोध–पत्र :

1. डॉ. कु. सुनीता
सहा. आचार्य, वनस्पति विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

2. डॉ. सिन्टू कुमार
सहा. आचार्य, भौतिकी विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

3. डॉ. गीता सिंह
सहा. आचार्य, रसायन विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

4. डॉ. अखिलेश कुमार गुप्ता
सहा. आचार्य, वनस्पति विज्ञान, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़ गोरखपुर

5. डॉ. अरूण कुमार मौर्या
सहा. आचार्य, वनस्पति विज्ञान, वौधरी चरण सिंह विश्वविद्यालय, मेरठ

संचालन/समन्यवक :
डा. सिन्टू कुमार
सहा. आचार्य, भौतिकी विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

2nd Technical Session

(Date 01st February, Time 04:30 P.M-06:00 P.M.)

I – Jagat Janani Sita Sabhagar

President:

Prof. Sheela Mishra
H.O.D. Statistics, Lucknow University, Lucknow.

Subject Specialist :

Prof. Vinay Kumar Singh
Zoology Dept., Deen Dayal Upadhyay University, Gorakhpur.

Dr. Yashwant Patel
Ctogenetics Laboratories, Zoology, Varanasi.

Research Paper Presentation:

1. Dr. A.K. Pandey
Scientist, NBFGR, (ICAR)

2. Dr. Satish Sahay
St. Joseph College, Tamilnadu

3. Dr. V. Thangrajan
St. Joseph College, Tamilnadu

4. Dr. Vimala
St. Joseph College, Tamilnadu

5. Dr. B.B. Mishra
Vector Control Research Centre (NIV), Gorakhpur

6. Dr. T.N. Girish
Sri Shainath Inst. of Higher Learning, Puttaparthi, India

7. Dr. Ajeet Kumar Tiwari
Asst. Prof. Zoology
Buddha P.G. College, Kushinagar

Coordinator :
Dr. Anjali Singh
Asst. Professor, Botany, Maharana Pratap P.G. College

II – Sri Ram Sabhagar

President:

Prof. Ravi Shankar Singh
Physics Dept., Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Dr. R.N. Singh
Zoology Dept. Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

Dr. Pradeep Kumar
SGN Government College, Gohana, Mau

Research Paper Presentation:

1. Dr. Km. Sunita
Asst. Prof. Botany, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

2. Dr. Sintu Kumar
Asst. Prof. Physics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

3. Dr. Geeta Singh
Asst. Prof. Chemistry, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

4. Dr. Akhilesh Kumar Gupta
Asst. Prof. Botany Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

5. Dr. Arun Kumar Maurya
Assist. Prof., Botany, Chaudhary Charan Singh University, Meerut

Coordinator :
Dr. Sintu Kumar
Asst. Professor, Physics, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

तृतीय तकनीकी सत्र

(दिनांक 02 फरवरी, समय– प्रातः 09:00 से 10:30)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. वी. एन. पाण्डेय
विभागाध्यक्ष वनस्पति विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. विजय शंकर वर्मा
आचार्य गणित विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

प्रो. रवि प्रकाश
एमेरिटस प्रोफेसर, रोहतक

शोध–पत्र :

1. डॉ. सी. बी. तिवारी
सहा. आचार्य, एस.एम.डी., जलालपुर, बिहार

2. आर. के. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी, गोरखपुर

3. एस. पी. उपाध्याय
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी, गोरखपुर

4. डॉ. चन्द्रकला लम्बोड
एम.डी. विश्वविद्यालय, रोहतक, हरियाणा

5. आम्रपाली वर्मा
महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

6. डॉ. वी. पी. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी, गोरखपुर

7. डॉ. दीपक बिशला
आई.टी. हेड, अम्बेडकर विश्वविद्यालय, नई दिल्ली

संचालन/समन्यवक :

डा. शिव कुमार
सहा. आचार्य, प्राणि विज्ञान, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. ओ.पी. पाण्डेय
विभागाध्यक्ष, रसायन विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. विजय कुमार
आचार्य गणित विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. यू. बी. सिंह
सहा. आचार्य, भौतिकी विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

शोध–पत्र :

1. डॉ. संजय कुमार विश्वकर्मा
बायोटेक्नोलोजी, मो. हुसैन महाविद्यालय, जौनपुर

2. डॉ. शिवांगी राव
फारेन्सिक सांइस, बी.एस.बी.ए. विश्वविद्यालय, लखनऊ

3. डॉ. स्मिता पूरी
रीजिनल ऐग्रीकल्चरल रिसर्च स्टेशन, सागर

4. डॉ. वन्दना सिंह
वर्मी बायोटेक्नोलोजी लैब, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

5. डॉ. योगेन्द्र कुमार
वर्मी बायोटेक्नोलोजी लैब, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

6. डॉ. संजय द्विवेदी
सी.एस.आई.आर., लखनऊ

संचालन/समन्यवक :

डा. अभिषेक वर्मा
सहा. आचार्य भौतिकी, महाराणा प्रताप पी.जी. कालेज

3rd Technical Session

(Date 02nd February, Time 09:00 AM-10:30 AM)

I – Jagat Janani Sita Sabhagar

President:

Prof. V.N. Pandey
H.O.D. Botany, Deen Dayal Upadhyay University, Gorakhpur.

Subject Specialist :

Prof. Vijay Shankar Verma
Mathematics Dept. Deen Dayal Upadhyay University, Gorakhpur.

Prof. Ravi Prakash
Emeritus Prof., Rohtak

Research Paper Presentation:

1. Dr. C.B. Tiwari
Assitt. Prof. Zoology, SMD, Jalalpur, Bihar

2. R.K. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi, Gorakhpur

3. S.P. Upadhyay
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi, Gorakhpur

4. Dr. Chandrakala Lambhod
M.D. University, Rohtak, Haryana

5. Amrapali Verma
Asstt. Prof., Maharana Pratap P.G. College, Jungle Dhusar, Gorakhpur

6. Dr. V.P. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi, Gorakhpur

7. Dr. Deepak Bishla
IT Head, Ambedkar University, New Delhi

Coordinator :
Dr. Shiv Kumar
Asst. Professor, Zoology, Maharana Pratap P.G. College

II – Sri Ram Sabhagar

President:

Prof. O.P. Pandey
H.O.D., Chemistry Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Subject Specialist :

Prof. Vijay Kumar
Mathematics Dept. Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Dr. U.B. Singh
Asst. Prof., Physics Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Research Paper Presentation:

1. Dr. Sanjay Kumar Vishwakarma
Bio-Technology Mohd. Hussain P.G. College Jaunpur

2. Dr. Shivangi Rao
Forensic science Baba Saheb Bheemrao Ambedkar University, Lucknow.

3. Dr. Smita Puri
Regional Agricultural Research Station, Sagar

4. Dr. Vandana Singh
Vermi Biotechnology Lab, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

5. Dr. Yogendra Kumar
Vermi Biotechnology Lab, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

6. Sanjay Dwivedi
CSIR, Lucknow

Coordinator :
Dr. Abhishek Verma
Asst. Professor, Physics, Maharana Pratap P.G. College

चतुर्थ तकनीकी सत्र

(दिनांक 02 फरवरी, समय– पूर्वाह्न 11:00 से 01:00)

I – जगत जननी सीता सभागार

अध्यक्ष :

प्रो. अजय सिंह
विभागाध्यक्ष प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

डॉ. केशव सिंह
सह आचार्य प्राणि विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

प्रो. एस.सी. लखोटिया
साइटोजेनिटिक लेब्रोटेरी, बी.एच.यू. वाराणसी

शोध–पत्र :

1. डॉ. अन्नु सिंह
माइकोपेथोलोजी लैब, झांसी

2. डॉ. अनुपमा श्रीवास्तवा
सहा. आचार्य, गणित, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

3. डॉ.चन्द्रभूषण तिवारी
सहा. आचार्य, प्राणि विज्ञान, गोपालगंज

4. डॉ.डी. के गौड़
सी.एम.पी. महाविद्यालय, इलाहाबाद

5. डॉ. दीपक कुमार भारती
वर्मी बायोटेक्नोलोजी लैब, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

6. डॉ. कुसुमलता सिंह
सहा. आचार्य, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

7. डॉ. मनमोहन कृष्ण उपाध्याय
राजकीय महाविद्यालय, कुशीनगर

संचालन/समन्यवक :

डा. अखिलेश गुप्त
सहा. आचार्य वनस्पति, महाराणा प्रताप पी.जी. कालेज

II – श्री राम सभागार

अध्यक्ष :

प्रो. दिनेश यादव
विभागाध्यक्ष, बायोटेक्नोनोलॉजी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

विषय विशेषज्ञ :

प्रो. अनिल द्विवेदी
आचार्य, वनस्पति विज्ञान विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

डॉ. अभय कुमार श्रीवास्तव
विभागाध्यक्ष, वनस्पति विज्ञान विभाग, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

शोध–पत्र :

1. डॉ. एस.के. बर्नवाल
विभागाध्यक्ष, रसायन विभाग, महाराणा प्रताप पी.जी. कालेज, जंगल धूसड़, गोरखपुर

2. ए.के. सिंह
महायोगी गोरक्षनाथ कृषि विज्ञान केन्द्र, चौकमाफी

3. डॉ. ममता सिंह
वैज्ञानिक प्लान्ट ब्रिडींग एण्ड जेनेटिक्स

4. डॉ. आशुतोष पाण्डेय
सी.एस.आई.आर., राष्ट्रीय वनस्पति अनुसंधान संस्थान, लखनऊ

5. डॉ. एम.के. उपाध्याय
राजकीय महाविद्यालय, हाटा, कुशीनगर

6. डॉ. दिलप्रीत कौर
राजकीय महाविद्यालय, हाटा, कुशीनगर

7. डॉ. दीपा श्रीवास्तव
सहा. आचार्य, वनस्पति विज्ञान, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

संचालन/समन्यवक :

डा. नवनीत कुमार
सहा. आचार्य, प्राणि विज्ञान, महाराणा प्रताप पी.जी. कॉलेज, जंगल धूसड़, गोरखपुर

4th Technical Session

(Date 02nd February, Time 11:00 AM-01:00 PM)

I – Jagat Janani Sita Sabhagar

President:

Prof. Ajay Singh
H.O.D. Zoology, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Subject Specialist :

Dr. Keshav Singh
Asso.Prof. Zoology Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Prof. S.C. Lakhotia
Cytogenetic Laboratory, BHU Varanasi

Research Paper Presentation:

1. Dr. Anu Singh
Mycopathology Lab, Jhansi

2. Dr. Anupama Srivastava
Asst. Prof., Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

3. Dr. Chandra Bhusan Tiwari
Asst. Prof. Zoology, Gopalganj.

4. Dr. D.K. Gond
CMP Degree College, Allahabad

5. Dr. Deepak Kumar Bhartiya
Vermi Biotechnology Lab, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

6. Dr. Kusum Lata Singh
Asst. Prof., Statistics, Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

7. Dr. Manmohan Krishna Upadhyay
Govt. Degree College, Kushinagar

Coordinator :
Dr. Akhilesh Gupta
Asst. Professor, Botany, Maharana Pratap P.G. College

II – Sri Ram Sabhagar

President:

Prof. Dinesh Yadav
H.O.D., Biotechnology, Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Subject Specialist :

Prof. Anil Diwedi
Botany Dept., Deen Dayal Upadhyay Gorakhpur University, Gorakhpur.

Dr. Abhay Kumar Srivastav
H.O.D. Botany, Maharana Pratap P.G. College, Jungle Dhusan, Gorakhpur.

Research Paper Presentation:

1. Dr. S.K. Vernwal
H.O.D., Chemistry, Maharna Pratap P.G. College, Jungle Dhusar, Gorakhpur

2. A.K. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi

3. Dr. Mamta Singh
Scientist, Plant Breeding & Genitcs

4. Dr. Ashutosh Pandey
CSIR, National Botanical Research Institute, Lucknow

5. Dr. M.K. Upadhyay
Govt. Degree College Hata, Kushinagar

6. Dr. Dilpreet Kaur
Govt. Degree College Hata, kushinagar

7. Dr. Deepa Srivastava
Asst. Prof., Botany, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Coordinator :
Dr. Navneet Kumar
Deptt. of Zoology, Maharan Pratap P.G. College, Jungle Dhusan, Gorakhpur

विशेष व्याख्यान

दिनांक 01 फरवरी, 2019 दोपहर 12.45 से 01.30 बजे
जगत जननी सीता सभागार

अध्यक्षता : **प्रो. सुग्रीव नाथ तिवारी**
पूर्व विभागाध्यक्ष, भौतिक विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

मुख्य वक्ता : **प्रो. कमान सिंह**
विभागाध्यक्ष, रसायन विज्ञान विभाग, बाबा साहेब भीमराव आंबेडकर केन्द्रीय विश्वविद्यालय, लखनऊ

दिनांक 02 फरवरी, 2019 दोपहर 12.45 से 01.30 बजे
जगत जननी सीता सभागार

अध्यक्षता : **प्रो. मालविका श्रीवास्तव**
विभागाध्यक्ष, माइक्रोबायोलोजी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

मुख्य वक्ता : **प्रो. राणा प्रताप सिंह**
संकायाध्यक्ष, अकादमिक अफेयर्स, बाबा साहेब भीमराव आंबेडकर केन्द्रीय विश्वविद्यालय, लखनऊ

SPECIAL LECTURE

01 February, 2019, 12:45 PM - 01:30 PM
Jagat Janani Sita Sabhagar

President : **Prof. Sugreeve Nath Tiwari**
Ex Head Physics Dept.
Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Chief Speaker : **Prof. Kaman Singh**
H.O.D Chemistry Dept., Baba Sahab Bhimrao Ambadekar Central University, Lucknow

02 February, 2019, 12:45 PM - 01:30 PM
Jagat Janani Sita Sabhagar

President : **Prof. Malavika Srivastava**
H.O.D., Microbiology,
Deen Dayal Upadhyay Gorakhpur University, Gorakhpur

Chief Speaker : **Prof. Rana Pratap SIngh**
Dean, Academic Affairs, Baba Sahab Bhimrao Ambadekar Central University, Lucknow.

AUTHOR INDEX

आधुनिक विश्व में वैदिक विज्ञान की प्रासंगिकता
(Relevance of Vedic Science in Modern World)

प्रो. डी.के. सिंह[1] एवं डॉ. भारती सिंह[2]

[1] पूर्व अध्यक्ष, प्राणि विज्ञान विभाग, पूर्व समन्वयक, पर्यावरण विज्ञान,
दीन दयाल उपाध्याय, गोरखपुर विश्वविद्यालय, गोरखपुर – 273009, उ.प्र.
ई–मेलः dksingh_gpu@yahoo.co.in मो.: 9454211574
[2]असिस्टेंट प्रोफेसर, हिन्दी विभाग, ज.अ.शा.इ. गर्ल्स पी.जी. कॉलेज, गोरखपुर
ई–मेलः bhartisingh1962@gmail.com मो.: 9454211575

सामान्यतया यह माना जाता है कि, विश्व का पहला ग्रन्थ वेद है। वेद ही समस्त धर्मों का मूल है – हजारों वर्ष पहले ऋषि–महर्षियों ने व्यक्ति व समाज के आचरण और पारस्परिक सम्बन्धों के लिए जो विधान बनाया है उसके मूल तत्व अपरिवर्तनीय हैं। वेदों के नियम स्वाभाविक एवं सांस्कृतिक हैं। विद्वानों ने ऋग्वेद को ज्ञान, यजुर्वेद को कर्म, सामवेद को उपासना और अथर्ववेद को आध्यात्म का विवेचन करने वाला माना है। वेदों का मूल विषय "सृष्टि विज्ञान" है। वेदों में सृष्टि का प्रारम्भ कैसे हुआ, इसका विस्तार किस प्रकार हुआ, इसके संचालन के नियम क्या हैं, इस विधान में मनुष्य का क्या स्थान और कर्तव्य हैं? इसे वेदों में विस्तार से भाव संगत ढंग से उल्लेखित किया गया है।

वेदों पर अनेक भाष्य लिखे गये हैं और उनमें काफी मतभेद भी हैं। प्राचीन विद्वानों में केवल 'सायणाचार्य' ही ऐसे हैं, जिनके चारों वेदों के भाष्य पूर्ण रूप में मिल सकते हैं। जिनका आधार लेकर ही देश–विदेश के विद्वानों ने वेद सम्बन्धी आधुनिक साहित्य की रचना की है। वेदों के अधिकांश मंत्रों के आधिभौतिक, आधिदैविक और आध्यात्मिक अर्थ होते हैं, जिनको हम स्थूल, सूक्ष्म और कारण रूप भी कह सकते हैं। स्थूल में वाह्य कर्मकाण्ड, पूजा, उपासना, प्रार्थना, शिक्षा आदि का समावेश होता है। प्रत्येक सूक्ष्म से सूक्ष्म कार्य के वैज्ञानिक रहस्य प्रकट होते हैं। कारण – रूप का अर्थ सबसे अधिक गूढ़ है, क्योंकि बिना आत्मज्ञान के वह भली प्रकार हृदयंगम नहीं हो सकता। शाप, वरदान, अणिमा, महिमा, लघिमा आदि अष्ट–सिद्धियाँ इत्यादि कारण शक्ति के अन्तर्गत् आते हैं।

वैदिक परम्परा का आधार पूर्ण ज्ञान का उपयोग प्रयोगात्मक रूप में करके ब्रह्माणीय यथार्थ से परिचित होना है। वेदों में भाव पूर्ण ज्ञान, जो मनुष्यों को किस प्रकार से इस ब्रह्माण्ड

में रहना है, का आदेश प्रदान करता है। वेदों में उल्लेखित इन्हीं ज्ञान के आधार पर हमारे ऋषि–महर्षियों ने बहुत से ब्रह्माण्डीय रहस्यों को आज के परिप्रेक्ष्य में हजारों वर्ष पूर्व ही उद्घाटित कर दिया था।

पांचवीं शताब्दी के महान गणितज्ञ, भौतक शास्त्री एवं खगोल वैज्ञानिक **'आर्यभट्ट'** ने गणित की पुस्तक 'आर्यभट्टीय' लिखा, जिसमें सर्वप्रथम उन्होंने दशमलव और शून्य का ज्ञान पूरे विश्व को दिया। आर्यभट्ट ने ही सर्वप्रथम पृथ्वी और चन्द्रमा के बीच की दूरी वैदिक खगोलीय ज्ञान के आधार पर बताया। पृथ्वी के अपनी धुरी पर घूर्णन करने की बात आर्यभट्ट ने यूरोपियन वैज्ञानिक निकोलस कोपरनिकस से हजारों वर्ष पूर्व ही बता दिया था।

वैशिष्यका दर्शन विद्यालय के वैज्ञानिक **'कणाद'** छठीं शताब्दी में ही वैदिक ज्ञान के आधार पर परमाणु के बारे में, आधुनिक परमाणु सिद्धान्त के जनक 'जॉन डाल्टन' से 900 वर्ष पूर्व ही विश्व को परमाणु सिद्धान्त से अवगत करा दिया था। इसके अतिरिक्त कणाद ने गति के तीनों नियमों का प्रतिवादन न्यूटन से हजारों वर्ष पूर्व ही कर दिया था।

1. गति का प्रथम नियम

कणाद – वेगः निमित्त विशेषात् कर्मणो जायते।

न्यूटन – The change of motion is due to impressed force.

2. गति का द्वितीय नियम

कणाद – वेग निमित्तापेक्षात् कर्मणो जायते नियत्दिक् क्रिया प्रबन्ध हेतु।

न्यूटन – The change of motion is proportional to the motive force impressed and is made in the direction of the right line in which the force is impressed.

3. गति का तृतीय नियम

कणाद – वेगः संयोग विशेषाविरोधी।

न्यूटन – To every action there is always equal and opposite reaction.

वैदिक वैज्ञानिक **'बोधायन'** ने सर्वप्रथम पाई के मूल्य को बतलाया और इससे किसी वृत्त की परिधि को कैसे निकाला जाये उससे विश्व को अवगत कराया। बोधायन ने अपनी पुस्तक **'शुल्वसूत्र'** में पाईथागोरस के प्रमेय को पाईथागोरस से 250 वर्ष पूर्व ही प्रतिवादित कर दिया था।

दीर्घचतुरश्रस्यक्ष्णया रज्जुः पार्श्वमानी तिर्यग्मानी।
च यत् पृथग भूते कुरूतस्त दुभयं करोति।।

Pythagoras' theorem: The square of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the other two sides.

बारहवीं शताब्दी के वैज्ञानिक **'भास्कराचार्य'** ने अपनी पुस्तक **'सिद्धान्त शिरोमणि'** में अंकगणित, बीजगणित, गोल अध्याय और ग्रहों के गणित के बारे में विस्तार से पूरे विश्व को बतलाया। अपनी पुस्तक **'कर्म कौतुहल'** में सूर्य एवं चन्द्र ग्रहण का ज्ञान दिया। आज भी हिन्दू पंचांग को यह पुस्तक वैदिक गणनाओं के आधार पर प्रतिवादित करती है। गुरूत्वाकर्षण के रहस्य को न्यूटन से काफी पहले ही वेदों में उल्लिखित किया जा चुका है। (ऋग्वेद–10.149. 1, 8.12.28, 1.6.5, 8.12.30, 1.35.9, 1.63.13 एवं यर्जुवेदः 33.43)

वैदिक शल्यक **'सूश्रुत'** ने शल्य क्रिया का आरम्भ 2600 वर्ष पूर्व ही किया था। जबकि आधुनिक शल्यकीय का पूरा इतिहास ही मात्र 400 वर्ष पूर्व का है। **'सूश्रुत संहिता'** में 1100 प्रकार की व्याधियों का उल्लेख है। लगभग 760 पौधों का प्रयोग विभिन्न व्याधियों के निदान में किया गया है। सूश्रुत संहिता में सर्वप्रथम प्लास्टिक एवं नेत्र शल्यकीय का विवरण आता है। इस संहिता में 110 प्रकार के चिकित्सकीय उपकरणों का वर्णन किया गया है, जिनका उपयोग विभिन्न प्रकार की शल्यकीय में किया जाता रहा है।

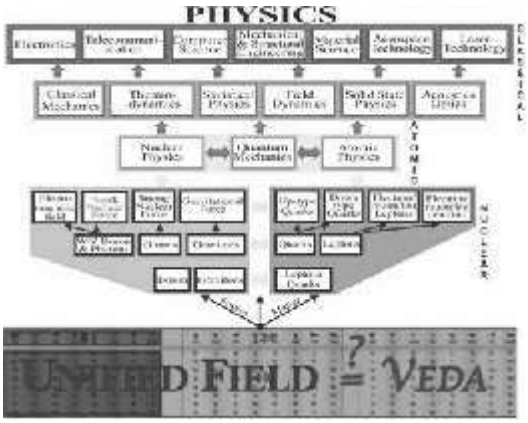
आयुर्वेदाचार्य **'महर्षि चरक'** को भारतीय औषधि विज्ञान का पिता माना जाता है। आज से लगभग 2500 वर्ष पूर्व चरक ने वेदों में वर्णित औषधीय पौधों के प्रयोग से बहुत सी व्याधियों का निवारण किया है। **'चरक संहिता'** में औषधीय पौधों का प्रयोग गोमूत्र, दही इत्यादि के साथ वर्णित है। चरक ने सर्वप्रथम पाचन, चयापचय व शरीर प्रतिरोधक क्षमता के बारे में त्रिदोष – पित्त, कफ़ एवं वायु के संतुलन के आधार पर समझाया है।

'पतंजलि' ने वैदिक ज्ञान के आधार पर सर्वप्रथम क्रमबद्ध विधि से योग विज्ञान के ज्ञान को प्रतिपादित किया है। पतंजलि ने विचार, भावना और इच्छा को समाप्त कर, एक साम्य की

स्थिति 'चित्त' को परिभाषित किया। भौतिक एवं मानसिक योग को क्रमशः हठ योग एवं राज योग के रूप में उल्लेखित किया है। यौगिक क्रियाओं में ब्रह्मण्डीय स्वर 'ओम' का भी प्रयोग अपने योग विज्ञान में किया।

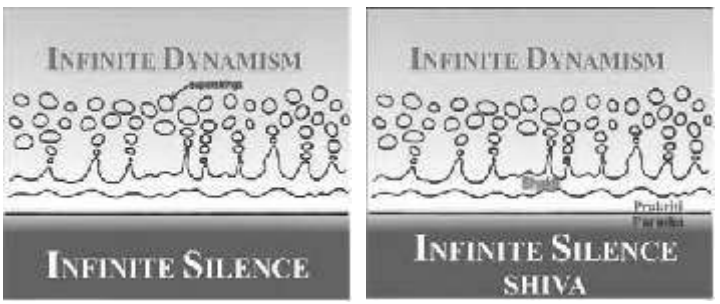
सूक्ष्माणु से परमाणु तक सृष्टि सृजनः—

सृष्टि का सृजन कैसे, कब और किस प्रकार से हुआ। इसके बारे में भौतिकी की आधुनिक **'यूनिफाइड फील्ड सिद्धान्त'** (क्वांटम मैकेनिक्स और फील्ड थ्यौरी) द्वारा प्रतिपादित किया गया है। ऋग्वेद में सृष्टि के सृजन, विकास को प्राकृतिक तथ्यों के प्रयोग से स्थापित करने का ज्ञान आज से हजारों वर्ष पूर्व ही कर लिया गया था। सृजन का वैदिक ज्ञान वास्तव में प्रकृति के आधारभूत नियम ही हैं और इन्हीं नियमों से सृष्टि का सृजन हुआ है।



भौतिकी की यूनिफाइड फील्ड थ्यौरी, सृष्टि के सृजन की व्याख्या तीन स्तरों में करती है। उसके अनुसार सृष्टि में जो भी दृश्य पदार्थ हैं, उन्हें हम पारम्परिक भौतिकी (क्लासिकल फिज़िक्स) में रखते हैं। दृश्य पदार्थ आने के पहले पदार्थ परमाणु स्तर पर होता है। जिसे हम परमाणु भौतिकी (एटॉमिक फिजिक्स) के अन्तर्गत् रखते हैं। इससे भी गहन स्तर पर हम नाभिकीय (न्यूक्लियर) स्तर के अध्ययन को न्यूक्लियर भौतिकी के अन्तर्गत् रखते हैं। इस प्रकार हम कह सकते हैं कि, सृष्टि में जो भी दृश्य भौतिक वस्तुएं हैं वे बहुत ही क्रमबद्ध एवं सुनियोजित ढ़ंग से व्यवस्थित होकर बनी हैं। विगत पचास वर्षों में सृष्टि सृजन के बारे में यूनिफाइड फील्ड सिद्धान्त सर्वमान्य सिद्धान्त है। ऋग्वेद में सृष्टि सृजन की मूलभूत अवधारणा में प्राकृतिक तत्वों को देवभाव से दर्शाया गया है। जबकि भौतिक विज्ञान उन्हें पार्टिकल एवं शक्ति के संयोग से परिभाषित करता है।

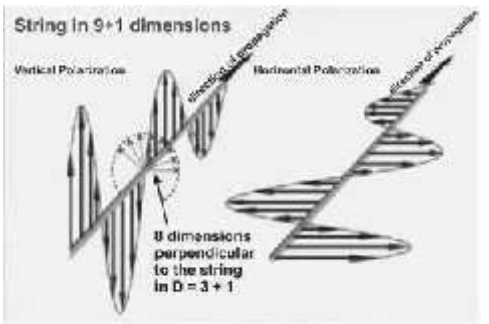
सृष्टि सृजन की अवधारणा को यदि भौतिकी के यूनिफाइड फील्ड सिद्धान्त एवं वेदों में दिये गये सूक्तों/ऋचाओं को देखा जाए तो वास्तव में दोनों एक से ही प्रतीत होते हैं। दोनों एक ही लक्ष्य – सृष्टि सृजन को विभिन्न प्रकार से परिभाषित करते हैं। वैदिक सृष्टि सृजन एवं यूनिफाईड फील्ड सिद्धान्त वास्तव में दो बीज हैं। जिन्हें अलग–अलग यदि भूमि में रोपित किया जाये तो एक से संतरे का वृक्ष (यूनिफाइड फील्ड सिद्धान्त) विकसित होगा तथा दूसरे से नींबू का वृक्ष (वैदिक विज्ञान) विकसित होगा। दोनों फलों के रासायनिक अवयव एक ही हैं अर्थात् सृष्टि सृजन। दोनों का लक्ष्य एक ही है परन्तु मार्ग अलग–अलग हैं। एक का आधार बौद्धिक भौतिकी एवं गणित है तो दूसरे का भाव प्रधान अनुभव है।



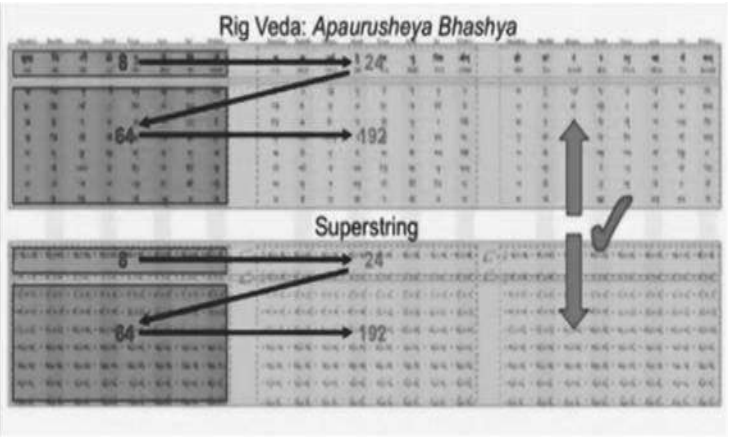
सृष्टि सृजन में यूनिफाइड फील्ड सिद्धान्त के अनुसार अनन्त शांति के अपरिवर्तनशील क्षेत्र, जिसमें सृजन की अपार, असीमित संभावनाएं हैं। जिससे गतिशील एवं प्रतिक्षण परिवर्तनशील रचना एक रबर स्ट्रिंग के रूप में उत्पन्न होती है। जिसे सुपरस्ट्रिंग कहते हैं। वैदिक विज्ञान के अनुसार अपरोक्ष अनंत शांति के क्षेत्र 'शिव' (पुरूष तत्व) से परिवर्तनशील शक्ति (प्रकृति) की रचना होती है। यूनिफाइड फील्ड से जो परिवर्तनशील उर्जा निकलती है वह पांच प्रकार की स्पिन होती हैं – ग्रेविटॉन, ग्रेविटेशन, फोर्स, मैटर एवं हिग्स जो तीन सुपरफील्ड के विभिन्न संयोग से बनते हैं। उसी प्रकार वैदिक विज्ञान के अनुसार सृष्टि सृजन में सभी भौतिक पदार्थ पांच महाभूतों – आकाश, वायु, तेजस, जल एवं पृथ्वी के द्वारा जो तीन दोषों वात, पित्त और कफ़ के विभिन्न संयोग से उत्पन्न होता है। भौतिक विज्ञान एवं वैदिक विज्ञान दोनों पांच से तीन और तीन से पांच की एक ही प्रकार की सृजन की परम्परा को प्रदर्शित करते हैं।

भौतिक वैज्ञानिकों के आधार पर परमाणु के केन्द्र में आवेशरहित न्यूट्रान एवं धनात्मक आवेश युक्त प्रोटॉन होते हैं और उनके चारों ओर विभिन्न कक्षाओं में ऋणात्मक आवेश युक्त इलेक्ट्रॉन होते हैं। प्रत्येक तत्व के परमाणुओं में इनकी संख्या अलग–अलग होती है। आधुनिक खोजों ने अब यह गणितीय गणनाओं के आधार पर स्थापित किया है कि परमाणु के सूक्ष्माणु (सब एटॉमिक पार्टिकल्स) आधारभूत पार्टिकल – फेरियॉन (क्वार्क, हाईड्रॉन, बेरियॉन, मेसॉन);

लेप्टॉन (न्यूट्रिआनो, टाउ, म्यूयॉन, इलेक्ट्रॉन) हैं। बलशक्ति क्षेत्र विभिन्न बोसॉनों के रूप में मुख्यतः – फोटॉन (इलेक्ट्रोमैग्नेटिक फोर्स), डब्लू/जे बोसॉन (कमजोर नाभिकीय बल), ग्लूऑन (शक्तिशाली नाभिकीय बल), ग्रेविटॉन (गुरूत्वाकर्षणीय बल)। पार्टिकल को वेदों में पुरूष तत्व और बल क्षेत्र को प्रकृति (शक्ति) कहा गया है। वास्तव में सूक्ष्माणु उनके क्षेत्र में अधिक उर्जा देने से उत्पन्न होते हैं जो स्ट्रिंग के रूप में अत्यन्त सूक्ष्म आकार के पारलौकिक रचनायें होती हैं। इन सूक्ष्माणुओं में द्रव्यमान हिग्स बल क्षेत्र में जाने से आता है। हिग्स बल क्षेत्र पूरे ब्रह्माण्ड में हर जगह एक समान होता है। सूक्ष्माणु पदार्थ स्ट्रिंग के रूप में दस आयामों (9+1समय) में दोलन करते हैं।



यूनिफाइड फील्ड सिद्धान्त के अनुसार दस आयामों में गति करने वाले सूक्ष्माणु आठ आवृत्त (टोन) में दोलन करते हैं। जब ये स्ट्रिंग कायांतरण करके बोसॉनिक स्ट्रिंग में बदलता है तो यह 26 आयामों एवं 24 आवृत्तियों में दोलन करने लगता है। जो अगले बदलाव स्वतंत्र फेरिऑनिक स्ट्रिंग में 4 आयामों एवं 64 आवृत्तियों में दोलन करने लगता है। अंत में आकाश, समय के संघनीकरण में 192 आवृत्तियों में दोलन करते हुए दृश्य भौतिक रूप में आता है।



महर्षि महेश योगी रचित 'अपौरूषेय भाष्य' में दर्शाया गया है कि, ऋग्वेद सृष्टि की रचना का मूलभूत आधार है और एक क्रमबद्ध योजना के अन्तर्गत् परिभाषित है। ऋग्वेद के प्रथम अक्षर 'अ' में ही पूरे सृष्टि की रचना समाहित है। जो 1 अव्यक्त 'अ' और 191 सूक्त अर्थात् कुल 192 सूक्तों में प्रथम मण्डल में व्यक्त है। प्रथम सूक्त के प्रथम ऋचा में 'अग्निम्' सम्पूर्णता को समाहित किये हुये विभिन्न क्रमों में सृष्टि रचना के रहस्य को उजागिर करता है। प्रत्येक व्याख्या के स्तर बदलाव की क्रियाविधि का उनके आने वाले ऋचाओं के बीच जगहों में प्रदर्शित होते हैं। प्रथम ऋचा की विस्तृत व्याख्या कुल 8 ऋचाओं के 24 पदों में की गई हैं। 2 से 9 ऋचाओं में 192 रिक्त स्थानों में 192 व्याख्याओं को प्रथम मण्डल के 192 सूक्तों में विस्तार पूर्वक दिया गया है। 192 रिक्तियां जो 192 सूक्त प्रथम मण्डल में हैं उनकी दसवें मण्डल में 192 सूक्तों में व्यख्या की गई है। इसके अतिरिक्त ऋग्वेद के प्रथम मण्डल 2 से 9 सूक्तों को 2 से 9वें मण्डल में क्रमबद्ध तरीके से व्याख्या की गई है। ऋग्वेद में 8, 24, 64 एवं 192 की संख्या जो सृष्टि की रचना में प्रथम मण्डल के प्रथम सूक्तों की व्याख्या की गई है, यह भौतिक विज्ञान के सूक्ष्माणु के सुपर स्ट्रिंग के विभिन्न आयामों में आवृत्ति के ठीक बराबर है, जो यह सिद्ध करते हैं कि, विज्ञान के सृष्टि सृजन की यूनिफाइड फील्ड सिद्धान्त वेद की सृष्टि सृजन व्याख्या एक ही है।

परमाणु से विभु बननाः

विभिन्न प्रकार के परमाणुओं का बनना सृष्टि सृजन में भौतिक पदार्थों के अस्तित्व में आने को दर्शाता है। भौतिक वैज्ञानिक इसे स्थूल पदार्थ के रूप में परिभाषित करेंगे, परन्तु परमाणु भी अपने आप में न तो अंतिम सत्य है और न ही स्थिर हैं। मुख्य रूप से उसमें दो भौतिक शक्तियाँ – ऋण आवेशित इलेक्ट्रॉन एवं धन आवेशित प्रोटॉन गतिशील रहते हैं। ये दोनों शक्तिमय होने पर भी भौतिक माने जाते हैं। परमाणु की स्थिरता परमाणु में उपस्थित अनावेशित न्यूट्रॉन कणों की उपस्थिति के कारण भ्रम जैसी जान पड़ती है। प्रोटॉन एवं न्यूट्रॉन परमाणु के नाभिक में होते हैं। जिन्हें वैदिक ग्रन्थों में 'संगाणु' तथा 'कर्षाणु' कहा गया है। विभिन्न तत्वों के परमाणुओं के इस सूक्ष्म शक्ति को देवियों की शक्ति कहा गया है। वैदिक दर्शन में एक ही ईश्वर की कल्पना की गई है –

विश्वतश्चक्षुरूत – विश्वतो मुखो विश्वतोबाहुरूत विश्वतस्पात्।
सं वाहुभ्यां धमति सं पतत्रैर्धावा भूमी जनयन देव एकः।।... ऋग्वेद 10.81.3

अर्थात्, एक ही परमात्मा पूरे विश्व को उत्पन्न करता, देखता एवं चलाता है। उसकी शक्ति सर्वत्र समायी हुई है। वही परमशक्तिमान और सबको कर्मानुसार फल देने वाला है।

अर्थात् परमात्मा अंश सृष्टि के कण–कण में विद्यमान् है।

सामान्यतः जीवन की उत्पत्ति ही चेतन संसार की अभिव्यक्ति को प्रदर्शित करती है। जीवन की उत्पत्ति के बारे में आधुनिक वैज्ञानिक, विशेषकर रूसी वैज्ञानिक ए.ई. ओपेरिन का मानना है कि आदि सागर के जल में न्यूक्लियोप्रोटीन्स के वायरस जैसे कण के रूप में, आज से अनुमानतः चार अरब वर्ष पूर्व हुआ। जीवन की उत्पत्ति समुद्र में हुई, इस बात की पुष्टि ऋग्वेद के सूक्त 1.163.1 में हजारों वर्ष पूर्व ही बताई जा चुकी है।

यद क्रन्दः प्रथमं जायमान उधन्त्समुद्रादुत वा पुरीषात।
श्येनस्य पक्षा हरिणस्य बाहू उपस्तुत्यं महि जात ते अर्वन।।

अर्थात्, हे अर्वन (चंचल गति वाले) बाज के पंखों तथा हिरन के पैरों की तरह गतिशील आप जब प्रथम समुद्र में उत्पन्न हुये.....। जीवन की उत्पत्ति न्यूक्लिक एसिड (डी.एन.ए.) के प्रारम्भिक समुद्र में बनने से हुई, जो प्रथम कोशिका के रूप में उत्पन्न हुआ। उस डी.एन.ए. में द्विगुणन के कारण एक से अनेकों कोशिकाओं का निर्माण हुआ जिससे पृथ्वी पर जीवन प्रारम्भ हुआ। उपरोक्त वैदिक श्लोक में चंचलता डी.एन.ए. के द्विगुणन प्रक्रिया को ही दर्शाता है। यह जो चंचल प्रकृति की द्विगुणन प्रक्रिया कोशिका में प्रारम्भ हुई वह तीन बन्धनोंयुक्त है, जो न्यूक्लियोटाईड के बीच के तीन हाईड्रोजन बन्ध को दर्शाता है।

त्रीणि त आहुर्दिवि बन्धनानि त्रीण्यप्सु त्रीण्यन्तः समुद्रे।
उतेव में वरूणश्छन्स्यर्वन्यत्रा त आहुः परमं जनित्रम्।।.... ऋग्वेद 1.163.4

वैदिक विज्ञान डी.एन.ए. को 'तवश्ता' और 'विवस्वत्' कहा गया है। वैदिक वैज्ञानिक वैदिक सभ्यता में पाये गये उद्धरणों में मछली के आकार की रचना को कोशिका, 'यू' आकार की रचना को क्रोमोसोम एवं सीढ़ीनुमा रचना को डी.एन.ए. बतलाते हैं। विष्णु के दसअवतार विभिन्न प्रकार के दस डी.एन.ए. को प्रदर्शित करते हैं। प्रकाश और ध्वनि का डी.एन.ए. अणुओं के उत्परिवर्तन पर प्रभाव, वैदिक विज्ञान में दिये गये तथ्यों को अधिक बल देते हैं कि मनुष्य के शरीर पर प्रकाश और ध्वनि का प्रभाव पड़ता है। वैदिक विज्ञान में कुण्डलिनी जागरण की प्रक्रिया इस विज्ञान का सर्वोत्तम उदाहरण है। जिसमें सूर्य के प्रकाश के सात रंगों के ध्यान और विभिन्न अक्षरों के उच्चारण से उर्जा के उर्ध्वगमन को नियंत्रण किया जाता है, जिससे पारलौकिक अनुभव प्राप्त होता है।

प्रकाश संश्लेषण की प्रक्रिया के बारे में आधुनिक विज्ञान यह कहता है कि, सूर्य के प्रकाश, जल एवं कार्बनडाई आक्साईड से पौधों में उपस्थित क्लोरोफिल भोजन एवं आक्सीज़न बनाते हैं। इस प्रक्रिया को सर्वप्रथम जोसेफ़ प्रिस्टले, माल्विन केल्विन एवं राबर्ट हिल ने

बतलाया। परन्तु ऋग्वेद में इस प्रक्रिया का उल्लेख पूर्व में ही किया जा चुका है –

इह ब्रवीतु य ईमङ्ग वेदास्य वामस्य निहिंत पंदै वेः।
शीर्ष्णः क्षीरं दुहते गावो अस्य वव्रिं वसाना उदकं पदापुः।।... ऋग्वेद 1.164.7

अर्थात्, जो सूर्य के उत्पत्ति स्थान को जानते हैं (प्रकाश की किरण) वे उन्हें धारण कर पानी का दोहन करती हैं (बरसाती हैं) वे ही तेजस्वी होकर निचले भागों से जल को सोखती हैं।

जीवन एक कोशिकीय जीव से होते हुए बहु कोशिकीय जीव में प्रदर्शित होता है। आधुनिक विज्ञान के अनुसार यदि हम उदाहरण स्वरूप मनुष्य शरीर को ही लें तो पायेंगे कि मनुष्य का शरीर करीब 220 प्रकार की 10^{14} कोशिकाओं का बना होता है। इन सभी कोशिकाओं में एक संयुक्त उच्च श्रेणी का समन्वय एवं एकीकरण होता है। यह प्रक्रिया मस्तिष्क से लेकर पूरे शरीर में फैले हुए कोशिका सिग्नलिंग विधि द्वारा होता है। बहुत से कोशिका संकेतांक मनुष्य के भ्रूणीय अवस्था से पूर्णतया वयस्क होने तक कार्य करते हैं। यह कार्य अनवरत पूर्ण जीवनकाल तक चलता है और शरीर के सभी क्रिया विज्ञान को नियंत्रित रखता है। ऋग्वेद में प्राकृतिक नियमों का संचालन स्वतः एकीकरण एवं समन्यवित संकेत जो डी.एन.ए. द्वारा संचालित एवं संपादित होता है वह आधुनिक विज्ञान के कोशिका सिग्नलिंग विधि के समकक्ष है। मनुष्य के पूरे शरीर में ही पूरा ब्रह्माण्ड समाया हुआ है। परमात्मा का अंश मनुष्य के भीतर ही है। श्रीमद् भागवत गीता जो वास्तव में वेदों का ही विस्तार है में श्रीकृष्ण ने कहा है कि – पूरी सृष्टि में मृत्यु और जन्म मुझमें ही समाहित है। यदि इस दृष्टि से देखा जाए तो जन्म–मरण की प्रक्रिया हमारे शरीर में स्टेम सेल कोशिका और एपोप्टॉटिक कोशिका के अनवरत क्रिया द्वारा प्रदर्शित होती है।

पदार्थ का परमाणु हमें सूक्ष्म से सूक्ष्म सत्ता की शक्ति की अनुभूति तो करता है, परन्तु वह चेतन सत्ता की जानकारी नहीं देता है। भारतीय तत्ववेत्ताओं ने भी ऐसे ही चेतन परमाणु और उसके विभू नाभिक का पता लगाया है। इसे चेतन सत्ता को आत्मा अथवा ईश्वरीय प्रकाश के रूप में माना है और उसकी विस्तृत खोज की है। उपनिषद उसे – अणोरणीयान्महतो महीयानात्मा – अणु से अणु और महान से महान बताती है। यदि हम केवल मनुष्य शरीर की बात करें तो 10^{14} कोशिकायें जो लगभग 220 प्रकार की हैं, के प्रत्येक नाभिक में शक्ति है। प्रत्येक कोशिका का निर्माण असंख्य परमाणुओं और अणुओं से हुआ है। प्रत्येक परमाणु में भी नाभिक शक्ति है। इन छोटी सी ईकाई से पूरा शरीर बना है। यद्यपि विज्ञान आत्मा अथवा चेतना के अस्तित्व पर किसी निर्णय पर नहीं है, फिर भी ऐसा प्रतीत होता है कि, छोटी से छोटी इकाई

की नाभिक शक्ति का एकीकरण एवं समन्वय एक चेतना शक्ति के रूप में पूरे शरीर में प्रवाह करती है, वही चेतना आत्मा का प्रतिनिधित्व करती है।

पुराणों में वर्णित आत्मा या चेतना शरीर के जीर्ण होने पर नये शरीर को धारण करती है और इस तरह यह मरण और जन्म के चक्र में चेतन सत्ता अपने कर्मों के द्वारा संचित उर्जा के प्रभाव से जागृत होकर पारलौकिक क्षेत्र के विभिन्न उर्जा क्षेत्र में गमन कर सकती है। हिन्दू धर्म में मान्यताओं के अनुसार चौरासी लाख योनियों में जन्म के बाद ही मनुष्य जीवन का प्राप्त होना एक प्रकार से उर्जा संचयन करके चेतन शक्ति जब एक योनि से दूसरी योनि में होते हुये उर्जा के एक निश्चित स्तर तक पहुंचती है, तभी मनुष्य योनि में जन्म का द्वार खुलता है। वास्तव में इस ब्रह्माण्ड में उर्जा का संचयन और क्षय चेतन शक्ति के प्रवाह को उर्ध्वगामी और अधोगामी दिशा में ले जाता है।

लौकिक से पारलौकिक उर्जा प्रवाहः

विचार तरंगें पैदा करने वाले अतिउच्च उर्जा सम्पन्न कणों का संचय योग ध्यान–धारणा द्वारा सम्भव है। जिस देव शक्ति का हम ध्यान करेंगे उसी प्रकार की क्षमताओं वाले सूक्ष्म ओजस्वीकण व्यक्तित्व में संचित हो जायेंगे। ये चित्त शक्तियां वस्तुतः नाभिकीय चेतनायें हैं। इसका कारण क्यू–मेसॉन, न्यूट्रिनो और पाई–मेसान जैसे अत्यन्त सूक्ष्म कणों में से कोई भी हो सकता है, जिनको गैलेक्सी के चुम्बकीय क्षेत्र भी प्रभावित नहीं कर पाती हैं।

वेदों में टेलीपोरेशन की क्रिया का भी उल्लेख है। अर्थात् पदार्थ और उर्जा का एक स्थान से दूसरे स्थान तक गमन बिना उन स्थानों के बीच भौतिक स्थानों का गमन किये। इस कार्य हेतु मुख्य आठ सिद्धियाँ और दस द्वितीय सिद्धियों को बारे में लिखा गया है। उन्हीं में से एक सिद्धि मनोजावा अर्थात् टेलीपोरेशन है, जिसका वर्णन विष्णु सहस्त्रनाम में किया गया है।

मनोजवस्तीर्थकरो वसुरेताः वसु प्रदः।
वसुप्रदो वासुदेवो वसुर्व सुमना हवि।। 1.74.1

योग एवं ध्यान से मनुष्य पारलौकिक सिद्धियों की शक्ति प्राप्त कर सकता है एवं पूरे ब्रह्माण्ड में कहीं भी यात्रा कर सकता है। आधुनिक विज्ञान इस प्रक्रिया पर काफी शोध कर रहा है। नासा ने एक पार्टिकल 'टेकियान' के बारे में पता लगाया है, जो प्रकाश की गति से तेज चलता है और सम्भवतः मनोजावा पार्टिकल के समान है।

योग के बारे में वेदों में सामान्यतः भौतिक, मानसिक एवं आध्यात्मिक प्रयासों को समेकित करने की विधि बतलाई गई है, जो विभिन्न मार्गों से परिभाषित है, जैसे – हठयोग,

राजयोग, क्रियायोग इत्यादि। पतंजलि ने योग के आठ अंश – यम, नियम, आसन, प्राणायाम, प्रत्याहारा, धारण, ध्यान एवं समाधि बताये हैं। जिनके प्रयोग से आत्मा से परमात्मा के मिलन हेतु उर्जा प्रवाह बनता है। यदि हम भौतिकी एवं गणितीय गणनाओं के आधार पर देखें तो मस्तिष्क के तीन भाग वल्किरी, मध्यमा, पश्यन्त यह क्रमशः भौतिकी के पारम्परिक, परमाणविकी एवं न्यूक्लियर स्तर को परिभाषित करते हैं। जैसे–जैसे ध्यान गहन स्तर को जाता है, वे वाह्य स्तर से दूर पारलौकिक अनुभव में चला जाता है, जिसे हम आत्मिक आनंद कहते हैं। गणितीय गणनायें इन स्थितियों को प्रदर्शित करती हैं तथा उनके संकल्प के कारण निःसृत तथा विस्तृत होती हैं। ये गणनायें पूर्ण नम्बर से (1,2,3...) शून्य नम्बर (0), ऋणात्मक (–1, –2, –3.....), फ्रैक्शन्स (2/3), दशमलव (.1, .2, .3.....)..... इत्यादि। इन मस्तिष्क की गणितीय गणनाओं को भौतिकी के क्वांटम मेकेनिक्स से परिभाषित किया जा सकता है, जो विचारों को मस्तिष्क के गहन स्थिति में ले जाते हैं जिन्हें हम समाधि कहते हैं। समाधि की स्थिति परे है – जागने से, स्वप्न से एवं नींद से। यह पारलौकिक है, जिसे परिभाषित नहीं किया जा सकता।

अब यह एक स्थापित सत्य है कि, वैदिक योग और ध्यान से बहुत सी व्याधियां जैसे – हृदय रोग, रक्त दबाव एवं मानसिक स्थिति इत्यादि को ठीक किया जा सकता है। आधुनिक एलोपैथिक दवायें पारम्परिक भौतिकी या परमाणु स्तर तक ही शरीर में कार्य करती हैं। जबकि आयुर्वेदिक दवायें न्यूक्लियर/आत्मिक स्तर पर वात, पित्त और कफ़ को नियंत्रित करती हैं, इसलिए आयुर्वेदिक दवायें आत्मा आधारित हैं और कई गुना अधिक प्रभावशाली हैं।

वैदिक शिक्षा आत्मा आधारित है। यह स्वयं के विकास, मस्तिष्क के विकास, ज्ञान के विकास, सृजनात्मक विकास के बारे में है। वैदिक शिक्षा सृष्टि के परमार्थ के लिए है। वैदिक शिक्षा के सर्वोत्तम उदाहरण भगवत गीता एवं रामायण हैं, जो वास्तव में मनुष्य के सम्पूर्ण विकास की बात करते हैं।

संदर्भः

1. ऋग्वेद संहिता भाग–1 से भाग–4, आचार्य श्रीराम शर्मा।
2. विज्ञान एवं आध्यात्म परस्पर पूरक – वाङमय, 23 – आचार्य श्रीराम शर्मा।
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4. ऋग्वेद – अपौरूषेय भाष्य, महर्षि महेश योगी।
5. वेद चिंतन – आचार्य विनोबा भावे।
6. वेदों में पुरूष सूक्त – महर्षि ओंकारानन्द सरस्वती।
7. साईन्टिफिक अमेरिकन, यू.एस.ए., विभिन्न संस्करण।

Opportunities in Life Sciences & Biotechnology for Scientists and Researchers

Dr. A. S. Ninawe
Ex-Advisor, Department of Biotechnology, New Delhi-110003.
E-mail: ninawe@gmail.com

"It is science alone that can solve the problems of hunger and poverty, of insanitation and illiteracy, of superstition and deadening of custom and tradition, of vast resources running to waste, or a rich country inhabited by starving poor… Who indeed could afford to ignore science today? At every turn we have to seek its aid… The future belongs to science and those who make friends with science."

—Jawaharlal Nehru (First Prime Minister of India)

Biotechnology is making progressive growth in education, research and employmentcreationto bring self-sufficiency in biotech industry. However, there are still impediments in the improvement of quality education due to inadequate infrastructure in most of higher educational and research institute in India. This gap is slowly bridged with the accelerated progress from its nascentstage with the establishments of large number of educational hubs offering graduate, post-graduate and doctoral education in various disciplines of life sciences and biotechnology. Human Resource Department (HRD) and other scientific ministries in India are supporting the programmes and schemes for the promotion of life sciences. The Department of Biotechnology (DBT) is promoting research and education in the sector tobring transformative changes through capacity building and the leadership development.

Introduction:

India's efforts in education and R&D arerated at par with the world class research. The infrastructure has been largely expanded in science based educational and research institutes with increased budgetary support. This has resulted inimprovement of the knowledgelevels of youth at school and college levels withimproved infrastructure for education. The establishment of state-of-art research facilities hasencouraged science graduates especially the biotechnologists in life sciences to take up research as a profession. The

establishment of Centres of Excellence for promotion of scientific researchcaterswith research incubators at schools and colleges supporting the vibrant biotechnology sector to carry out discovery-oriented research by the students. In India, until the 1960s, biological research was largely directed towards pragmatic applications in agriculture, nutrition, and public health. The modern biological research came into being much later. As a stepone, IISc, Bangalore established a laboratory with groups of scientist working afermentation, pharmacology, and silkworm biology. The first truly modern 'molecular biology research unit'was established in 1962 as a branch of the Tata Institute of Fundamental Research (TIFR) in Mumbai, an institute originally devoted solely to physics and mathematics. In the late 80's i.e. in 1986, the National Institute of Immunology (NII),whose initial goal was to develop vaccines broadened its scope several years later and is now conducting a wide range of basic biological research. The Center for Biochemical Technology, which was initially as a producer of biochemical reagents in India in 1977 was renamed after 'The Institute of Genomics and Integrative Biology' in 2002 with the required infrastructure and facilities for conducting research in basic sciences. The National Facility for Animal Tissue and Cell Culture was established in 1988 as a repository facility and distribution center for cell lines. In 1995 it was up-graded as a full-fledged establishment known as The National Center for Cell Science (NCCS) in 1995. India is investing heavilyin the infrastructure development for promotingresearch facilitiesin life sciences and biotechnology andalso upgrading to bring them on par with similar facilities available in the USA and Europe.

Science and Technology Education in India:

In India, there has been rapid advancements in S&T, strategically important for generating a critical mass of highly educated and skilled manpower at secondary and tertiary level. This isproviding quality education in schools and institutions of higher education. In theglobal arena the scientific and educational contributions by Indian Institute of Technology (IIT), Tata Institute of Fundamental Research (TIFR) and Indian Institute of Science (IISc) have been greatly recognised and India has acquired the status of a knowledge economy with a huge infrastructural base to support the education system.India's S&T capability is growing very fast and India is rated the third-largest scientific and technical manpower in the world. However, India still has

to harness its knowledge potential since a large pool of youth is availablein the Country. Thus youth can be a positive force for development provided they have given opportunities of knowledge gain through educational and skills improvement to contribute in a productive economy.

Educational- Research Policies:

The Scientific Policy Resolution (1958), the Technology Policy Statement (1983), and the Science and Technology Policy (2003) of the Government of India are the indications of the continued political commitment to support S&T and represent a vision for its development. NSTP-2003 of the Government and the Vision Statement on Biotechnology by DBT provide a framework and give strategic direction to different sectors to accelerate the pace of development of biotechnology in India over the next ten years. Among the developing countries, India is one of the countries which recognised the importance of biotechnology as a tool to advance the growth of the agricultural, health and environment sectors as early as the 1980s. Since then the policies focussed on promotional programmes that have progressive growth of biotechnology. The government policies that promote the development of biotechnology have encouraged the participation of industry and academia, which has increased the sustainable growth. The need was addressedto the development of skilled manpower for the successful implementation of mission based projects in S&T and biotechnology.The central government spent around 4% of a grant annually of its gross domestic product (GDP) on education focusing on the streams viz, information technology, nanotechnology and biotechnology, agriculture, human and animal health, environment protection and development of new value added products, processes and techniques/tools.

India has witnessed a spectacular growth rate of more than 30% in biotech sector during the past five years. The bio-pharma segment has shown the highest growth rate (67%). During the last 25 years, the transition occurring in biotechnology has invariably experienced different degrees of transformation in terms of policy, education structure, infrastructure, human resources in biotechnology areas like health, industry, agriculture, environment and animal husbandry had some or the other biotechnological applications. The pharmaceutical industry is for health-care products, the largest user for developing vaccines, medicines and diagnostics, clinical and contract research.In agriculture the approval of the Bt gene being spliced into cotton

seeds, genetically modified crops and the hybrids with seed firms and tissue culture laboratories. The biotech on manufacturing and services sector has opened increasing markets for new products as a sunrise industry sector requiring a huge mass of skilled labour.In India, agriculture and pharmaceutical sectors are more visible than industrial and environmental sectors by addressing innovation and product development issues beyond the public and private sector scientists and industry.The students coming out after secondary, higher secondary and undergraduate educations are not adequately engaged in research and development activities. This is a critical need to be addressed through quality improvement in academic institutions and with focus on skill development. The participation of the academic institutions and industries through Public Private Partnership can further harness the education sector better and create a platform for research to help in teaching and practical training of students. To prepare the biotech students in higher education Biotechnology Finishing Schools are run by Union States of India and managed by private partners Association of Biotechnology Led Enterprises (ABLE), Bangalore. However, these schools need to be well recognized under the formal system such course curriculum of the students with credibility.Institute of Bioinformatics and Applied Biotechnology, Bangalore, offers post degree diploma courses and training in bioinformatics and biotechnology, as well as in entrepreneurship. The opportunities IBAB is also providing hands on practical training, after biotechnology degree courses at other institutions but the efforts are very limited.

Investments in R&D Sector and Biotechnology:

There has been a significant increase in the Government funding for science and technology. There are more than 22 central funding agencies responsible for sanctioning grants for science and technology research in the country for extra mural sponsored projects. Its aim is to develop research capability, infrastructure and excellence in research and education.India is working hard to improvement of the quality of science by injecting more funds and creation of new scientific institutions to fill the gaps in research and education. India's investment in R&D with a budgetary provision of about US$ 66.5 billion for supporting research ramps it at 6th position in the world. The funds allocated for higher education are not sufficient to pursue quality research. Biotechnology is the future of the country and the private sector is the driving

force of biotechnology supporting industrial R&D and production capabilities which in turn greatly influences on human resource development.The Indian government has introduced various start-up intellectual property protection schemes to ease patent filing to promote awareness and adoption of IP rights for protection and commercialising of IPRs. These schemes provide access to high-quality Intellectual Property services and resources.Institutions under the Government of India are further extensively promoting research parks technology business incubators (TBIs) and (RPs) which would promote the innovative ideas till they become commercial ventures. This may take a lead in basic and applied research in India and is likely to boost up better than past and at present.

The Department of Biotechnology is the scientific department of the Govt. of India in the Ministry of Science & Technology, promoting biotech education in the country. It interacts with stakeholders, students, faculty, experts, academic institutions, research institutes and the biotech industry. Since the establishment of DBT in 1986, the major focus was on integrated human resource development to cater to the needs of R&D, teaching and biotech industry promotion. It plays a pivotal role in student development by promoting the quality biotech education. The higher secondary students are being nurtured with excellence at undergraduate and post graduate level by providing practical training and minor research exposures. The PG graduates in biotechnology are given training with stipend in industries. Fellowships for doctoral and post-doctoral research with integrated teaching approach are provided for pursuing basic and applied research in biotechnology and integrated sciences. Opportunities are created for training research scientists by providing a forum for interaction in the form of seminars/symposia, short term training courses in advanced techniques and associateships for training in leading national and overseas laboratories.

Educational Programmes in Biotechnology:

Post-graduate Programme in Biotechnology:

In the initial phase, DBT had given emphasis to a HRD programme for intensive teaching and training of young students, the training of scientists and technicians at various levels, from research associateships to midcareer scientists, and exposing visiting scientists from advanced countries to newly

developed techniques used in biotechnology.In 1985-86, DBT started courses in Biotechnology in six universities, just thereafter two and a half decades it was expanded to over 72 universities today.The teaching programmes have been expanded in different specialisations such as general, agricultural, medical, pharma, environmental, marine, industrial, bio-resource, veterinary, food and bioprocess engineering. The implementation of the scheme during the last three decades created the best model for producing quality students, teachers and researchers. Faculty is creating a nucleus for research work with industry and R&D organizations. The M.Sc./M. Tech. graduates in biotechnology and bioinformatics meet the need for quality teaching by sharing faculty and infrastructure through partnership with UGC. The placement of students is tracked with the established placement cells of the respective universities to help students in finding placements and by organising campus interviews. Although efforts have been to improve biotechnology education to provide adequate employment opportunities to the PG and Ph.D. students, the students have not been well preferred to take placements in the industrial establishments. The Young Entrepreneurs Scheme (YES) encourages students towards entrepreneurship. Other programmes include BEST (Biotechnology Entrepreneurship Student Teams), Junior Research Fellowships (JRF) and Senior Research Fellowships (SRF). A postdoctoral fellowship is being supported through Indian Institute of Sciences, Bangalore, for selection for Post-Doctoral Fellow (DBT-PDF) programme in India. For the faculty, there are short-term training courses (2-3 weeks); Biotechnology Overseas Associateship programme; visiting scientists from abroad programme; distinguished biotechnology research professorship; National Energy Bioscience chair; Energy Bioscience Overseas Fellowship; Ramalingaswami fellowship; Wellcome Trust fellowships by the DBT; National Fund for Basic, Strategic and Frontier Application Research in Agriculture (NFBSFARA); and the National Agricultural Innovation Project (NAIP) by ICAR are available to enrich the knowledge in the field of biotechnology. India has also taken initiative for biotech development with close interaction with the state governments, particularly through state S&T councils in terms of developing biotechnology application projects, demonstrating proven technologies and providing training in human resources in states and Union Territories. The DBT has launched several programs to encourage entrepreneurial activities that to support industry with creation of scientific and technical competence particularly the entrepreneurship

development for industrial expansion.

The Biotech Industrial Training Program (BITP) provides industrial exposure to biotechnology post-graduates.By enhancing the employability is also bridgesthe skill gap between students produced by the universities and requirements of the industries, the Department initiated Biotech Industrial Training Programme in 1993-94 to provide industrial training to M.Sc./M. Tech students in biotechnology. This programme is mutually beneficial and is highly popular with students as it gives them first-hand experience of industry environment. This also meets the expectations of the students as well as provides opportunity for industries to select their prospective manpower in biotech companies. Many finishing schools have been introduced realizing the development of soft skill training in professional life finishing school are also required for the perfection of education at schools and universities and also to address various other issues in biotechnology and life sciences education and business planning. These schools are addressingthe gap between industry and academic curricula, by exposing students to crafted courses suitable to meet the needs of industries.

Skill Promotion in Biotechnology:

In India, there is an increasing demand for skilled human capital to meet biotechnological research and develop biotechnology-oriented products. DBTthrough its Biotech Industrial Training Program (BITP)is supportingthe private institutions for conducting trainingsinhealthcare companies, agriculture, bio-services, pharmaceuticals, etc. Biotechnology has grown in India in almost all the sectors which includethe medical field (healthcare/pharma), bioinformatics, agricultural biotechnology, bio fertilisers, bio pesticides, national bio resource development, plant biology, marine biotechnology, etc. The skill set of biotechnology is imparted through courses such as the BSc, BE, BTech, the 5-year integrated BTech/MTech) and is also at post-graduate level (Msc/ M.Tech). DBT is supporting biotechnology programme in general biotechnology, agricultural biotechnology, medical biotechnology, marine biotechnology, bioinformatics, industrial biotechnology and pharmaceutical biotechnology. Newer areas, such as functional genomics/proteomics, cleaner technologies, gene therapy, bio-safety, molecular and human genetics, rational drug designing, upstream and downstream processing for recombinant products, IPR and patenting in biotechnology, etc.are recognized as top priority areas

according to the national biotechnology development strategy of DBT.

Innovation in Science& Research:

To attract the best brains for pursuing basic sciences, DBT initiated DBT scholarships in biology since 1989 for 20 topers in 10+2 biology examination conducted by CBSE. This scheme has been expanded to cover State Boards from 2006-07, and the number of scholarships has been increased and made attractive.The Government has launched a new Scheme, 'Innovation in Science Pursuit for Inspired Research' called INSPIRE. It is an initiative for attracting talent to study science through a long term programme. The scheme is promoted through the Department of Science and Technology for youth promotions based on performance in the school board examination.The scholarships provided for pursuing degree-level courses in natural sciences, doctoral level fellowships and faculty positions for post-PhD professionals, along with assured research funding over a period of five years. The Department of Biotechnology supporting'Star College Scheme' to improve hands-on-exposure and practical training of the biotechnology component in existing life sciences areaswith an on the development of biology and biotechnology with creation of trained manpower by exposing the students and technicians to recent developments in the area of genetic engineering and molecular biology and biotechnology and their exploitation in industry, agriculture and medicine.

Womenin Life Sciences & Biotechnology:

Women are role models for future developments in research and scientific programmes, however, their achievements are not recognized well in all the fields including science and technology. While women undertake education at graduation, post graduation and doctoral levels, most of them are not actively engaged in further research. The need was addressed by various funding agencies by supporting research schemes exclusively for women. University grants commission (UGC), Department of Biotechnology (DBT), Science and Engineering research Board (SERB), Department of Health research (DHR) and Department of science and technology (DST) have launched separate schemes exclusively for women having aptitude towards research in science and technology. The Department of Biotechnology is supporting Biotechnology Career Advancement and Re-orientation Programme for women Scientists mainly for the career development of employed/ unemployed women scientists

by providing extramural research grants in the areas of Life Science and biotechnology. The scheme has also been extended to unemployed women scientists' after a career break so as to help them undertake independent R&D projects. Women participations greatly accepted in adoption of appropriate technologies and knowledge to disseminate technology in entrepreneurial parks/ women development centres to develop rural folk.The scheme also enhances the participation of Women Scientists in Biotechnology Research promotion.

Life sciences and biotechnology enterprises and companies, which includes businesses that use biotechnology, such as medical laboratories, IT bioinformatics, biotechnology ventures, pharmaceutical, chemical, food, agrochemical, and seed companies are finding ways to spent their earnings on promotion of research in S&T and biotechnology. They are investing in social awareness creation and train the community in farm based activities to promote new hybrids and biotech crops with a future strategy to market their produce in a better way. The research is being pursued on genetic engineering and molecular biology aspects by taking responsibility of genes and gene based products and GMO based and recombinants with their adoption to the environmental conditions and human ethics.

North-East Connect in S&T & Mentorship:

DBT is promoting science education programme in the North-Eastern region for imparting good science education at school level with the creation of suitable platforms to access modern laboratory facilities. A scheme is being supported for the establishment of "Basic Science Labs in Senior Secondary schools (BLiSS)" across the North Eastern States of India with an objective to promote education in Basic Science at Senior/Higher Secondary level and to attract brilliant students to multidisciplinary research areas. The science lab will be a common lab for all science subjects, which includes Biology/ Biotechnology, Chemistry and Physics. A good level of competence has been developed in R&D in North East Region of the country through mentorship in Biotechnology with a programme promoted by DBT-North Eastern Region-Biotechnology Programme Management Cell (NER-BPMC).A mentorship programme is also being supported for qualified post-doctoral scientist through in house training by BIRAC through Biotech Ignition Grant.

Promoting Research among the youngsters:

The Department is providing support for holding national and international seminars and symposia, organising popular lectures by eminent scientists, providing travel grants to students and researchers for participation in international conferences as well as organising exhibitions to showcase products, processes and technologies. These scholarships provideopportunities to young students and researchers for interaction with leading national and international experts which helps in shaping their future career. Proactive efforts by Government with industries to address the gap in skill sets of students are enhancing the employability of students and improving their career prospects. This may create further opportunities for life sciences students in agri-based industries involved in production of transgenic plants, seed industries, tissue culture units, agri-chemicals such as bio fertilisers, bio pesticides etc., environmental amelioration, pharma industries for diagnostics, vaccine, new drug molecules, clinical research organisations for clinical trials, bioinformatics industry etc..

Brain Drain/ Brain Gain:

The educational and research fellowships supported in life sciences and biotechnology to make the youngsters entry into the professional career as scientist to address the discoveries in agricultural science to understand soils and their chemistry, new strains of crop plants that are resistant to diseases and yield more food per cultivated acre. Scientists and professionals working abroad in the area of life sciences and biotechnology can be attracted to come back to India for accepting the research positions for promotion of quality education, research and excellence. The schemes supported by the Department of Science & Technology and Biotechnology though fellowship programmes help brilliant scientists and engineers from all over the world to take up scientific/ research positions in India. The fellowships are scientist-specific and allow them to work in any of the scientific institutions and universities in their discipline. Eligible scientists are given regular research grants through the extramural funding schemes supported by various S&T agencies of the Government of India. Scientists and engineers of Indian origin from all over the world are encouraged to take up scientific research position in Indian Labs through schemes like Ramanujan and Ramalingaswamy

Fellowships. Ascheme also exists in the area of biotechnology called Ramalingaswamy Re-entry Fellowship supported by the Dept. of Biotechnology for biotechnologists exists to provide attractive avenues to pursue R&D in Indian institutions.

Make in India Movement:

Make in India movement is spreading its wings across different industrial clusters in different streams of education, vocational training and in professional research. The skill based infrastructure development enable the youth and professionals to upgrade their knowledge as per the job requirements continuing with their learning process. Considering India's facing lot of challenges in absorbing the educated youth especially in R&D institutions/ industry and the private sector. Biotechnology education system is focussing on skill based education through education programs at vocational schools, technical institutes like ITIs, colleges and universities.

Conclusion:

India needs to get actively engaged in access, equity and inclusion in science, technology and innovation both at national and the global level. The Science & Technology policy supports the alignment of technological innovation with social values in meaningful manner. The S&T sector with facilitated developments led to a New Horizon in education by bringing research excellence through adoption of Responsible Research and Innovation.The life sciences and biotechnology sector is accelerating the economic growth that needs to be addressed at the sustainable level. This will provide potential opportunities areas in biotechnology and life sciences which can drive the developments and bridge the research gaps in education and research. Ultimately the movement will encourage scientists/ engineers to work with social scientists through inter-disciplinary learning and will help to understand the need of the community through creation of good avenues in life sciences and biotechnology.

** The author was working in the Department of Biotechnology as Scientist "G" and Advisor, dealing with the Programme area of Aquaculture and Marine Biotechnology. The views expressed are of Authors and not that of the organization to which he belongs.*

Impact of Global Warming on Ecosystem, Food and Health in 21st Century

Prof. Vinay Kumar Singh*
Department of Zoology, Deen Dayal Upadhyaya Gorakhpur University,
Gorakhpur, 273 009, UP, India

Abstract: Rapid and continued loss of biodiversity is increasing at an alarming rate. Human pressure on earth ecosystem and climate is accelerating many folds. The problem of fresh water crisis; floods/ sea levels; dangerous pests/ vectors will be increased with increasing average temperature of earth. Terrestrial ecosystem, play an important role on earth. Rise in 3°C temperature of earth may cause extinction of 25-30% of plant and animal species. Ocean acidification due to higher CO_2 concentration in oceanic water will affect the survival of corals, shelled animals. It has been predicted that upto 2050 agricultural production of most developing country will significantly reduced. Heat waves, floods, drought will be increased many fold and ultimately it affect the human health. Immediate remedies to check the warming of earth is required by scientist, social thinker and policy maker to make the earth environment sustainable for human beings.

Keywords: Global warming, temperature, food, health, disease.

Introduction

In twentieth century average temperature of earth surface is increased 0.74+0.18 ºC (1.33+0.32ºF). IPCC (Interogovernmental Panel on Climate Change) stated that the increase in global average temperature is mainly due to anthropogenic activity. Loss of biodiversity, acidification of oceans, loss of wetlands, bleaching of coral reefs, increase in allergy-inducing pollen and neglected tropical diseases are the major problems associated with global warming. (Borenstein, 2007, Katiyar, 2010, Singh, 2016). Rapid and continued loss of biodiversity is taking place at an alarming rate. The ecological footprint, which measures the extent of human demand on Earth's ecosystems, has tripled since 1961, showing that the planet earth's resources are being used at a rate 25% higher than their ability to regenerate (WWF, 2006). Increase in warm weather caused rapid melting of glaciers and ice caps, which in turn will raise the ocean levels affecting coastal areas.

Impact on agriculture, forest & ecosystem-

Climatic change along with rise in human population and mis-management of fresh water has caused heavy loss of fresh water on earth

(Dutta, 2009). Of the total water resource of the earth, 97.3% is salt water and the rest fresh water. Out of 2.7% fresh water 77.2% is frozen/ice, 22.4% ground water, 0.35% lakes and ponds and 0.01% in rivers and streams. Agriculture uses maximum amount of water in the world and puts lot of pressure on ground water. It has been estimated that the drinking water needs 2.7 L/capita/day or ($1M^3$/year/capita) (Das, 2009). In tropical countries a rise in temperature 1.0°C will decrease the production of crop, especially wheat and maize. Increase in global temperature about 3°C will reduce the agricultural production of Asia, Africa and Central America by 30% to 40% (Katiyar, 2010, Singh, 2016).

1. Crop production may increase in high and mid-latitudes, if local average temperatures increase more than 1-3ºC, but their overall global production will decrease.
2. There will be high risk of hunger in lower latitudes, especially dry and tropical regions. Crop productivity may decrease even small changes in local average temperature of 1-2ºC.
3. Risks of droughts and floods will be common in subsistence sectors at low latitudes.
4. Adaptations by cultivation cycles of crops may maintain cereal yields, if warming remains modest.
5. Adverse effects of global warming may cause yields of aquaculture and fisheries.

(source- Climate Change and its Implications: Which Way Now? by Professor Praveen Jha for the Commonwealth Foundation, Centre for Economic Studies & Planning, Jawaharlal Nehru University, New Delhi, India)

Natural forest ecosystem are great resources for wild animals, fuel wood, fodder, timber, herbal medicine including raw materials for paper and pulp industries. In India 22-23% land area are occupied by forests (Das, 2009, GFRA 2010). GFRA (2015) noted that the forest cover is slight increasing 0.8% of total land area of country. It has been estimated that India has lost about 45 million hectare of forests wealth, of which only 6 million hectares have been replaced (Sharma, 1987). The main cause of deforestation is an increase in human population, livestock and agricultural field. Urbanization, industrialization construction of NH roads and mining activities are major important factor, which speed up the deforestation activity. Biodiversity is the number of animal/plant species in a particular ecosystem of a region, which is important for both man-

made and natural ecosystem. If current human growth and resource management pattern do not change, we will lose many important species of plants and animals on earth and the ecosystems of the globe will become unsustainable.

1. The combination of climate change and associated disturbances like flooding, drought, wildfire, infestation and ocean acidification, in addition to other contributors to climate change such as land use change, pollution and over exploitation of resources will exceed the resilience of many ecosystems.
2. Beyond 2050, terrestrial ecosystems, which play an important role as carbon sinks, may reach the upper limit of the absorptive capacity or even, decrease their net carbon uptake.
3. If increases in global average temperature exceed 1.5-2.5ºC, around 20-30% of plant and animal species may become extinct.
4. Ecosystems goods and services, like water and food supply, will be adversely affected by projected major changes in ecosystem structure and function, species' ecological interaction and geographic ranges.
5. Increasing ocean acidification due to higher CO_2 atmospheric concentrations will harm corals, shelled organisms and dependant species.

   (source- Climate Change and its Implications: Which Way Now? by Professor Praveen Jha for the Commonwealth Foundation, Centre for Economic Studies & Planning, Jawaharlal Nehru University, New Delhi, India)

Impact on health-

According to researchers in different part of the world, climate change impact on public health will be extensive, ruthless and affect all sectors of the public health system. Global warming will stir up the plague of malaria, dengue fever, Hantavirus (lung disease- pulmonary syndrome (HPS). and vector-borne diseases (Murugappan and Subbarayan, 2010). Dehydration is one of the risk factors linked to kidney stone disease. It is predicted that by 2050, higher temperature will cause an additional 1.6 million to 2.2 million kidney stone cases, up to a 30 % growth in US (Murugappan and Subbarayan, 2010). Climate variables are able to affect the prevalence, intensity and geographical distribution of helminths, directly influencing free-living larval stages and indirectly influencing mainly invertebrate, but also vertebrate, hosts. The impact

of climate change appears to be more pronounced in trematodes, and is mainly shown by increased cercarial production and emergence associated with global warming.

Schistosomiasis/ fasciolosis is a parasitic disease that affects 200 million people in different countries; and frequently referred to as the second most important parasitic disease after malaria among the infectious diseases of tropical and subtropical countries. Schistosomiasis/ fasciolosis third most prevalent parasitic disease in the world in terms of overall morbidity burden, socio-economic and public health importance and human impact. Alveolar echinococcosis is currently the only cestode disease which has been accelerated by climate change. Incident of increased nematodiases, including heterakiasis and different helminth disease, trichostrongyliases and protostrongyliases, ancylostomiases and dirofilariases, intensively analyzed with regard to climate change (WHO, 2006; Mas-Coma et al., 2008, Singh, 2016). Some studies suggest that increase in death toll figures for climate change-induced diseases will hit about 185 million lives only in sub Saharan Africa by the end of the 21st century (Christian Aid, 2006).

Indian public health system is very weak and fragile e.g. more than 1500 people die of gastro-intestinal infections every day, tuberculosis kills more than 1000 per day, about 20,000 people die of rabies per year, about 20,000 people die of poisonous animal bite. Vector borne diseases such as malaria, dengue, JE, chikungunya, kalaazar are panic problems in our country. H_1N_1 a swine flu known as pandemic influenza of 2009. This is new strain of influenza virus. It is the recombination between the influenza viruses of man, animal and birds. The symptoms include high fever, cough, sore throat, loose stools and difficulty in breathing. It was reported in April 2009 in Mexico and affected 168 countries including India. WHO declared as pandemic on 11 June, 2009 (Hati, 2009). Dengue as an important public health concern globally about 100 million persons affected annually from the tropical and subtropical countries (Gubler, 1998).

- Increases in malnutrition and consequent disorders, with implications for child growth and development;
- Increased deaths, disease and injury due to heat waves, floods, storms, fires and droughts;
- Increased burden of diarrhoeal disease;
- Increased frequency of cardio-respiratory diseases due to higher

concentrations of ground level ozone related to climate change;

- Altered spatial distribution of some infectious vector-borne disease.

IPCC (2014) noted that effects climate change between 2030-2050 is expected to cause 250,000 more deaths per year from malnutrition, malaria, diarrhea, neglected tropical disease and heat stress. Its direct damage cost is estimated to be between USD 2-4 billion/year by the year 2030 (Table-1).

Africa and Asia, because of their geography and housing of the largest numbers of vulnerable people, their multiple stresses and low adaptive capacities, will be most affected by climate change. According to Stern (2007) problems related to climate change in different continent will be-

Africa

- Over 200 million people may be exposed to water stress within the next two decades, exacerbated by a rapidly growing population.
- Climate variability and change will severely compromise food production, decreasing yields in some areas by as much as 50% by 2020.
- Over-fishing and rising water temperatures will decrease lake fisheries resources.

Asia

- Within the next 2-3 decades, the melting of glaciers in the Himalayas will imply more floods and less water resources, progressively decreasing river flows.
- Climate change along with increasing population's pressure will decrease freshwater availability, adversely affecting over 1 billion people North Asia.
- Increased flooding from sea and rivers will affect coastal areas, greatly affecting South, East and Southeast Asia's densely-populated mega-delta regions.
- By the middle of the century, crop yields could decrease by 30% in Central and South Asia, while increasing by 20% in East and Southeast Asia. High risks of hunger are projected for the developing countries in the area.
- Floods and droughts will increase endemic morbidity and mortality due to diarrhoeal diseases, as well as the spread of cholera.

The climate change was forecast in the study using models of global warming obtained from the Intergovernmental Panel on Climate Change (IPCC-

2007), ivth assessment report, According to them global average temperature increase largely based on emission of future green house gases (CO_2 and Methane) (Murugappan and Subbarayan, 2010). The integrated approach is essential solve the problem by public awareness and primary education of pollution and the effects of global warming.

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Table-1. Different degrees of temperature rise of global warming and their possible climate impacts.

Temp Rise (°C)	Water	Food	Health	Biodiversity
1°C	Small glaciers in the Andes disappear completely, threatening water supplies for 50 million people	Modest increases in cereal yields in temperate regions	At least 300,000 people each year die from climate related diseases: diarrhea, malaria, and malnutrition.	At least 10% of land species facing extinction according to one estimate) 80% bleaching of coral reefs, including great Barrier Reef
2°C	Potentially 20- 30% decrease in water availability in some vulnerable regions, e.g. South Africa and Mediterranean	Sharp declines in crop yield in tropical regions (5- 10% in Africa)	40-60 million more people exposed to malaria in Africa	15-40% of species facing extinction (according to one estimate, High risk of extinction of Arctic species)
3°C	1-4 billion more people suffer water shortages, while 1-5 billion gain water, which may increase flood risk	150-550 additional millions at risk of hunger	1-3 million more people die from malnutrition 20-50% of species	facing extinction (including 25-60% mammals, 30-40% birds and 15-70% butterflies in South Africa
4°C	Potentially 30-50% decrease in water availability in Southern Africa and Mediterranean	Agricultural yields decline by 15-35% in Africa, and entire regions out of production	Up to 80 million more people exposed to malaria or vector borne disease in Africa and Asia	Loss of around half Arctic tundra
5°C	Possible disappear-ance of large glaciers in Himalayas,affecting one quarter of China's population and hundreds of millions in India	Continued increase in ocean acidity seriously disrupting marine ecosystems and possibly fish stocks	ND	ND
Above 5°C	The new era science opinion, Earth's average temperature will rise by even more than 5 or 6 C if emissions continue to grow and positive feedbacks amplify the warming effect of greenhouse gases (e.g. release of carbon dioxide from soils or methane from permafrost). This level of global temperature rise would be equivalent to the amount of warming that occurred between the last age and today- and is likely to lead to major disruption and large-scale movement of population.			

ND- No data, Source: opcit (2007)

Pharmacological activity of *Nerium indicum* (Linn.)

Raghubir Narayan Singh
Department of Zoology,
Maharana Pratap P.G. College Jungle Dhusan Gorakhpur-273014,

Abstract: *Nerium indicum* (Linn.) belongs to the family Apocyanaceae. It is wild plant and commonly known as "Kaner". *N. indicum* is an important medicinal plants used for a folk remedy in some region of India. In traditional, Chinese medicine, the flowers and leaves of *N. indicum* have been used to stimulate cardiac muscle, relieve pain and eliminate blood stasis. The plant has been found to possess major therapeutic activity such as analgesic, anti-ulcer, antibacterial, neoprotective, insecticidal/ molluscicidal, anti-dibetic, anti-oxidant activity. *N. indicum* consist of glycoside, oleandrin, tannin, volatile oil 0.25%. Leaves contain two principle glucoside, neriin and oleandrin, properties. It has also anti-cancer properties. In the present review is mainly focused on the pharmacological, analgesic, anti-diabetic, anti-oxidant, anti-bacterial, anti-viral, insecticidal/molluscicidal, hepatoprotective, neuroprotective, anti-cancer, anti-hyperlipidemic, anti-feedent activity of *N. indicum.* It use as bioindicator is also discussed.

Keywords: *Nerium indicum*, Phytochemistry, Pharmacological activity, Oleandrin, Oleander.

Introduction:

Nerium indicum Linn. (Syn. *N. odoum* soland) commonly known as Kaner and belongs to the family Apocyanaceae. It is native of Indian sub continent and widely distributed in Mediterranean region, subtropical Asia. *N. indicum* is well known ornamental plant with leathery evergreen leaves with red/pink/white flower. The plant is indigenous to Indo-Pakistan subcontinent (Patel, 2010a). *N. indicum* is highly reputed in the traditional systems of medicine, to care variety of human ailments. The leaves consist of cardiotonic, diuretic properties and are used against snake bites. The cardiotonic and diuretic properties is mainly due to the active component oleandrin. Roots have been used externally for the cure of different types of cancers, leprosy, headache, ringworm and other skin complains (Ajinkya and Saraswati, 2013). Fresh juice of leaves is dropped into the eyes for inducing lacrimation in opthalmia (Anona, 1991). *N oleander* caused severe cardiac arrhythmia and severe diarrhea, sometimes with blood (Tokarnia et al., 1996). Its 11-dihydroxyhexadecanoic acid and its glycoside have been reported as anti-cancer and anti-microbial agents (Siddiqui et al., 1987). In *Charak samhita*, karvir (*N. indicum*) has been indicated at 20

places for the management of *Twark Roga.* Wide spectrums of biological activities have been reported with various constituents isolated from different part of *N. indicum* (Zia et al., 1995).

A wide spectrum of biological activities has been reported with various constituents isolated from different parts of the *N. indicum*. Root, bark and seed contain cardiac glycosides, which have paralyzing action on the spinal cord. Oil obtained from the root of *N. indicum* is used in leprosy and skin disease (Saini P, 2010). The leaves and bark are used as heart tonic, diuretic, expectorant, diaphoretic and emetic (Patel at al., 2010; Jawarkar et al., 2012). Root boiled in water is helpful, when applied externally in skin complaints, herpes and ringworms infections (Ajinkya and Saraswasti, 2013). A very little dose of leaf juice is used against snake or other venomous bites (Ajinkya and Saraswati, 2013). Lacrimation infusion of young leaves juice is beneficial in opthalmia. Root part is used in haemorrhods, various type of cancer, ulceration and leprosy (Shafi et al., 2006; Sikarwar et al., 2009; Vinayagan and Sudha, 2011; Shashi et al., 2013).

N. indicum plant consists of cardiac glycosides in its leaves, stem and flowers. Leaves of *Nerium indicum* have two principles components: neriin and oleandrin, glucosides, having similar properties with digitalin. Main toxin component is oleandrin. The plants have digtoxin properties like steroid glycosides. The barks consist of toxic glycoside: rosaginin and nerlin, volatile oil, fixed oil (Patel, 2010a). Flowers also have alkaloid, glucoside, carbohydrate, flavonoid and tannins' and phenolic compound (Patel, 2010b).

N. indicum flowers are hermaphrodite and leaves are powerful repellent. A decoction of the leaves has been applied externally in the treatment of scabies and to reduced swelling. Asha and Chakraborthy, (2010) have antibacterial activities of *N. indicum*. The root is powerful resolvent (power to disperse inflammatory). The oil prepared from the root bark is used in the treatment of leprosy and skin disease of scaly nature (Ajinkya and Saraswati, 2013).

Different parts of the *N. indicum* plant used as a molluscicide, insecticide and rat poison. The pounded leaf and bark are used as an insecticide (Singh and Singh, 1997; Ajinkya and Saraswati, 2013). The leaves have little amount of latex that can be used to make rubber, though the amount is so little for commercial utilization. The plants have an extensive root system and are often

used to stabilize soil in warmer area (Singh and Singh, 1998; Rajbhandari et at., 2001; Patel, 2010).

Phytochemistry:

N. indicum have many primary metabolites like carbohydrates, proteins, phenols, lipids etc. Several polysaccharides purified from leaf and flower of *N. indicum* have higher soluble sugar. The sugar has large number of stereo-isomerism, because they contain many asymmetrical carbon atoms. The stems have higher levels of phenol. The flower contains higher levels of lipids (Vijayvergia and Kumar, 2007).

The leaves of *N. indicum* consist of two principles: neriin and oleandrin, glucosides with properties similar to digitalin. The main toxin of oleander is oleandrin (Chopra and Modi, 1948). The plant having digtoxin properties like steroid glycoside. The bark having scopoletin and scopoli (Rangaswami and Reichstein, 1949; Hafieez, 1987). The alcoholic extract of the root bark showed the presence of a-amyrin, b-sitosterol; the ether fraction showed odoroside betulinic acid, oleonolic acid (Jayaraman, 1995).

The root of *N. indicum* contains glycoside, neriodorin, neoriodorein and kreabin. The bark contains scopoletin, scopolin. Besides this it also contain tannins, red colouring matter, a aromatic oil, wax and flobefin and a yellow coloured stable oil. It contains neriodin, nerium D, rutin and anhydro-oleandrin. The root consists of bitter glycosides fenolinic acid and aromatic oil. It also have potassium salts in excess (Ajinkya and Saraswati, 2013).

Pharmacological Activity:

The leaves and flowers of *N. indicum* are cardiotonic, diaphoretic, diuretic, anti-cancer, anti-bacterial, anti-fungal and expectorant (Ajinkya and Saraswati, 2013). A decoction of the leaves has been applied externally in the treatment of scabies and to reduced swelling. *N. indicum* is very poisonous plant as contains powerful cardiac toxin. Therefore, it is used with extreme caution. The root is powerful resolvent and used in the form of plasters and is applied to tumors. It is only used externally. It is prepared in form of powder and mixed with water to form paste and then applied to lesion and ulcer on the penis (Ajinkya and Saraswati, 2013). Bark is better used as cathartic, febrifuge in intermittent fever. Oil prepared from the root, bark is used in treatment of

leprosy and skin diseases of the scaly nature (Ajinkya and Saraswati, 2013). Seeds are poisonous, abortifacient. They are used as purgative in dropsy and rheumatism. The part of entire plants is used as anti-cancerous agent. The flower, leaves, latex, bark and roots are used against corns, warts, cancerous ulcer, carcinoma, ulceration and hard tumors (Valnet, 1976).

Analgesic activity:

Ahmed et al. (2006) had noted the analgesic activity of methanolic extracts of flower, root, stem and leaves of *N. indicum* with the help of acetic acid –induced writhing model in rats. Flower extracts of *N. indicum* showed significant inhibition 89.14% and 93.20% of control writhing responses at oral doses of 250 mg/kg body weight of mice, respectively. The root extract showed prominent analgesic activity with 59.18% and 95.92% writhing inhibition at 125mg/kg and 250mg/kg body weight of mice, respectively. The result were found to be highly effective in comparison to the control and accompanied with dose dependence. The stem extracts showed only 6.78% and 27.89% inhibition of writhing response at oral doses of 125mg/kg 250mg/kg body weight of mice, respectively. The analgesic activity of stem extract was less significant as compared to that of crude flower and root extract. All the fraction of crude leaf extract of *N. indicum* showed 100% inhibition of writhing reflex. This is demonstrated that administration of the fraction of crude leaf extract inhibited the pain sensation produced by acetic acid since mice did not show any writhing reflex during this investigation (Ahmed et al., 2006).

Anti-diabetic Activity:

Ishikawa et al. (2007) noted that the ingestion of leaves of *N. indicum* before a meal reduced the postprandial level in type II diabetic patients. Extract of *N. indicum* leaves strongly inhibit the á-glucosidase. They have isolated the active principal compound 3-O-caffeoylquinic acid and 5-O-caffeoylquinic acid. These compounds inhibit á-glucosidase in non-competitive manner. Sikarwar et al. (2009) studied the effect of chloroform/ethanolic extract of *N. indicum* leaves on alloxan-induced diabetic rat model. The single dose of ethanolic extracts (300 mg/kg b.w.) of *N. indicum* significantly ($P<0.01$) reduced the blood glucose level as compared to diabetic control on the 7th day of the study. Chloroform extracts (500 mg/kg b.w.) shown significant reduction of blood glucose after one hour, whereas ethanolic extract showed significant reduction

after three hours. Aqueous extract of the same plant could not reduce glucose level at sub-acute level, though it did not showed reduction of glucose level at 7 hours as compared to diabetic control. The effect of different extract on glucose tolerance test in normal rats was evaluated. After 30 minutes of glucose administration the peak of blood glucose level increased rapidly from the fasting value and then subsequently decreased. Mwafy and Yassim (2011) noted that antidiabetic activity of aqueous extract of the leaves on streptozotocin-induced diabetics models in rats. There was a significant 128% and 18.5% changes in serum glucose level and insulin level at the 4th day of observation in treated group, respectively (Mwafy and Yassim 2011).

Anti-ulcer Activity:

Patel et al. (2010) investigated methanolic extract of leaves of *Nerium indicum* for anti-ulcer activity by studying pylorus ligation and indomethacin-induced ulcer in *in vivo* treatments against rats. They reported that the leaf extract at 250 and 500 mg/kg body weight dose in indomethacin-induced ulcer resulted in 65.97% and 69.63% protection, respectively, with an ulcer index of 5.416 and 4.833, respectively. These observations were based on six parallel experiments. Furthermore, in pylorus ligation-induced ulcer in rats, 250 and 500 mg/kg body weight dose resulted an ulcer index of 5.666 and 4.583, respectively, which was much lower than that of the control (14.083) (Patel et al., 2010).

Anti-oxidant Activity:

Reactive oxygen species (ROS) are the causative agents to make disorders in physiology of body. Several plant based products contain tremendous ROS scavenging capacity (Dey and Chaudhari, 2014). Several free radical scavenging elements were recognized in hydro-methanolic extract of the leaf, stem and root of *N. indicum.* (Dey et al., 2012; Dey and Chaudhari, 2013). Leaf displayed excellent hydroxyl radical, peroxynitrite, hypochlorous acid. Whereas stem, indicate the presence of nitric oxide and DPPH (diphenylpicrylhydrazyl) radical scavenging capacity. *N. indicum* root displayed lipid peroxidation, superoxide anion, hydrogen peroxide and singlet oxygen scavenging activity (Dunn et al., 2011).

The methanolic extract of leaves and/ flower of *N. indicum* was analyzed

for Anti-oxidant activity (AOA) in terms of DPPH (diphenylpicrylhydrazyl) free radicals. Total phenolic content (TPC) was measured in terms of gallic acid equivalent and flavonoide content was analyzed in terms of quecertin equivalent. The lipid peroxidation was higher in flowers than leaves. Enzymatic anti-oxidant activity such as superoxide dismutase, glutathione peroxidase and catalase of *N. indicum* flowers were around 10% to 30% higher than that of leaves. Methanol extract of *N. indicum* flowers are more potent anti-oxidant than leaves (Vinayagam and Sudh, 2011). Mohale et al. (2016) reported the antioxidant activity of ethyl acetate extract of *N. indicum* flowers. According to them treatment with this extract caused significant increase in the endogenous antioxidants, superoxide dismutase (SOD), catalase (CAT), and reduced glutathione (GSH) in blood and brain of rats.

Anti-bacterial Activity:

Hussain and Gorsi (2004) reported the anti-bacterial activity of chloroformic / ethanolic / methanolic extract of root, bark and leaves against *Bacillus pumilus, Bacillus subtilis, Staphyloccus aureus* and *Escherichia coli*. According to them methanolic root extract demonstrate comparatively better anti-bacterial activity than bark and leaves. Organic solvent extract of different parts of the *N. indicum* displayed broad spectrum anti-bacterial effect against gram positive bacteria. It blocks the microbial growth, having micro biostatic effects. Methanolic, chloroform, hexane extracts have shown considerable antimicrobial activity of the plant (Chauhan et al., 2013).

The anti-microbial activity of methanolic extracts of *N. indicum,* exhibited growth inhibition on selected bacterial strains viz. *Bacillus species*, *Escherichia coli, Klebsiella species, Yersinia species, Enterococcus species* (Ramya, 2010). Reddy (2010) reported *in vitro* anti-bacterial activity of *N. indicum* leaf extract at 2 mg, 4 mg , 6 mg, 8 mg/well. Recently, Chetwani et al. (2017) reported that *N. indicum* extracts viz. acetone, ethanol and aqueous have anti-bacterial activity against *Pseudomonas aeruginosa*. Among all these extracts acetone was most effective.

Anti-viral Activity:

N. indicum exhibited considerable anti-viral activity against herpes simplex virus and showed no cytotoxic effects (Rajbhandari et al., 2001). Anti-influenza

viral activity with 50% inhibition was noted at dose of 10 µg/ml *N. indicum* methanolic extract. Singh et al. (2013) demonstrated that an aqueous extract of plant (Anvirzel™) containing oleandrin compound of *Nerium* is effective against HIV in human. This product Anvirzel™ reduced the potentiality of HIV to infect new cells. Oleandrin extract from leaves of *Nerium*, down-regulated HIV coat protein g120 expression at 10 mg/ml concentration.

Insecticidal/ Molluscicidal Activity:

Singh and Singh (1998) reported that *Nerium indicum* is an important source of Molluscicide. Singh and Singh (1997) reported that different preparations of *N. indicum* leaf were toxic against *Lymnaea acuminata*. Purified fraction of leaf extract was 14 times more toxic to *L. acuminata* than standard molluscicide niclosamide. According to them molluscicidal activity was due to glycoside oleandrin present in the leaf extract of *N. indicum*. They studied the molluscicidal activity of bark of *N. indicum* against *Lymnaea acuminata.* According to them toxic components of *N. indicum* bark are soluble in water and ethanol. The toxicity of different bark preparations was both dose and time dependent. The 24h LC_{50} of lyophilized aqueous extract of bark against *L. acuminata* was 34.5 mg/l. Low concentration of vacuum-dried ethanolic extract (24h LC_{50} : 4.9mg/l) and purified bark (24h LC_{50} : 0.87mg/l) was more effective to treat the vector snail *L. acuminata* (Singh and Singh, 1998).

Laboratory experiments showed insecticidal property of the *Nerium* leaves against sugarcane mites and citrus leaf minor (Siddiqui et al., 1990). Guzman and Ambros (1992) reported that *N. indicum* has insecticidal activity against pest *Blatta orientalis*. They noted that the sap of *N. indicum* bark extracted in the proportion of 30, 20 and 10 g per 200 ml of water, were as effective as the commercial household insecticide. The addition of 25 ml of kerosene with 100 ml of extracts resulted into higher activity. Root extracts of the plant are toxic to black carpet beetle larvae. Kerosene extracts of fresh flowers are toxic against rice weevil, *Sitophillus oryzae* (Anon, 1991). Singh et al. (1993) observed that the latex of *N. indicum* is potent molluscicide. Its toxic effect is both time and dose dependent. It was found that very low concentration (24 hLC_{50}, 0.565 mg/l) of the latex was effective against *L. acuminata.*

Hepatoprotective Activity:

Hepatopancreatic activity of *N. indicum* was noted by various workers.

Methanolic flower extract of *N. indicum* was evaluated for hepatoprotective activity in rats. Dose of 500 and 1000 mg/kg body weight prevented carbon tetrachloride induced damage in liver cells of rats (Patel, 2010c). Carbon tetrachloride induced a significant rise in serum glutamate pyruvate transminase (SGPT), serum glutamate oxaloacetate transminase (SGOT) and alkaline phosphatase (ALP) activity in liver cells. Treatments of rats with different dose of plant extract significantly altered serum marker enzymes levels against carbon tetrachloride treated rats. The activity of the extract at dose comparable to the standard drug silymarin. Histopathological changes of liver sample were compared with respective control. (Patel, 2010c). Singhal and Gupta, (2012) reported that *N. indicum* methanolic extract of flower is potent hepatoprotective agent as evident by less inflammation and necrosis resulted from carbon tetrachloride induced liver damage. Normal liver architecture was restored at higher dose of the flower extract.

Neuroprotective Activity:

Polysaccharide J6 isolate from flowers of *N. indicum* can be used against Alzheimer's disease (Man-shan ya, 2007). *N. indicum* exert partial protection in cortical neurons stressed by beta-amyloid (Aâ) peptides or deprivation of nutrition from serum. A new polysaccharide from the flowers of *N. indicum* (named as J6) was aimed to investigated its neuroprotective effects against Aâ-induced apoptosis. Pretreatments of the polysaccharide J6 significantly decreased the activity of caspase-3 as well as the cytotoxicity triggered by Aâ peptide in a dose dependent manner. In contrast to the activation of the survival signaling such as Akt found in J2, J3, and J4 fractions neuroprotective effects of J6 markedly inhibited Aâ peptide-stimulated phosphorylation of c-Jun N-terminal kinase (JNK-1). Dunn et al. (2011) demonstrated that oleandrin from leaves of *N. indicum* has potential to act as neuroprotective against in ischemic injuring oxidative damage and glucose deprivation. According to them yellow fluorescent protein tagged coronal brain slices had more protection from oxygen and glucose deprivation, when exposed to 1 µm oleandrin. This treatment also increased the á1 and á2 subunits of Na^+/K^+ ATPase in rat brain.

Anti-cancer Activity:

Nerium oleander leaf extract (NOE-4) treated human Burkitt's lymphoma (Raji cell) were heavily affected in a dose dependent manner as control Raji

cell were not affected with human mononuclear cell (MNCs) mediated cytotoxicity (Mamdooh et al., 2006). Turan et al. (2006) studied the antileukemic effects of various extracts of the *Nerium* on HL 60 and K 562 cell lines. They noted that cytotoxic index on K562 cells were 66.2%, 57, 8%, 58.1% and HL 60 cells were 69.3, 66.5 and 62.8% for leaf, stem root extracts, respectively. ATP binding cassette transporter P-glycoprotein was affected by these extracts, which ultimately kill the K 562 cells. Different extracts and compounds isolated from *N. indicum* were tested for their efficiency as anti-cancer agents. Newman et al. (2007) noted the efficiency of a major glycoside oleandrin on human pancreatic tumor cell, PANC-1. Oleandrin not only checked cell proliferation of PANC-1 cell but also arrests cell at G (2)/M stage of cell cycle, which indicates that oleandrin stimulated death of PANC-1 cells was governed by apoptotic pathway.

Anti-hyperlipidemic Activity:

The anti-hyperlipidemic effect of petroleum ether chloroform, ethanol and aqueous extracts of *N. indicum* leaves was studied against in triton induced and atherogenic diet induced hyperlipidemic rats. Chloroform extract of *N. indicum* leaves caused a significant reduction in serum lipid parameters like total cholesterol, triglycerides low density lipoprotein (LDL) very low density lipoprotein (VLDL) and increase in high density lipoprotein (HDL) in hyperlipidemic rats in comparison with hyperlipidemic control in both (Patel, 2010b).

Anti-feedant Activity:

Anti-feeding compounds can cause death impairment development or reproduction and may involve chronic as well as acute toxic effects. *Spodoptera litura* consumed minimum castor leaf sprayed with *N. indicum* leaf extract than fresh castor leaf. In addition to the leaf protection, enzymatic inhibition in insects is more, when it is consumed with castor leaf sprayed by *Nerium* leaf extract. In indicate that *N. indicum* leaf is an effective anti-feeding agent (Dhanapakiam and Shanazbegum, 1995).

Bio-indicator:

Alcoholic extracts of dried flowers are pink in colour. The colour changes

to green on addition of alkali and reappears when acid is added. The change of colour occurs in the pH range 5.4-5.7 and its use as a bio-indicator in volumetric analysis for titration of moderately strong acids has been suggested (Anon, 1991). Portillo et al. (1994) reported the leaves of *Nerium* plant can be used as an indicator of environmental contamination of lead produced by the effluent of motor vehicle. Use of plant products in old Indian Aurvedic system against various disease is well known.

Conclusion

In the present review, we have discussed the information on the pharmacological activities of *N. indicum* in treatment of various diseases. Literature survey revealed that *N. indicum* is source of mainly therapeutically important chemical constituents as glycoside, oleandrin, tannin, neriin, phytosterin, and l-strophnathin, rosaginin and nerlin, volatile oil, fixed oil, neriodori and neriodorein. Different studies on *N. indicum* indicate its important role in medicine. All the part of plant that is leaves; stems, barks and the flowers have action as tonic, cardio-tonic, and diaphoretic, diuretic, emetic and expectorant. In recent years, traditional system of medicine has become a topic of global importance. Plants have their own chemical compounds, some of these chemicals also have therapeutic value for human. *N. indicum* depicted the fact that it is a popular remedy among the various ethnic groups, Ayurvedic and traditional practitioners for treatment of ailments. Researchers has explored the therapeutic potential of this plant as analgesic, antidiabetic, anti-ulcer, antioxidant, antibacterial, antiviral, hepatoprotective, neuroprotective, anticancer, antihyperlipidemic, and anti-feedant activity. Instead of its use as insecticidal/ molluscicidal and bio-idicators is also recommended by various workers.

Although extensive works has been reported on the pharmacological properties of *N. indicum*, yet lot of researches are still needed to explore its full potential in medical science of 21st century.

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Effect of Pathogenesis on ascorbic acid and organic acids content of pear and pomegranate

Dr. Abhay Kumar Srivastava
Maharana Pratap Post Graduate College
Jungle Dhusan, Gorakhpur273001
Seminarmpm2019@gmail.com

ABSTRACT: Ascorbic acid content of healthy marketable fruits of Pear *(Pyrus communis* L.) and Pomegranate (*Punica granatum*,L) estimated were 56 and 180 mg/100gm fresh fruit respectively. The values were recorded to reduce significantly when estimation were made at 5, 10, 15 days of storage. Artificially induced infection caused further reduction of ascorbic acid in both the fruits. It was recorded that the reduction in pathogen mediated system at 5, 10 and 15 days respectively were higher than control by 16, 10.7 and 23.2 % in pear : *Curvularia tuberculata* ; 7, 6.4 and 12.1 % in pear :*A. alternata* isolate A and 15, 11 and 20 % in pomegranate : *A. alternata* isolate B interaction. The overall reduction in these system were higher than control by 23, 12 and 18% respectively. The reduction in ascorbic acid resulted in to loss of nutritive and table quality of these high value fruits.

The organic acid content of fresh marketable fruits of pear(*Pyrus communis* L.) consists of malic acid (0.96mg/g), citric acid (0.92mg/g), tartaric acid (0.80mg/g), succinic acid (0.38mg/g) and malonic acid (in traces). Artificially induced infection of *Curvularia tuberculata* Jain resulted in reduction of tartaric acid (15%), malic acid (52%) and malonic acid (100%) and an increase in citric acid (30.4%) and succinic acid (73%) while oxalic and fumaric acids formed de novo but artificially induced infection with *Alternaria alternata* Fr. Keissler isolate A in pear resulted in decrease in tartaric (27.5%) and malic (29%) acids, increase in citric(52.1), succinic (89.4%) and malonic acids and *de novo* synthesis of oxalic and fumaric acids. Fresh fruits of pomegranate (*Punica granatum* L.) consists of tartaric (3.2mg/g) ,citric (1.93mg/g), malic (0.96mg/g), malonic (0.80mg/g) , succinic (0.54mg/g) and oxalic acids (in traces). Interaction of *Alternaria alternata* Fr. Keissler isolate B in pomegranate resulted in decrease in tartaric (57.5%) and malic (6.2%) acids and an increase in citric (9.8%) and succinic (35% acids while malonic acid was completely utilized by the pathogen and fumaric acid synthesized *De novo*.

Keywords: Ascorbic acid, Vitamin C, Organic acids, *Alternaria alternata*, *Curvularia tuberculata*, Pear, Pomegranate, Post inflectional changes.

Introduction

Plants are the only source of vitamin C (Ascorbic acid) which is stored in fruits abundantly. It is utilized in metabolism as co-factor. High ascorbic acid content confers resistance in plants against fungi (Vidyasekaran *et al.* 1972)

and bacteria (Lelyveld, 1975). Pathogenesis causes severe change in vitamin C content (Jamaluddin, 1976). Ascorbic acid oxidase was reported in some fungi (Mandels,1953 and Ward,1955). Inadequacy of available data on ascorbic acid degradation was realized (Dasgupta and Mandal, 1989).Therefore present study was undertaken to add information on ascorbic acid degradation in pathogen mediated system. Similarly organic acids are third important stored substances in fruits after protein and sugars. Wood (1960) has reported organic acids as an important source of energy in plant cells. Role of organic acids in disease resistance was reported by Mohanraj *et al.* 1971. Sharp modification in organic acids content of different fruits under pathogenesis has also been noticed by various workers (Kapoor, 1983 ; Majumdar and Modi, 1980; Aggarwal and Bisen,1975;and Prasad and Bilgrami,1972). Present study deals with quantification and post inflectional changes in organic acids in aforesaid isolates.

Material And Methods

Isolates : Two different isolates of *Alternaria alternate* Fr Keisler were isolated from naturally infected fruits of pear : *Pyrus communis* L. (isolate A) and pomegranate : *Punica granatum* (isolate B).They also differed in their growth and sporulation behavior on Czapex and Asthana and Hawker media as well as host range (Srivastava, 1996). *Curvularia tuberculata* Jain was isolated from naturally occurring fruits of pear (*Pyrus communis* L). Inoculation : Pin prick method (Tomkin and Trout, 1931) of inoculation was used. *Incubation* : inoculated fruits as well as control were incubated in BOD for 15 days (Ascorbic acid studies) or 7 days (organic acid studies) at 25 $-^{+}2^{0}$C and analyzed for ascorbic acid contents at the gap of 5 days. *Ascorbic acid estimation*: Titration methods of ascorbic acid estimation based on the reduction of 2,6, di-chloro-phenol indo-phenol reagent was used. (Roe and Kuether, 1943). Two gram of healthy and diseased fruit were separately crushed in 25ml of 5% meta-phosphoric acid and filtered through Whatman No.42. Residue was washed twice with 10ml of meta-phosphoric acid and volume was finally raised to 50ml by adding required amount of meta-phosphoric acid.

10ml of filtrate was titrated against previously standardized solution of 2,6,dichlorophenol indophenols. The volume of indophenols reagent required for completion of each titration was recorded on the basis of three readings. In all cases blank correction of the titration value was made as suggested by

Frank (1955). The quantity of ascorbic acid in mg/100g fruit was calculated by formula :

(AxIxVx100) / v x W

Where A= Quantity of ascorbic acid (mg) reacting with 1ml of indophenols

I = total volume of indophenol required for completion of titration

V = Total vol. of extracts (here 50ml)

W = Weight of fruit pulp (here 2g)

V = Volume of extract used in each titration (here 10ml)

Organic acid estimation: Two gram of healthy and diseased fruits were extracted in 80% ethanol, boiled, filtered and centrifuged (Kapoor,1969). The clear supernatant liquid was taken out and stored in refrigerator at 4°C. The organic acids were separated by one dimensional ascending paper chromatography using solvent 10:2:5 (n-butanol : formic acid : water) as per procedure of Lugg and Overall,1947. Organic acids were detected by spray of 0.04% bromo-phenol blue indicator (w/v in ethanol). The organic acids were identified by comparing their respective Rf values with that of standard. Quantitative estimation of organic acid was done by planimeter and using standard curve.

Result & Discussion

Gradual decrease in the ascorbic acid content in healthy as well as infected fruits of pear and pomegranate was noted. However irrespective of pathogens or fruits, the decrease was always faster in case of pathogen mediated system. The percentage loss of ascorbic acid in pear fruit infected with *Curvularia tuberculata* was 93.2% after 15 days of incubation whereas the corresponding loss in healthy fruit was 70% (Table 1). Kapoor, 1983 has reported 81.4 % loss of vitamin C by infection of *Curvularia tuberculata* in guava fruit during 10 days of incubation. *A. alternata* isolate A resulted loss of ascorbic acid by 82% in pear and *A. alternata* isolate B resulted loss of ascorbic acid by 70.5% in pomegranate fruit during incubation period of 15 days (Table 1). *A. alternate* was earlier reported to be causing loss of ascorbic acid by 90.7% in litchi fruit (Prasad and Sinha, 1975), 84.6% in papaya (Prasad and Verma, 1976), 62.9% in banana (Prasad and Prasad,1977) and 100% depletion in apple (Nema, 1981). In case of banana the incubation period was 15 days while 10

days in rest except apple where it was 12 days. Loss of ascorbic acid content in fruit of pear was also reported due to different pathogens with varying amounts. The loss was 80.6 % by *Aspergillus flavus* (Singh and Sinha, 1984), 87.3% by *A parasiticus* (Singh and Sinha, 1984) and 100% by *Sclerotium rolfsi* (Sumbali and Mehrotra, 1982) during an incubation period of 7, 7 and 8 days respectively.

Ascorbic acid works as an oxidation reduction substance. It is known that L ascorbic acid is easily oxidized to dehydro L ascorbic acid by the enzyme ascorbic acid oxidase or by certain other oxidative enzymes like polyphenol oxidase , cytochrome oxidase, per-oxidase etc. according to following reaction (Prasad and Prasad,1977 ; Ward, 1955) :

L ascorbic acid $\xrightarrow[2H]{\text{oxidase}}$ dehydro L ascorbic acid $\xrightarrow{H_2O}$ 2,3 Diketogluconic acid

An atypical ascorbic acid oxidase specific for L ascorbic acid has been found to occur in certain fungi (Mandels, 1953; Ward,1955). Similar oxidation of ascorbic acid during fungal infection is known in case of rusts (Kirlay and Farkas, 1957; Oakes,1958). There it is probable that the decline in the ascorbic acid contents may be due to the production of suitable ascorbic acid degrading enzymes either by the pathogen concerned or by the interaction of host and parasite (Ghose et al. 1965). Comparatively rapid decline in the ascorbic acid in the infected tissues may also be due to the increased respiration rate under pathogenesis which has been observed in many fungi especially powdery mildew and rusts (Samborski and Shaw,1956 ; Dally *et al.* 1961 ; Bushnell and Allen,1962).

Oxalic acid was synthesized de novo in pear: *A. alternata* isolate A and pear : *C. tuberculata* interactions but totally exhausted in pomegranate : *A. alternata* isolate B. The synthesis among the two pathogen mediated system also varied under same fruit by different pathogen which is due to differential activity and capability of different pathogen (Table-2). While studying the effect of carbon sources on growth and sporulation of same pathogens, Srivastava 1996 reported poor growth and no sporulation in: *C. tuberculata*, moderate growth and no sporulation in *A. alternata* isolate A and poor growth and fair sporulation in : *A. alternata* isolate B on tartaric acid. However in present study,The decline in tartaric acid due to pathogenesis was found commensurate with the likeness of tartaric acid as carbon source by the respective pathogens. Citric acid increased in three pathogen mediated system understudy but the

increase was maximum in pear: *A. alternata* isolate A. Such increase in citric acid in pathogen mediated system was also reported by Majumdar and Modi (1980) and Prasad and Bilgrami (1972) in mango and litchi due to pathogenesis of *Aspergillus* species. Malonic acid was completely utilized by the pathogen mediated systems pomegranate: *A. alternata* isolate B and pear : *C. tuberculata* interactions but contrary to this Malonic acid was synthesized in pear: *A. alternata* isolate A interaction which is indicative of variation in different isolates of same pathogens. Malic acid was reduced due to pathogenesis in all the host pathogen mediated systems understudy. In contrast to this study, an increase was noted in brinjal due to *A. alternate* by Prasad and Poddar (1977). In vitro growth of pathogen on succinic acid has been recorded (Srivastava, 1996), however it is interesting that in the present in vivo study, accumulation of succinic acid was noted in three pathogen mediated system. Probably it is due to an end place of succinic acid in metabolic change of organic acids. Mc. Elory (1960) and Prasad and Bilgrami (1972) have explained the pathway viz.

Oxalo-acetic acid + $NADH_2$ → Malic acid + H_2O → Fumaric acid + $NADH_2$ → Succinic acid

The pathogen induced production of succinic acid by host has been reported while the fungus was unable to produce same in an in vitro study (Kapoor and Tandon, 1970).

Fumaric acid was synthesized de novo in all the three pathogen mediated system understudy but maximum quantity of fumaric acid was found in pomegranate: *A. alternata* isolate B interaction (6.30mg/g). The present study was in conformity with the results of other workers in different crops viz. Guava: *Aspergillus niger* (Singh,1968) ; Apple : *Botridiplodia theobroma* (Raghawan and Saxena, 1979); Tomato : *Cylindrocladium* (Tandon et al.,1974) ; Tomato : *Myrothecium rosedium* (Tandon et al. 1974) and grape : *Phomopsis viticola* (Arya,1980). Thus the two isolates of *Alternaria alternate* Fr Keisler differed in post infection behaviours on oxalic acid and malonic acids. Pathogenesis by three test pathogens brought severe modification in organic acid contents of pear and pomegranate.

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Table 1: Changes in ascorbic acid contents (in mg/100g.) fruit pulp of healthy and infected fruits of pear and pomegranate.

Fruits	Ascorbic acid content Days after inoculation/infection				Loss of ascorbic acid after 15 days in percent
	0	5	10	15	
Pear Healthy	56.0	42.0	23.6	16.8	70
Inoculated *(C.tuberculata)*	56.0	33.6	17.5	3.8	93
Pear healthy	56.0	42	23.6	16.8	70
Inoculated *(A.alternata isolate A)*	56.0	38	20.0	10.0	82
Pomegranate	180.0	152	112	86	52.7
healthy Inoculated *(A.alternata isolate B)*	180.0	125	92	53	70.5

TABLE 2: Organic acids (mg/g fresh weight) in fruits of pear infected with *C. tuberculata* and *A alternata* isolate A and pomegranate infected *with A alternata* isolate B

Organic acid	Pear *C. tuberculata*			Pear *A alternata* isolate A			Pomegranate *A alternata* isolate B		
	healthy	diseased	% change	healthy	diseased	% change	healthy	diseased	% change
Oxalic acid	-	0.18		-	0.24		T	-	Cd
Tartaricacid	0.80	0.68	-15	0.80	0.58	-27.5	3.20	1.36	-5.75
Citricacid	0.92	1.20	30.0	0.92	1.40	52.1	1.93	2.12	9.8
Malicacid	0.96	0.46	-52	0.96	0.68	-29	0.96	0.92	-6'2
Malonicacid	T	-	CD	T	0.44		0.80	-	CD
Succinicacid	0.38	0.66	+75	0.38	0.72	89.4	0.54	0.73	+35.1
Fumaricacid	-	T		-	T		-	6.30	
Total	3.06	3.18		3.06	4.06		7.43	11.43	

T =Traces ;C= Comletely Deplted

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Plastic Waste Management Strategies

Kritika Rao
Maharana Pratap Post Graduate College
Jungle Dhusan, Gorakhpur273001

Abstract : Plastics are integral part of society and have varied application. Plastics are composed of a network of molecular monomers bound together to form macromolecules. There are increasing concerns due to non degradability and generation of toxic gases on combustion during incineration. Due to fabrication of desired shape colour and specification convenient to customers there is increasing application in packaging, agriculture, automobiles and biomedical. They are indispensable to the modern generation due to development in information technology, intelligent and smart packaging system. Efforts are in progress for development of efficient and precise conversation of renewable raw materials into innovative polymeric product through recent technologies which are superior in terms of performance, environmental and cost perspectives. In rivers and at coastal regions the marine pollution is increasing at a faster rate due to indiscriminate disposal by the consumers. Research & Development studies are now centred for investigating whether consumption of plastic debris by marine organism translates into toxic exposures for people who consume seafood with particular relevance to plasticisers, stabilizers, heavy metals viz phthalates, BPA, lead cadmium, methyl mercury. Biological effects from pollution are linked with resulting economic effects and losses. A cornerstone of sustainable development is the establishment of affordable, effective and truly sustainable waste management practices in developing countries.

Plastic waste management is a critical issue. Over 300 million metric tons of plastics are produced in the world annually and about fifty percent of this volume is for disposal applications, product that are discarded within a year of their purchase. It is the boon and bane of our times. Although there are multiple uses, its waste and the resultant pollution clogs up our rivers, oceans, lands and adversely affects the biodiversity. We need to plan for disposal of new synthetic product, implants etc which have completed their shelf life. In future polymeric adhesives and implants are to be developed which address total joint replacement features for patients with varied complications and age. It should be robust, biocompatible with surface treatment options to allow for reduced friction and wear throughout the implant life. In a CPCB supported study we have found that the soil and ground water quality may be affected in dumpsite areas.

Plastics have been used widely in both water and food packaging due to their natural properties such as inertness and low bulk densities, which make them suitable mover materials and little risk to contaminants. Plastic bottles and sachets have become prevalent all over the country, particularly, urban areas. The packaging revolt has not been backed by proper plastic waste management policy, which has left a lot of cities in India littered with plastic wastes,hence, creating horrible visual troubles and other community health problems. Growing environmental awareness and reduction in available landfill capacity have prompted plastic recycling programmes in most developed countries. Currently, however only between 5 to 25% of plastic waste is being recycled. The paper discusses prospects of plastic waste management schemes. It is

concluded that the existing rate of environmental worsening is likely to continue unless long term remedial measures are adopted for plastic wastes management in the country.

Introduction

Plastics have made significant contribution in almost every field of human activity today –agriculture, medical, transportation, piping, electrical and heat insulation, packaging, manufacturing of household and electronic goods, furniture and other items of daily or specific use. Plastics in medical products like disposable syringes, blister packing of tablets and capsules, joint replacement prostheses, inter venous (IV) fluid bottles, blood bags, catheters, heart valves, etc., have significantly helped supporting the human life. Medical devices made of plastics are implanted into the human body. Packaging is one of the most important applicationsof plastics. In fact, about 40% of plastic materials worldwide are used in packaging applications. Plastics have contributed in creating a sustainable, hygienic, energy efficient, cost effective and environmental friendly packaging system. Versatility of plastics has allowed creating an efficient pilfer proof, hygienic and cost effective packaging of food products like milk, spices, edible oil, bread, confectioneries, rice, wheat flour, snack foods and various types of medicines. Plastics are used for packaging of toiletries, cosmetics and host of other consumer products of daily and special purpose use required all – rich or poor in urban cities or in the villages. This has been possible due to the following attributes of plastic materials:

i. Safe and hygienic – inert and chemical resistance,
ii. Light weight and non-breakability,
iii. Excellent barrier properties - enhancing shelf-life,
iv. Superior impact resistance,
v. Sterilizable and resistance to bacterial and other microbial growth,
vi. Transparency as well as opacity,
vii. Lower fuel consumption and product loss during transportation.

Contribution of plastics to human health is difficult to ignore. Plastic based packaging with the above-mentioned properties ensures reaching the best, hygienic and unadulterated product to the masses. Despite all these benefits, plastics packaging in general, and plastic bags / carry bags – which are a part of the packaging system, are under the scanner. Plastics are blamed for series of health, safety and environmental problems. Non-biodegradability of plastics is attributed towards causing waste management problems and choking of the

drains in urban cities. The solution to waste management problem lies in segregation of dry and wet solid waste at the source for which an effective mass awareness campaign is very important. Creation of efficient solid waste management infrastructure coupled with encouraging establishment of recycling centres would help address the MSW problem. Plastics can be recycled to produce articles for mass use augmenting the concept of resource management. Many useful products have been developed with recycled plastics and large number of people is employed in these activities in small, micro and informal sectors. An informal industry estimate put the recycling figure of India at around 1.5 Million Tons – close to 50% of plastics used for packaging applications. This is a very high recycling ratio. Recycling ensures that the unwanted and discarded plastics waste does not remain in road side nor it is carried to the landfill. Apart from the conventional recycling, which is popular in India, alternate processes of plastic recycling are also required to be encouraged. Low-end, mixed and comingled plastics waste can be used safely for co-processing in cement kilns. Industrial fuel can be produced from all types of mixed plastics waste. Plastic waste has been used to construct asphalt roads. All these processes have been successfully tried and established in Indian conditions. Adherence for abiding to safe norms while recycling, as stipulated by the regulatory authorities, is a must. Proper education, facility, incentives and awareness can achieve this goal. However, some types of plastic waste like multi layer laminates, EPS, etc. are not easily recyclable by conventional process. Sometimes when different types of plastic waste, which are otherwise easily recyclable individually, get mixed with different groups of plastics in the waste stream forming, what we call, comingled plastic waste, recycling becomes difficult. Such type of plastic waste, generally, is abandoned by the waste pickers creating waste management problem. In India, the infrastructure for handling of solid waste particularly in urban areas is woefully inadequate. Poor littering habit of the general public has aggravated the problem. Union as well as different state government authorities had indeed imposed restrictions on use of thin plastic carry bags to contain the waste problem indirectly. However, it is recognized that various Government Notifications were not implemented effectively. This led to an increased pressure on the local authorities to take more stringent measures including complete ban on plastic bags. It is realized that complete ban on plastic carry bags is not the solution – rather it would encourage use of alternate materials creating an increased environmental pollution in the real sense and ultimately leading to the cause

of climate change – a more dreaded reality the world is facing today. A voluntary cooperation and self-regulation by the industry and the public at large and adequate action by the Government Authorities can solve the waste management problem. Life Cycle Impact Analysis (LCIA) is an important and modern scientific tool to analyse the total environmental impact of a product or activity on the earth. The sum total of the environmental impact of a product or activity from its inception, production, transportation to market place, usage and reusage,recycling and disposal for disintegration or recovery of energy or the basic constituents of the material for producing the same or other materials of use – gives the indication of the product or activity's environmental friendliness or otherwise, compared to an alternative. Outcome of many LCA studies conducted by credible academic institutions and independent professional organisations of repute have proved that plastics have much less adverse impacts on the environment pollution as compared to their alternative.

Types of Plastics and their Major Applications

The various types of plastics and their major applications are as follows:

Thermoplastics:

These types of plastics become soft when heated, they can be moulded or shaped with pressure when in plastic state and, when cooled, they solidify and retain the shape or mould. Some common thermoplastics with their uses and properties are as follows: -

Polyethylene terephthalate (PET): Some common properties are:

i. Tough and clear, good strength and stiffness, chemical and heat resistant, good barrier properties for oxygen and carbon dioxide.

ii. It is used in-packaging, soft drink and mineral water bottles, fibres for clothing, films, food containers, transport, building and appliance industry (as it is fire resistant), etc.

High density polyethylene (HDPE): Some common properties:

i. Good process ability, excellent balance of rigidity and impact strength, excellent chemical resistance, crystalline, melting point (130-1350C), and excellent water vapour barrier properties.

ii. Used for making blow moulded products (various types of containers, water bottles), pipes, injection moulded products (storage bins, caps, buckets, mugs), films(carrier bags), etc.

Polyvinyl chloride (PVC): Its properties are:

i. Versatility, energy saving, adaptability to changing time and environment, durability, fire resistance.

ii. It is used in industries such as building and construction, packaging, medical, agriculture, transport. Also used for making wires and cables, furniture, footwear, domestic appliances, films and sheets, bottles, etc.

Low density polyethylene (LDPE): Characteristics of LDPE are:

i. Easy process ability, low density, semi crystalline nature, low melting range, low softening point, good chemical resistance, excellent dielectric properties, low moisture barrier, poor abrasion and stretch resistance.

ii. It is used for making carrier bags, heavy duty bags, nursery bags, small squeeze bottles. Also used in milk packaging, wire and cable insulation,etc.

Polypropylene (PP): Properties are:

i. Low density, excellent chemical resistance, environmental stress resistance, high melting point, good process ability, dielectric properties, lowcost, creep resistance.

ii. Used for making bottles, medical containers, pipes, sheets, straws, films, furniture, house wares, luggage, toys, hair dryer, fan, etc.

Polystyrene (PS): Some of the properties of polystyrene are:

i. Glassy surface, clear to opaque, rigid, hard, high clarity, affected by fats and solvents.

ii. Used for making electrical and communication equipments e.g. plugs, sockets, switch plates, coil forms, circuit boards, spacers and housings. Also used formaking containers, toys, wall tiles, baskets, cutlery, dishes, cups, tumblers, dairy containers, etc.

Others plastics: There are many other types of plastics except these six types, often used in the engineering sector. Examples include polycarbonate (PC), nylon, and acrylonitrile butadienestyrene (ABS).

Thermosets:

Thermosetting materials are those which once set cannot be remoulded/ softened by applying heat. It includes phenol, melamine and urea formaldehyde, unsaturated polyester, epoxy and polyurethanes. These materials are not

recyclable. The management of plastic waste is to be planned in such a manner that the plastic waste generated from various sources is suitably taken care of.

Conventional Technology for Plastic Waste Management

The conventional technology for plastic waste management involves recycling, landfilling and incineration. Recycling of plastics through environmentally sound methods:

Recycling of plastics must be carried out in such a manner that it minimizes the pollution level throughout the process and, as a result, increase the efficiency of the process and conserve the energy. Plastic recycling technologies have been divided into four general types-primary, secondary, tertiary and quaternary. Primary recycling includes processing of scrap/waste into aproduct with features similar to the original product.

Secondary recycling involves processing of waste plastics into products that have characteristics dissimilar from those of original plastic products.

In Tertiary recycling, basic chemicals and fuels are produced from plastic scrap as part of the municipal waste stream or as a segregated waste.Quaternary recycling reclaims the energy content of the scrap plastics by burning/incineration. This process is not in use in India. Steps Involved in the Recycling Process are:

Selection : The recyclers need to select the wastes which are suitable for recycling.

Segregation: The plastic waste need to be segregated as per the codes stated in the BiS guidelines (IS:14534:1998).

Processing: After selection and segregation, the pre-consumer waste shall be recycled directly. The post consumer waste (used plastic waste) shall be washed, shredded, agglomerated,extruded and granulated.

Landfilling: This is a traditional approach to waste management, but space for constructing landfills is becoming limited in some countries. A well-managed landfill site results in restricted instant environmental harm further than the impacts of collection and transportation, though there are long-term threats of contamination of groundwater and soil by few additives and breakdown by plastics products, which can turn out to be constant organic pollutant.

A main drawback of landfills from a sustainability feature is that no one

of the material resources used for the production of plastic is recovered—the Material flow is linear rather than cyclic. In U. K., a landfill tax is functional, which is currently set to rise every year so as to increase the incentive to turn away wastes from landfill to recovery actions.

Incineration: This process lessens the need for landfilling of plastics wastes, but, there are worries that hazardous materials may be released into the atmosphere during this process. For example, halogenated additives and PVC are usually present in mixed plastic waste which leads to the threat of dioxins, furans and other polychlorinated biphenyls being released into the environment.

The choice of incinerators is very important. Though it is not likely to be done in a controlled manner so as to reduce the pollution due to off-gas i.e. dioxins and furans to wanted standards. So this method of plastic waste management is usually not preferred. The treatment cost of the gases is frequently more than the energy recovered.

Modern incineration technology has answers to tackle any incineration problem without polluting the environment and, in many cases, recovering the calorific value out of the waste being incinerated. Heavily contaminated plastic waste collected from different waste streams can be utilized for energy recovery by waste incineration plants. Cost of this system of recovery is considered highest among all the other alternatives. When considering incineration as an option, it is to be remembered that plastic waste incineration may lead to generation of harmful pollutants like dioxins and furans, which is highly undesirable.

Recent Technologies for Plastic Waste Management

The recent technologies for plastic waste management are listed here.

Polymer Blended Bitumen Road: The process of road laying using waste plastics is designed and the technique is being implemented successfully for the construction of flexible roads at various places in India.

Co-processing of Plastic waste in Cement Kiln: Plastic waste generated from different cities and towns is a part of municipal solid waste (MSW). It is a matter of concern that disposal of plastic waste is causing many problems such as leaching impact on land and ground water, choking of drains, making land infertile, indiscriminate burning causing environmental hazards etc. Plastic waste, being non-biodegradable, is littered in most of the cities/towns

and their-by giving an ugly appearance. It is estimated that approximately 15,342 tonnes/day (TPD) of plastic waste (on per capita basis) is generated in the country.

To get rid of plastic waste disposal problems, Central Pollution Control Board (CPCB) in association with M. P. Pollution Control Board has taken initiative to use the plastic waste in cement plant at ACC Kymore (Katni, M. P.). The stack monitoring results, revealed that emission values are found below the standard set for Common Hazardous Waste Incinerators. After getting encouraging results, CPCB has granted permission to many cement plants to co-process the hazardous and non-hazardous (including plastic) waste in their kilns after trial burns.

Co-processing of plastic waste as an Alternative Fuel and Raw Material (AFR):Co-processing refers to the utilization of waste materials in industry process such as cement, production of lime or steel and power stations or any other large combustion plants. Co-processing shows replacement of primary fuel and raw material by waste recovering industry and material from waste. Waste materials, for instance, plastic waste used for co-processing are referred to as alternative fuels and raw material (AFR). Co-processing of plastic waste suggests advantages for cement industry as well as for the Municipal Authorities responsible for waste management. In other hand,cement producers can save fossil fuel and raw material consumption, contributing the more eco-efficient production. In addition, one of the advantages of recovery method used in existing facility would be, eradicating the need to invest on other plastic waste practices and to secure land filling.

Co-processing of Plastic waste in Cement Kiln: One of the most effective methods of recycling of plastics waste for recovery of energy is its use as an alternative fuel in cement kilns. Apart from recycling of plastic for making new products and saving energy, there are also projects which aim to turn plastic into new energy sources. Plastic is prepared from crude oil, which is the same raw material from which fuel is made.

Thus, some scientists have made it their goal to turn waste plastic back to crude oil so that it can be reused for powering engines. With the help of this method, waste plastic is not only put to actual use, but it also helps to save the scarce crude oil resources left on earth. The high temperature used in the cement kilns gives a scope for use of even some type of plastic waste contaminated with toxic chemicals like pesticides and some other hazardous

materials without creating any increased emissions in the air or water. No segregation or cleaning is required for such type of disposal. Low-end plastic waste, which creates a waste management problem, may provide the vital energy to the cement industry. At 10% replacement rate, 170 Cement Kilns in India could dispose of the entire plastic waste generated in the country today with additional benefit ofreduction in the use of fossil fuel- coal.

Plasma Pyrolysis Technology (PPT): Plasma Pyrolysis is a technology, which put together the thermo-chemical properties of plasma with the pyrolysis process. The extreme and versatile heat generation ability of plasma pyrolysis technology enables it to dispose of all types of plastic waste.

Process Technology: In Plasma Pyrolysis, initially the plastic waste is fed into the primary chamber at 850^0C through a feeder.

The waste material dissociates into carbon monoxide, hydrogen,methane, higher hydrocarbons etc. Induced draft fan drains the pyrolysis gases and plastic waste into the secondary chamber. In this chamber, the pyrolysis gases are combusted in the presence of excess air. The inflammable gases catch fire because of high voltage spark. The temperature in the secondary chamber ismaintained at 1050 ^{0}C. The hydrocarbon, hydrogen and CO are combusted into water and safe carbon dioxide. Conditions are maintained such that it eradicates the possibility of formation of toxic gases. The conversion of organic waste into non toxic gases (CO2, H2O) is more than 99%. The excessive conditions of plasma kill stable bacteria such as bacillus stereo-thermophilus and bacillus subtilis right away. Segregation of the waste is not necessary, since very high temperatures make sure the treatment of all types of waste without discrimination.

Conversion of Plastics Waste into Liquid Fuel: This technology is not very complicated. As feedstock, it can accept a broad range of plastics, including those that are unwashed,unsorted, or which are hard to recycle. Once the material is obtained, it can be cut up into small pieces prior to its utilization, but current advancements have led to the capability of putting larger pieces of plastic directly into the system. To start the process, waste is laden into a hopper with a forklift.

The materials which can be loaded include plastic car bumpers,fuel tanks, product packaging, component holders, agricultural film, and pharmaceutical packaging. Natural gas is burnt to generate heat and get the process started once the hopper is in the reactor. At this point a catalyst helps in breaking the

plastic hydrocarbons into shorter chain of molecules. The off-gases that are not going to be collected as fuel are used to produce heat and keep the process going. The fuel oil and diesel are condensed from a gaseous state into a liquid state, which are collected as the process continues. They are placed into temporary fuel tanks. The process is controlled by an automated system.

Conclusion

Plastic Waste Management has assumed great significance inpresent day context. Various schemes are being implemented to mitigate the impacts of plastic waste in India. Recycling is one such scheme for waste management of plastic products. It makes rising sense environmentally as well as economically and current trends demonstrate a considerable increase in the rate of recovery and recycling of plastic wastes. These trends are expected to continue, but some significant challenges still exist from both technological factors and from economic or social behaviour issues relating to the collection of recyclable wastes, and substitution for virgin material. Joined with efforts to increase the specification and use of recycled grades as replacement of virgin plastic, recycling of waste plastics is an efficient way to improve the environmental performance of thepolymer industry.

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Effect of root powder of *Potentilla fulgens* and their different organic extracts on the (Reproduction) fecundity, hatchability and survival of *Lymnaea acuminata*

Pradeep Kumar*

*Department of Zoology, S.G.N. Govt. P.G. College,
Muhammadabad Gohana, Mau, 276403, U.P. India

Abstract: Fasciolosis is a worldwide food-borne parasitic trematode infection among common public health problems and cattle population. The snail is one of the most important intermediate carrier hosts of the fasciolosis. The control of snail population is one of the important methods in the campaign to reduce the incidence of fasciolosis among both human and cattle populations. In order to achieve this objective, the use of plant derived molluscicide is an appropriate approach to control of the snail populations. The present study was to observe the effects of sub lethal (20% and 60% of 24h LC_{50}) doses of *Potentilla fulgens* root powder, different organic extract and column purified fraction on the, fecundity, hatchability and survival of fascioliasis vectors snail *Lymnaea acuminata*. Plant derived molluscicides significantly reduced the reproductive capacity of the snail *L. acuminata.* Maximum reduction in fecundity (27.63 % of control) was observed in snail treated with ethanol column fraction of the root powder of *Potentilla fulgens.* In withdrawal group significant recovery was noted in all treatments of the snails (91.78 % of control). The hatching period of egg laid by treated group was prolonged from 8 to 17 days with respect to 7 to 9 days in control snails. Percent hatchability as well as survivability of young snail were significantly reduced in sub lethal doses of column fraction of the root powder of *P. fulgens*.

Keywords: *Potentilla fulgens*, Reproduction, Fecundity, Hatchability, *Lymnaea acuminata.*

1. Introduction

Fasciolosis is a global zoonotic disease which caused by two trematode *Fasciola hepatica* and *F. gigantica* in Africa and Asia (WHO, 2007; Mas-Coma, 2014). According to WHO 2.4 million human populations are infected with *Fasciola* and a further 180 million are at risk of infection (Anonymus, 1995). There is a very high incidence of fasciolosis in the cattle population of the eastern region of the Uttar Pradesh (Singh and Agarwal, 1981). The fresh water snail *Lymnaea acuminata* is an intermediate host of the *Fasciola* species (Agarwal and Singh, 1988; Kumar and Singh, 2006; Kumar et al., 2007; Kumar et al., 2011; Kumar et al., 2018). Fasciolosis caused immense economic losses

such as, lower production of milk, wool and meat, reduce weight gain, and impaired fertility (Agarwal and Singh, 1988; Parr and Gray, 2000) of infected animals. One of the possible approaches to control of the fasciolosis infestations by the control of intermediate host snail population below threshold level. A number of chemically diverse plant molluscicide have been isolated and identified (Singh et al., 1996). However, the natural products in general have an advantage over synthetic products, because natural products have biodegradable, eco-friendly and hence are less likely to accumulate in the environment. Previously, it has been reported by us that root powder of *Potentilla fulgens* and different organic extract, column purified fraction were potent molluscicide (Kumar et al., 2018). In the present study were focus on the plant derived molluscicides containing sub lethal (20% and 60 % of 24h LC_{50}) doses of *Potentilla fulgens* root powder, different organic extract and column purified fraction on the, fecundity, hatchability and survival of the fascioliasis vectors snail *Lymnaea acuminata* .

2. Materials and Methods

2.1. Experimental Animal

Adult *L. acuminata* (2.60±0.30 cm in length) were collected from low lying submerged field of Gorakhpur (U.P.) India. The snails were allowed to acclimatize for 72 hours in dechlorinated tap water at 23 to 25^{0}C in laboratory condition. The pH of water was 7.1-7.2 and dissolved oxygen, free carbon dioxide and bicarbonate alkalinity were 6.3-7.1 mg/l, 5.2-6.3 mg/l and 103.0-104.0 mg/l, respectively.

2.2. Preparation of crude products

The fresh dried root of *Potentilla fulgens* were procured from local market in Gorakhpur, (UP) India. Dried root of *P. fulgens* were pulverized separately in the electric grinder and the crude powders thus obtained, were then sieved with the help of fine mesh cloth. This fine powder was then used separately for fecundity, hatchability and survival of the vector snail *L. acuminata*.

2.3. Extraction of crude products

Two gram dried roots powder of plant *P. fulgens* were extracted with 200 ml of 98% ether, 99.7% chloroform, 98% methanol, 98% acetone, and 95% ethanol at room temperature for 24h. Each preparation was filtered separately

through sterilized whatman No-1 filter paper and the filtered extracts where subsequently evaporated under vacuum (Kumar and Singh, 2006). The residues, thus obtained, were used for the determination of molluscicidal activity. The root powder of *P. fulgens* yielded 250 mg ethanol, 350 mg chloroform, 360 mg ether and 415 mg acetone extracts.

2.4. Column purification

One hundred milliliters of ethanol extract fraction of dried root powder of *P. fulgens* were subjected to silica gel (60-120 mesh, Qualigens Glass, Precious Electrochemidus Private Limited, Bombay, India) chromatography through a 5 × 45 cm column. Five milliliter fractions eluted with ethanol (95%) were collected. Ethanol was evaporated under vacuum and the remaining solids obtained were used for the fecundity, hatchability and survival of the vector snail each fraction.

2.5. Treatments

Snails were treated with sub lethal (20% and 60% of 24h LC_{50}) concentration of dried root powder of *P. fulgens,* different organic extracts and column purified fractions on the reproduction was studied by the method of Kumar et al., (2013). Groups of 20 snails in 3L water were treated with sub lethal concentrations (20% and 60% of 24h LC_{50}) root powder of *P. fulgens,* of different organic extracts and column purified fractions for the fecundity, hatchability and survival of the snails.

2.6. Fecundity, Hatchability and Survivability of the Snail

These experiments were performed according to the method of Kumar et al., (2013). The total number of eggs laid by sub lethal (20% and 60% of 24h LC_{50}) concentration of plant derived molluscicides and control group of snails were counted after every 24h for 96h. Since it is difficult to detect the mother snails for particular spawn, capsules containing eggs from each treated and control group were incubated at 30°C in covered petri dishes containing the same concentration as those given to adult snails. The development of embryos at regular intervals was observed under a binocular microscope until they hatched. A dead embryo lacks embryonic movements and becomes opaque. Dead embryos were removed to avoid any contamination. Young snails were immediately transferred to fresh water and their survival was observed up to 72h after hatching. Each experiment was replicated six times. In a

withdrawal experiment, snail were transferred to fresh water after 96h of exposure to the above- mentioned treatment and their fecundity was observed for the next 72h.

2.7. Statistical analysis

Each experiment was replicated at least 6 times. Values were expressed as Mean±SE. Students t-test was applied to determine the significant ($P<0.05$) difference between sub lethal treated and control group of the animals. Product moment correlation coefficient was applied in between exposure time and different values of fecundity/ survival of hatched snails (Sokal and Rohlf, 1973).

3. Results

In control groups of 20 snails laid 230-240 eggs/day. There was a significant ($p<0.05$) reduction in the fecundity of snail *L. acuminata* treated with sub lethal concentration of the 20 and 60 % of LC_{50}/24h of dried root powder, ether extract, chloroform extract, methanol extract, acetone extract, ethanol extract and column purified fractions as a molluscicides (Table-1) No egg lying after 48h was observed in snails treated with 60% of 24h LC_{50} of column purified fractions of dried root powder of *P. fulgens*. The hatching period was prolonged in treated group (8-18 days) with respect to control group (7-9 days) (Table-2). Withdrawal of snail after 96h treated snail for next 72h in fresh water caused a significant ($P<0.05$) recovery in the fecundity of snails with respect to their corresponding treatment (Table-1).

After 48h no survival of young snail was noted in treated with 60 % of 24h LC_{50} of ethanol extract, whereas after 24h no survival was observed in young snail treated with 20 % or 60% of 24h LC_{50} of column purified fractions (Table-2). There was a significant ($P<0.05$) negative correlation between the treated time and survival of young snails hatched from eggs laid by snail treated to 20%, 60% of 24h LC_{50} of different organic fractions (Table-2).

4. Discussion

The result section clearly indicates that sublethal molluscicidal concentration (20% and 60% of 24h LC_{50} of dried root powder, different organic extracts column purified fractions of *P. fulgens*) significantly ($P<0.05$) reduced the reproductive capacity of snail *L. acuminata*. Molluscicidal activity different organic extracts and column purified fractions of 60% of the 24h LC_{50}

significantly (P<0.05) reduced the fecundity of *L. acuminata* within 72h.

A number of plant products have been effectively used for control of snail reproduction (Marston and Hostettmann, 1985; Mello-Silva et al., 2007; Kumar et al., 2009). Kumar et al., (2009) has reported the plant derived molluscicide (ferulic acid, umbelliferone, eugenol and limonene) influence on the fecundity of snail *L. acuminata.* Maximum reduction in the fecundity was observed in 60% sub lethal concentration of 24h LC_{50} of column purified fractions *P. fulgens.* Hemalatha et al., (2013) has been reported the ethanolic root extract of *P. fulgens* preventing gastric ulcers in rats due to anthihistaminic and $H^+ K^+$ - ATPase inhibitory activities. It may be possible that the different active component of *P. fulgens* in snail body could change the different enzyme activity. Ray et al., (2010) has been reported that the alcoholic extract of dried root powder of *P. fulgens* reduced significantly vital tegumental enzyme activity of acid phosphatase, alkaline phosphatase and adenosine triphosphatase (ATPase) in cestodes parasite *Raillietina echinobothrida* and trematodes *Gastrothylax crumenifer*, respectively. The acid phosphatase, a lysosomal enzyme (Aruna et al., 1979), plays an important role in catabolism pathological necrosis autolysis, and phagocytosis (Abou-Donia, 1978). The enzyme alkaline phosphatase plays a critical role in protein synthesis (Pilo et al., 1972), shell formation (Timmermans, 1969), other secretary activities (Ibrahim et al., 1974), and transport of metabolites (Vorbrodt, 1959) in gastropods. *P. fulgens* root extract is rich in polyphenolic components (Hemalatha et al., 2013) with the maximum quantity of phenolic tannins. Jaitak et al., (2010) reported the root extract of *P. fulgens* contain high amount of tannin and flavonoid. Several tannin bearing different families of plants have molluscicidal properties (Ayoub and Yankov, 1986). It may be possible that different active components of *P. fulgens* diffuse in the snail body and inhibit certain enzymes. It may affect the caudodarsal cells (CDSs) in brain and ultimately decrease the release of the ovulation hormone that resulted a decrease in the fecundity of the snails. Roubos et al., (1981) has reported that the caudodarsal cell is responsible for the fecundity of snail *Lymnaea acuminata*. Previously different experimental studies of *P. fulgens* have revealed that its root extract possesses antitumor (Rosangkima and Prasad, 2004), antioxidant (Jaitak et al., 2010), gastroprotective (Laloo et al., 2013), and anthelmintic (Roy et al., 2010) activities.

The reduction in percent hatchability of eggs laid by *L. acuminata* treated with sublethal concentrations of different organic extract and column purified fraction of *P. fulgens* as molluscicides with the embryonic development and growth of the snails. The snails, young larvae were weak, unable to break the egg capsule, and died owing to starvation. Young snails hatched from the treated egg masses showed delay in attaining maturity in comparison with the control groups. In general, the egg shells were thinner, and the hatchlings had shorter tentacles and slower movement and were smaller in size as compared with control group. Mortality and low reproduction in treated snails suggest the active molluscicidal components in organic extract and column purified was able to reduce the snail population by inhibiting development at any stage of snail growth.

Therefore, the transfer of mother snails to fresh water for the next 72h after 96h leads to a significant recovery in the fecundity. Thus, recovery of the effects would be an added advantage in their use against harmful snails. The plant derived molluscicides are easily available and biodegradable with sublethal molluscicides is a new concept for the control of snail population below threshold population of snail. The plant derived active components can be used to make a significant sterility in snails as well as in development of embryonic stages.

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Table1. Effect of sublethal (20% and 60% of 24h LC_{50}) molluscicide of *Potentilla fulgens* (root powder, ether extract, chloroform extract, methanol extract, acetone extract, ethanol extract and column purified) on the fecundity of the snail *Lymnaea acuminata*

Treatment (Sublethal concentration of #24h LC_{50} of 20 and 60%)	Fecundity after 24h (eggs/20 snail)	Fecundity after 48h (eggs/20 snail)	Fecundity after 72h (eggs/20 snail)	Fecundity after 90h (eggs/20 snail)	Withdrawal after 96h treated snails Fecundity after 72h (eggs/20 snails)
Control	178.44±0.33	176.24±0.42	177.12±0.42*	179.66±0.22*	188.32±0.51
P. fulgens (DRP)	+145.22±0.62*	140.13±0.15*	138.40±0.56*	136.55±0.32*	176.40±0.92
	+141.31±0.42*	138.22±0.42*	136.99±0.82*	134.73±0.99*	170.22±0.40
Ether extract	+138.24±0.51*	136.55±0.92*	134.22±0.72*	132.58±0.75*	169.63±0.31
	+135.42±0.64*	134.22±0.42*	133.82±0.66*	130.48±0.62*	165.49±0.32
Chloroform extract	+133.40±0.32*	132.66±0.72*	130.44±0.26*	128.67±0.42*	161.88±0.32
	+128.61±0.72*	127.69±0.40*	125.66±0.82*	123.32±0.93*	155.99±0.82
Methanol extract	+131.33±0.40*	130.52±0.22*	126.55±0.13*	125.52±0.82*	148.62±0.73
	+126.49±0.32*	124.66±0.32*	122.72±0.82*	119.63±0.42*	141.93±0.19
Acetone extract	+120.42±0.55*	118.67±0.72*	116.32±0.44*	113.63±0.88*	138.68±0.42
	+110.43±0.29*	109.72±0.66*	107.62±0.63*	103.88±0.33*	137.66±0.82
Ethanol extract	+96.47±0.12*	92.72±0.63*	90.22±0.73*	88.62±0.32*	130.99±0.82
	+75.23±0.39*	73.77±0.82*	70.62±0.66*	67.42±0.32*	110.67±0.31
Column purified	+38.62±0.42*	-	-	-	98.62±0.83
	+27.63±0.82*	-	-	-	91.78±0.42

[#] Kumar et al., (2018). Each value is mean ± SE of six replicates. Each replicates represents the egg laid by the group of 20 snails. (*) significant (P<0.05) when student "t" test was applied to treated and control groups. (+) product moment correlation coefficient showed that there was significant (P<0.05) negative correlation in between the exposure period and fecundity of snail *L. acuminata*. (-) No fecundity was observed.

Table 2. Effect of sublethal (20% and 60% of 24h LC_{50}) molluscicide of *Potentilla fulgens* (root powder, ether extract, chloroform extract, methanol extract, acetone extract, ethanol extract and column purified) on the hatchability and survival of the snail *Lymnaea acuminata* eggs obtained after 24h in table1.

Treatment (Sublethal concentration of 24 h LC_{50} of 20 and 60%)	Hatchability percentage (hatching period)	Percent survival after 24h	Percent survival after 48h	Percent survival after 72h
Control	100 (7-9)	100	100	100
P. fulgens (DRP)	138.11±0.36(8-13)	135.42±0.32*	130.75±0.55*	122.66±0.82*
	136.42±0.86(8-14)	133.62±0.42*	127.66±0.12*	115.92±0.33*
Ether extract	142.66±0.92(8-14)	133.63±0.22*	128.56±0.82*	118.58±0.66*
	139.52±0.63(8-15)	130.56±0.82*	126.58±0.32*	114.63±0.42*
Chloroform extract	140.85±0.32(8-13)	128.72±0.63*	126.42±0.53*	119.82±0.32*
	136.42±0.53(8-15)	126.55±0.66*	124.82±0.12*	113.63±0.82*
Methanol extract	135.32±0.42(8-14)	124.55±0.32*	122.63±0.66*	120.66±0.32*
	128.63±0.92(8-16)	120.63±0.66*	128.33±0.62*	115.52±0.88*
Acetone extract	13266±0.42(8-15)	120.63±0.82*	118.56±0.33*	116.52±0.82*
	126.56±0.93(8-16)	117.53±0.23*	115.62±0.88*	114.33±0.36*
Ethanol extract	128.75±0.82(8-16)	94.69±0.38*	91.56±0.31*	-
	122.63±0.32(8-17)	80.63±0.63*	-	-
Column purified	60.32±0.56(8-18)	-	-	-
	42.48±0.63(8-19)	-	-	-

Each value is mean ± SE of six replicates. Each replicates represent the egg laid by the group of 20 snails (*) significant (P<0.05) when student "t" test was applied to treated and control groups. (-) No fecundity was observed.

Transition temperature *versus* formula mass of selected high-T_C oxide superconductors

Mahendra Prasad[1]*, A.M. Parmeswaran[1] and Kaman Singh[2]

[1]School of Engineering Sciences, Simon Fraser University, Burnaby B.C., Canada

[2]Department of Chemistry, School for Physical Sciences,
Babasaheb Bhimrao Ambedkar University
(A Central University), Lucknow-226025, India

*Corresponding author (E-mail: mpa56@sfu.ca/drmprasad2003@yahoo.co.in)

Abstract : The transition temperature T_c of superconductor signals the onset of superconductivity. We were curious to see the variation of T_c with the formula mass (F_M) of well studied high T_c oxide superconductors to observe whether there exists any correlation between T_c and F_M of these oxide superconductors. Interestingly, it is observed that the variation of T_c with formula mass F_M, ratios of T_c /F_m of 8 different high-T_c superconductors which exhibit transition temperature greater than 90 K, converge to show a ratio of 0.136 with 14% deviation. Other superconductor and bismuth-based which have T_c less than 90 K differ significantly. Extrapolating the transition temperature to 25°C, a formula mass F_M of high-T_c oxide superconductor turns to be 2239 with only 14% deviation in different materials which have T_c e" 90 K. This means if oxide superconductors of formula mass 2239 are synthesized, then that materials could possibly exhibit room temperature superconductivity.

Keywords: Formula mass, T_c / F_M ratio, composite, polymerized superconductors

1. Introduction

Soon after the discovery of ceramic high-temperature superconductivity by Bednorz and Muller in 1986 [1] there were enormous research activities in the world's many laboratories employing different groups of metal oxides with expectations to raise transition temperature as high as possible. Various metal oxides with different stoichiometric ratio were thoroughly investigated and repeatedly studied to assess the authenticity of the variable transition temperature reported to the specialized Journals meant for high-temperature superconductors. Physicists, material scientists, chemists, engineers, theorists, mathematicians and computer experts including science administrators got engaged with two major objectives:

(i) To search for materials that could exhibit superconductivity closer to room temperature and

(ii) To enrich our understanding of the mechanism of high T_C-oxide

superconductors.

This is because the phenomenon of superconductivity in these materials was considered different and exotic from low-temperature superconductors observed in metals and alloys [2-4]. Such vigorous efforts have resulted in approximately two hundred thousand papers by a large number of researchers all over the world with new experimental, and theoretical techniques [5-9]. However, the two objectives cited above are yet to be achieved. Under the prevailing situation, the attempts to research for new materials that could meet our goals particularly, T_c closer to room temperature, therefore, research efforts in oxides were seemingly diverted to look for applications of these materials available to us. Now major laboratories and researchers are deeply involved in the projects and activities of making high-T_c superconducting devices [10-14].

We viewed the variable transition temperature of high-T_c oxide semiconductors from their formula mass perspective. We selected these materials [15] and intend to examine the on the formula mass of these ceramic superconductors. Such data are shown in Table 1 [15].

1. $YBa_2Cu_3O_7$
2. $Bi_2Sr_2Cu\ O_6$
3. $Bi_2Sr_2CaCu_2O_8$
4. $Bi_2Sr_2Ca_2Cu_3O_6$
5. $Tl_2Ba_2Cu\ O_6$
6. $Tl_2Ba_2CaCu_2O_8$
7. $Tl_2Ba_2Ca_2Cu_3O_{10}$
8. $TlBa_2Ca_3Cu_4O_{11}$
9. $HgBa_2CuO_4$
10. $HgBa_2CaCu_2O_6$
11. $HgBa_2Ca_2Cu_3O_8$

Let us look at the variation of T_c on the formula mass of these materials shown in Table 1. Transition temperature increases almost linearly with F_M. The slope of T_C/F_M in case of $YBa_2Cu_3O_7$, Tl-based and Hg-based oxide superconductors are in excellent agreement with an average value of 0.142 with 4% deviation. However, taking 8 high T_C-oxide superconductors which have

T_C e" 90 K shown in Table 1, gives T_C/F_M = 0.136 with 14% deviation. Reviewing T_C *versus* formula mass data closely, it is noticed that materials #1,8,9,10 and 11 represent an excellent fit in a straight line if plotted as T_C *versus* formula mass. Other materials, # 4,6 and 7 show higher formula mass for room temperature though the slope remains nearly closer. This consistency among the different class of high-temperature superconductors seems to be unnoticed by researchers. Accordingly, we extrapolated the formula mass of materials that could exhibit T_C closer to room temperature. Looking at the last column of Table 1, we find that hypothetical average formula Mass of 8 oxide high-T_C materials given above turns out to be 2239 with 14% deviation. This empirical analysis of T_C *versus* formula mass seemingly suggests that if YBCO, Tl-based and Hg-based oxides, etc. of much higher masses are synthesized virtually in the polymerized form/composites, we are likely to get transition temperature higher and closer to room temperature.

Motivating Factors:

Superconductivity was initially discovered in mercury at liquid helium temperature by H.K. Onnes in 1911 (Comm. Phys Lab. Univ. Leiden, Nos. 122 and 124, 1911). All metals and alloys possess very high electron density. In fact, it is the high electron density and mobility of charge carriers that make a distinction between superconductor, metals, semiconductors. In other words, it is the absolute value of electrical conductivity that helps us classify different kinds of conductors. Reports on some high-temperature superconductors suggest that thinner [16,17] samples exhibit semiconductor-like behavior whereas thicker ones showed metallic type characteristic prior to superconducting transition. More recently Honma *et al* [18] in YBCO clearly demonstrated that transition temperature T_C has very much to do with the 3D-charge carrier concentration and they reported the value 1.6 x $10^{21}cm^{-3}$. Such information of 3D charge density and electron density of states can be altered to required levels in a high-temperature superconductor is viewed from a perspective of raising the carrier density comparable to metallic conductors in the oxides by synthesizing composite-polymerized sort of materials that could ensure the increased concentration of charge carriers at par with metals and alloys that could exhibit T_C closer to room temperature.

Table 1: Data showing T_c *versus* formula mass of high-temperature superconductors

S. No.	Material	Formula Mass	Tc (K)	Slope Tc / FM	Slope ≥ 90 K	Formula Mass (298 K)
1	$YBa_2Cu_3O_7$	667.00	92	0.138	0.138	2161
2	$Bi_2Sr_2CuO_6$	752.74	20	0.027		
3	$Bi_2Sr_2CaCu_2O_8$	888.36	85	0.096		
4	$Bi_2Sr_2Ca_2Cu_3O_6$	959.98	110	0.115	0.115	2601
5	$Tl_2Ba_2CuO_6$	842.96	84	0.100		
6	$Tl_2Ba_2CaCu_2O_8$	978.58	108	0.110	0.110	2767
7	$Tl_2Ba_2Ca_2Cu_3O_{10}$	1114.20	125	0.112	0.112	2670
8	$TlBa_2Ca_3Cu_4O_{11}$	1029.45	122	0.119	0.119	2242
9	$HgBa_2CuO_6$	634.79	94	0.148	0.148	1911
10	$HgBa_2CaCu_2O_6$	738.41	128	0.173	0.173	1719
11	$HgBa_2Ca_2Cu_3O_8$	874.04	134	0.153	0.153	1944

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Studies on Fungitoxic Properties of Leaf Extract of *Curcuma zedoaria* against some pathogenic Fungi

Dr. Akhilesh Kumar Gupta
Maharana Pratap Post Graduate College
Jungle Dhusan, Gorakhpur-273014
E-mail : akki.200@gmail.com

Abstract : The aqueous and methanol leaf extract of *curcuma zedoaria* was investigated for its fungitoxic properties against fifteen phytopathogenic fungi *viz. Alternaria alternata*, *Alternaria solanai*, *Aspergillus fumigatus, Aspergillus niger, Colletotrichum capsici, Colletotrichum falcatum*, *Fusarium moniliforme*, *Fusarium udum*, *Fusarium oxysporum*, *Fusarium lycopersici*, *Helminthosporium oryzae, , Pyricularia oryzae, Pythium debaryanum, Rhizoctonia solani* and *Sclerotium rolfsii* using Agar dilution method. The methanol extract was found to be the most effective and showed significant fungitoxic activity against the test organisms. The extract of *Curcuma zedoaria* seems promising since it showed highest fungitoxic activity against the test phytopathogens.

Keywords: *Curcuma zedoaria,* phytopathogenic fungi, aqueous extract, methanol extract fungitoxic

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Organic Aquaculture in India: Challenges and Opportunities

A. K. Pandey
ICAR-National Bureau of Fish Genetic Resources,
Canal Ring Road, Lucknow - 226002, India
Email: akpandey.ars@gmail.com

Organic farming systems rely on the ecologically-based practices including culture and biological pest management completely excluding the use of synthetic chemicals in crop production and prohibit the applications of antibiotics as well as hormones in livestock production. The term organic implies certain standards for production and processing of the products in sustainable

and environmentally sound manners. There has been an increased awareness of the importance of sustainable methods of food production which reduce detrimental impact on environment. Preference of consumers demanding for organic products is reflected in increase in organic commodities found in the market place. The organic products are traceable from the farm to the consumers because at every stage it is being inspected and certified, thus ensuring the integrity of any product marketed as organic. Standards and certification procedures are being set by a few certification agencies identified throughout the world. There is record expansion in the requirement of organic food products from crop, livestock, fisheries, mollusks and other aquatic species including plants. Organic fish farming is relatively a new concept and organic aquaculture production takes place primarily in USA and European Union (EU, Austria, Belgium, France, Germany, Ireland, Luxembourg, the Netherlands, Switzerland and the United Kingdom) where certified organic salmon, carp, milkfish and trout are grown and sold. There exist reports that certified mussels, tiger shrimp, white shrimp and tilapia are being grown in Vietnam, Peru, Ecuador, Chile, New Zealand, Israel and Indonesia.

As for organic aquaculture is concerned, interest in the practical, technical and normative aspects is growing very fast among the various stakeholders including producers and their associations, traders, consumers and regulators as well as government representatives (regulatory authorities). There have been initiatives in several regions of the world with regard to various aspects of organic farming of finfish, shellfish and sea weeds. Draft standards of specific reference to organic aquaculture production have been developed by the International Federation of Organic Agriculture Movements (IFOAM). Organic Guarantee System (OGS) of IFOAM unites the organic world through common standards, verification and market identity. These standards cover carnivorous, omnivorous and herbivorous organisms of all stages grown in any form of enclosures such as earthen ponds, tanks and cages (open and closed systems).

Though organic aquaculture is a new concept for this country, our traditional (extensive) and semi-intensive fish farming practices continue to sustain the aquatic environment as well as livelihood of fish farmers. Keeping the huge potential of selling aquaculture products in markets of the European Union and USA, the Marine Products Export Development Authority (Ministry of Commerce, Government of India), Kochi has initiated the Indian Organic

Aquaculture Project (IOAP) on organic black tiger (*Penaeus monodon*) and scampi (*Macrobrachium rosenbergii*) farming in Kerala and Andhra Pradesh in January 2007 in technical and consultancy collaboration with Swiss Import Promotion Program (SIPPO). M/S Rosen Fishery Hatchery, Trichur has produced 11.50 lakh organic scampy seeds and supplied the same to Kerala (3.4 lakh) and Andhra Pradesh (8.1 lakh) for organic aquaculture. Harvest of the first organic scampy was done on 01.11.2008 in 20 ha spread over four farms in Kuttanad of Alappuzha district of Kerala. Buyers were from Germany, exporters, officials from SIPPO and Naturland Association (Germany). The organic prawns were sold @ 350-500/kg. With this, India has also embarked on the path of organic aquaculture which will be expanding with the active support of MPEDA. The industrialized and developed countries of the West where affluence, education and consumer awareness are quite high remain as the main destinations of organic aquaculture products.

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Innovative Research in Agriculture and Biological Areas Frontline Demonstration: An Effective Tool for Increasing Productivity of Pulses in Gorakhpur District of Uttar Pradesh

AK Singh, RP Singh, VP Singh and RK Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmafi, Gorakhpur, Uttar Pradesh
Email: avanishsinghicar@gmail.com

Abstract : Pulses are the primary source of protein for the poor and the vegetarians who constitute the majority of Indian population. Its soil rejuvenation qualities such as fixation of atmospheric nitrogen through biological activities, recycling of soil nutrients, and addition of organic matter and other nutrients make pulses an ideal crop of sustainable agriculture in the tropical and sub-tropical regions. The productivity of pulse crops continues to be quite low due to technological gaps in adoption of pulse technologies and other factors also. Frontline demonstration programme is a unique technology transfer tool for better technology adoption that bridge the yield gaps. The main objectives of

FLD's on pulses is to demonstrate and popularize the improved package of practices on farmers' fields for effective transfer of generated technology and fill the gap between recommended technology and traditional farming practices. To boost the production and productivity of pulse crops, Mahayogi Gorakhnath Krishi Vigyan Kendra, Gorakhpur are conducting frontline demonstration on pulse crops. Fifty and 10 frontline demonstrations were conducted in pigeon pea and chickpea, respectively during kharif and rabi season 2017-18 in district of Gorakhpur. The results were compared with the different variables like improved variety seed, seed rate, seed treatment, sowing method, balanced dose of fertilizers, pre-emergence herbicide and need based pesticides application as cash inputs for demonstration and farmers practice included old mix variety, broadcasting sowing method, no use of fertilizer, no weeding and no proper plant protection practices. There was a wide yield gap between the potential and demonstration yields in both the pulse crops due to technology and extension gaps. Increase in yield in demonstration plots due to adoption of improved package of practices 42.55 and 42.67 per cent in pigeon pea and chickpea respectively as compared to existing farming practices. On an average technology gap of different pulse crops under front line demonstration was 8.69 q/ha while its range varied from 7.05 to 10.34 q/ha. Extension gap of different pulse crops range was 4.37 to 5.07 q/ha with an average of 4.72 q/ha and technology index was varied from 29.37 to 41.36 per cent with on an average of 35.37 per cent. The wide variation in the technology gap and in index percentage were found due to variation in agro-climatic parameters, soil fertility, biotic stresses, socio-economic and management practices. This variation can be narrowed down through dissemination of improved technology among farming community with effective extension methods and demonstrations. Average net profitability of worth Rs. 53208.50/ha as compared with farmers practices (Rs. 31540.00/ha) were also obtained and average incremental benefit cost ratio (ICBR) i.e. 9.05 was recorded in demonstrated plots. The higher additional returns and effective gain obtained under demonstrations could be due to improved technology, non-monetary factors, timely operations of crop cultivation and scientific monitoring. This can be seen as a positive indicator for formulating and disseminating, more extensive, technology specific and farmer centric FLD programme to improve knowledge and adoption amongst farmers in the district to boost Chickpea production.

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Mentha spicata L. essential oil as eco-friendly plant based pesticide in view of its antifungal, antiaflatoxigenic and antioxidant efficacy during storage of food commodities

Akash Kedia

Department of Botany, Govt. General Degree College at Mangalkote, P.O. Khudrun, Burdwan, W.B., India (email: akashkedia28@gmail.com).

Abstract: In view of the harmful aspects of synthetic pesticides, the present study was conducted to evaluate the efficacy of *Mentha spicata* L. essential oil (EO) as antifungal, antiaflatoxigenic and antioxidant agent in order to assess its potential as plant based pesticide for management of fungal and aflatoxin deterioration as well as oxidative damage in stored food commodities. The EO significantly inhibited growth and aflatoxin B_1 production by toxigenic strain of *Aspergillus flavus* (LHP-6) at 1.0 and 0.8 µl/ml respectively. EO also showed broad Fungitoxic spectrum against 13 food borne molds at 1.0 µl/ml concentration. In addition, the EO showed pronounced antioxidant activity as IC_{50} value was found to be 2.55 µl/ml during DPPH free radical analysis. The EO showed non phytotoxic nature during the seed germination assay of chick pea seeds. Hence, *M. spicata* EO has industrial potential in formulation of plant based safe pesticides for stored crop protection against fungal and aflatoxin contamination as well as oxidative damage during post harvest processing of food commodities.

Keywords: Essential oil, Antifungal, Aflatoxin, Antioxidant, Pesticide.

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Antifungal activity of some locally available plants against *Fusarium oxysporum* f. sp. *Udum*

Amrapali Verma
Maharana Pratap Post Graduate College
Jungle Dhusan, Gorakhpur 273014

Abstract : The antifungal activity of crude extracts of some plants was evaluated against *Fusarium oxysporum* f. sp. *udum* involved in wilt disease of pigeon pea. Screening of the crude extracts of different parts of 10 plants viz. *Amranthus virdis* Linn., *Ageratum conyzoides* Linn., *Acalypha indica* Linn., *Coccinia grandis* (Linn.) *J. O. Voigt*, *Eclipta alba* Linn., *Euphorbia hirta* Linn., *Lantana indica* Linn., *Riccinus communis* Linn., *Physalis minima* Linn., *Parthenium hysterophorus* Linn. *Withonia somnifera* (Linn) *Dunal, are* performed to determine the antifungal activity against *Fusarium oxysporum* f. sp. *udum*. by "food poisoning method". The crude extract of leaf of *Eclipta alba, Withonia somnifera* and *Lantana indica* exhibited maximum toxicity against the test fungus. Whereas some plant show moderate antifungal activity.

Keywords: Plant, Antifungal activity, Wilt disease

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Status of Cercosporoid fungi in India

Anu Singh, H.D. Bhartiya and Jyoti Kumari
Mycopathology Laboratory,Department of Botany
Bipin Bihari P.G. College,Jhansi-284001(U.P.) INDIA
Email ID: anusingh3212@gmail.com

Abstract : Jhansi district of Bundelkhand region has a diverse and rich phanerogamic vegetation. This area is rich in biodiversity and for foliar fungi in particular, still for the foliar fungi this region is virgin, but for the growth and development of foliar fungi the climatic conditions are suitable.

Cercosporoid fungi are the heterogenous assemblage of hypomycetes forms of Deuteromycotina. Cercosporoid fungi was represented by genus *Cercospora* which was introduced by Fresenius (1863) to accommodate

foliicolous hypomycetes producing vermicular, phragmosporic conidia. In *Cercospora* complex, almost all the generic segregrates have their root in monophyletic *Mycosphaerella* telemorph,which is one of the largest genera of Ascomycetes. The segregrates of *Cercospora* complex fall in to two groups,the Dematiaceous and Non- Dematiaceous. The dematiaceous genera are charaterized by their pigmented conidiophores and conidia, conidia being hyaline in case of *Cercospora*. The generic segregrates represented by *Cercospora* are known as Cercosporoid or *Cercospora*- *Passalora* complex whereas the Nondematiceous genera, produce hyaline conidiophores and conidia and represented by *Ramularia* are called Ramuloroids or *Cercosporella*-*Ramularia* complex.

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Absolute Summability of Function based on (Δ, α, β) (C, l) Summability Methods

Anupama Srivastava
M.P.P.G Jungle Dhusan, Gorakhpur
E-mail:dr.anupamasrivastava@gmail.com

Abstract: In this paper, we introduce the absolute summability of function based on (D, α, β)(c, l) summability methods and investigated some of their properties. If 1 ≥ 0, p ≥ 1, we say that s(x) is summable $|c, l|_p$ (absolutely summable (c, l) with index p), if $\int_T^{\infty} \left|\frac{d}{dy} c_l(y)\right|^p < \infty$; for some T ≥ 0.

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Biodiversity Conservation and Uttar Pradesh: A Legal Study

Dr. Arun Kumar Maurya
Assistant Professor, Botany
Department of Botany, Multanimal Modi P.G. College (C.C.S. University, Meerut)
Modinagar, Ghaziabad, U. P. 201204
E-mail: *botany25@gmail.com*

Abstract : Biodiversity is a valuable natural resource that provides diverse goods and services to human beings like the food, medicine, fodder, fiber, firewood. India occupies 2.4% land of the globe. It is also one among 17th mega diverse country that encompasses four ecological and twenty two agro-biodiversity hotspots and one of the eight Vavilovian centre of origin known as the Indian centre of origin. Considering the immense importance of biodiversity, United Nation brought a treaty for biodiversity conservation known as the Convention of Biological Diversity (CBD). It is an international legally binding global treaty that deals with biodiversity conservation, its sustainable use and intellectual property related (IPR) aspects. The Convention reaffirmed the sovereign right of the state over their natural or biological resources. It was brought during the Earth summit in Rio de Janeiro in 1992. The Convention establishes three main goals viz, the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. The detailed provisions for these purposes are made under Cartagena and Nagoya protocols (2010). Apart from this, the Bonn guidelines have also been made in consonance with above protocol.

India became signatory to the CBD in December 1993 and ratified in February 1994 and legislated the Biological Diversity Act 2002. The Act aims to achieve the goals of CBD by applying the precautionary principle along with establishing three tier institutional mechanism namely, National Biodiversity Authority (NBA) at the Union level, State Biodiversity Authority (SBA) at state level and the Biodiversity Management Committees (BMC) at local level. It Act also tries to regulate the access, use of biodiversity and in IP rights, establishes biodiversity heritage sites, *in-situ* and *ex-situ* measures, advices central government to take other measures for biodiversity conservation. Apart from

this, NBA tries to prevent biopiracy from India through legal mechanism. Uttar Pradesh (U.P.) is one of the largest state of India. It has only approximately 2.4% geographical area under protected area. It possesses the huge population, whose pressure has led to great impact on the biodiversity status of the state. Even though, the biodiversity of U.P. is still very good as it possesses 2,932 and 2,387 species of flora and fauna which accounts 0.72 % and 0.18 % of plant and animal species with respect to world biodiversity. U.P. possesses very small area under forest that too in certain patches which harbors several unique wildlife such as rhinoceros, elephant and tiger. Keeping these facts in mind, it is very much pertinent to study the legal framework that is playing crucial role in the biodiversity conservation of U.P.

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Bayesian estimation of shape parameter of Erlang Distribution under Precautionary Loss Function

Arun Kumar Rao and Kusum Lata Singh
M.P.P.G. College, Jungle Dhushan, Gorakhpur
e-mail: arunrao1972@gmail.com,
123kusumlata@gmail.com

Abstract: Erlang distribution is a continuous probability distribution with wide applicability primarily due to the exponential and gamma distribution. In this paper Bayesian estimation of shape parameter of Erlang distribution under precautionary loss function have been obtained using Consul and Geeta distribution.

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Phytoremediation Potentiality of Some Plants Grown On Fly Ash Dykes: A Case Study of Obra Thermal Power Station, Sonebhadra, India

Ashutosh Pandey*, Sanjay Dwivedi, Shekhar Mallick, Nandita Singh and Vivek Pandey

Plant Ecology and Climate Change Division; CSIR- National Botanical Research Institute Lucknow

*Email: apandeymsb@gmail.com

Abstract : Heavy metal contamination in water and soil is a big challenge of 21th century. Due to increasing demand of electricity in developing India, millions of tons fly ash generated per annum after burning of coal in Thermal Power Plants. The fly ash contains high amount of toxic elements which are not only affect the local vegetation, but it's accumulation in crop plants transferred from lower to higher trophic level through food chain contamination. The present study is focused on to assess the phytoremediation potentiality of four fly ash tolerant plants namely *Phragmitis kraka, Saccharum spontaneum, Canna occidentalis* and *Pteris vittata.* These selected plants were transplanted on fly ash dykes in the month of September 2016 and monitored after one year in terms of plant height, biomass and heavy metal accumulation in plant parts. The results indicated that fly ash contains significant amount of trace Mn (411mg kg^{-1}), Fe (11083mg kg^{-1}), Cu (41mg kg^{-1}), Zn (27 mg kg^{-1}) and toxic Cr (61 mg kg^{-1}), Ni (40 mg kg^{-1}), As (8 mg kg^{-1}), Pb (4 mg kg^{-1}) metals. Among the plants, *Saccharum spontaneum,* accumulated highest amount of Cr (5 mg kg^{-1}) and Ni (13 mg kg^{-1}) in root, while arsenic was found highest in the shoot of *Pteris vittata* (38 mg kg^{-1}). After one year the reduction in metal content of fly-ash was found maximum for Cu (65 %) followed by As (64%), Cr (55%), Zn (46%) and Ni (35%), Fe (31%) and Mn (22%). Therefore, the study concluded that the *Saccharum spontaneum,* and *Pteris vittata* are the most suitable plants to develop phytoremediation technique for decontamination of fly ash dykes. The more information and correlation of different parameters/ results will be presented during the conference.

Keywords: Fly-ash, Heavy metals, Food chain contamination, Phytoremediation.

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सिवान जिले के संकटग्रस्त पादप विविधता

बसन्त नारायण सिंह
अधीक्षक, प्रताप आश्रम, गोलघर, गोरखपुर
मो.– +919430219611, +918969168505
E-mail id:-bnsingh.botany@gmail.com

सारांशः पृथ्वी का पूरे ब्रह्मण्ड में सबसे न्यारी ग्रह होने के मुख्यतः दो कारण है। पहली जीवन की उपलब्धता और दूसरी सूरज से इसकी सटीक दूरी जो इसे जीवन्त बनाती है। विकास के क्रम में लगभग चार मिलियन वर्ष पूर्व इस धरती पर जीवन का उद्‌भव हुआ जो धीरे–धीरे विकसित होकर आज लगभग 3–100 मिलियन जीव जातियों के रूप में विद्यमान है। परन्तु अभी तक लगभग 8.7 मिलियन जीव–जातियों की ही जानकारियाँ प्राप्त है (Census of marine life – August 24, 2011)। बाकि जीव–जातियों की पहचान अभी बाकि हैं। भारत दुनिया के प्रमुख जैव–विविधता वाले देशों में से एक है जो क्षेत्रफल की दृष्टिकोण से तो 2.4% का स्थान रखता है जबकि जैव–विविधता में 8% का हिस्सेदारी रखता है।

जैव–विविधता का ह्रास वर्तमान समय का एक महत्वपूर्ण संकट है। यद्यपि जैव–विविधता का ह्रास एवं नये जातियों की उत्पति प्रकृति में एक सामान्य प्रक्रिया है। जैसे एक हजार वर्ष में एक जीव जाति का विलुप्त होना एक सामान्य प्रक्रिया है जबकि एक वर्ष में ही एक जाति का विलुप्त होना सचमुच एक सोचनीय विषय हो जाता है। Raven – 1987 के अनुसार लगभग 60,000 पादप जातियाँ निकट 50 वर्षो में विलुप्त के कगार पर खड़ी है।

हमारा जिला सिवान भी इस विषम परिस्थतियों से अछूता नहीं है। बहुत सारी पादप जातियाँ जो कालांतर में हुआ करती थी आज उनका नामोनिशान भी नहीं है। यह लेख उन पादप जातियों के लिए है जो किसी तरह अपना गुजर–बसर तो कर रही हैं परन्तु मानवीय गतिविधियों एवं पर्यावरणीय संकटों के कारण निकट भविष्य में विलुप्त की दिशा में अग्रसर हो रही है। उन्हीं 45 पादप जातियों की एक संक्षिप्त सूचि सामान्य नाम, वनस्पतिक नाम, परिवार, अँग्रेजी नाम तथा उसके उपयोग के आधार पर वर्णन किया गया है जो लोगों में जागरूकता उत्पन्न करेगी जिससे उसके बचाव के उपाय भी सामने आयेगें।

उपर्युक्त पादप जातियों जैसे ज्वार, बाजरा, महुआ, तंगुनी, कालमेघ, बघनखी, दोणपुष्पी आदि में से नील और अफिम का बिल्कुल ही नामों निशान नहीं है जबकि बिट्रीश काल में इसकी खेती जोरों पर हुआ करती थी। टंगुनी, चीना, कोदो, सवॉ, साठी धान, बर्रे/कुसुम की खेती नहीं

हो रही है। जबकि कम वर्षा, वैश्वीकताप एवं परिवर्तित जलवायु में इसकी खेती बेहतर हो सकती हैं। ज्वार, बाजरा, मडुआ, तिल, रेड़ी, जौ, तीसी, जई, सनई, कवाछ, अतार, पटुआ की खेती कुछ खास वर्ग के लोग अपनी आवश्यकता के अनुसार करते हैं। तालमखाना, केउकन्द, बाह्मी, वसाक, लाजवंती, भूई आँवला, वन बैगन, रेंगनी काँट, गोखरू, खस, अकरकरा हाथीसुण्ड, भुंगराज, गुरूच, बघनखी, द्रोणापुष्पी, कलिहारी को लोग खर–पतवार समझते हैं। कालमेघ, सर्पगंधा को बहुत कम लोग पहचानते हैं। सेनुआर, सीता अशोक, कपास को लोग शौक से लगाते हैं, शीशम जो जिले का मुख्य ईमारती लकड़ी हुआ करता था जो फंगल बिमारी के कारण विलुप्ति के कगार पर खड़ा है तथा पुत्रंजीवा का कोई खास आर्थिक महत्व नहीं है।

ऐसी विषम परिस्थति में **'सिवान जिले के संकटग्रस्त पादप विविधता'** का समुचित वर्णन बुद्धिजीवि, किसान, व्यवसायी, चिकित्सक, शोधकर्ता, सामान्य नागरिक, प्रसाशनिक अधिकारी एवं समस्त लोगों के बीच इसकी जानकारी उपलब्ध कराना तथा इनकी उपयोगिता को उजागर करना अत्यंत आवश्यक है। नहीं तो वह दिन दूर नहीं जब इनकी जानकारीयाँ पुस्तकों के पन्नों में सिमट कर रह जायेगी। भले ही यह शोध पत्र सिवान जिले पर केन्द्रित है परन्तु यह समस्त उत्तर भारत का खुला तस्वीर है।

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Study on Microflora Community in Wheat Rhizosphere and Rhizoplane

Basant Narain Singh
Superintendent Pratap Ashram Golghar, Gorakhpur (UP)
Email ID: bnsingh.botany@gmail.com

Abstract : The studies were conducted on different experimental wheat field to establish the species composition of fungi living on the wheat rhizosphere, and to establish the quantity and quality composition of microorganisms developing in the rhizosphere of this plant. Besides, the studies established the effect of rhizosphere antagonistic bacteria and fungi on some pathogenic soil-borne fungi. The mycological analysis of the infected roots and the stem base of wheat showed that the main cause of the occurrence of necrotic signs on the roots and the stem base of wheat were the fungi of Rhizoctonia solani and Fusarium spp., and above all, the species of F. avenaceum, F. culmorum

and F. oxysporum. The microbiological analysis of rhizosphere soil gave 7.16·10 6 bacteria colonies, totally. The number of Bacillus spp. was a little lower and amounted to 4.37·10 6 colonies, while Pseudomonas spp. constituted 3.98·10 6 colonies on average. The total number of fungi was 35.8·10 3 colonies. Within the pathogenic fungi isolated from the rhizosphere of the analyzed plant the dominating ones were Fusarium spp. and Rhizoctonia solani, while among saprophytic fungi those were Penicillium spp. and Trichoderma species.

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Anatomical, phytochemical and *in vitro* antimicrobial activity of *Enicostemma littorale,* Blume

S. Bavya[1], M. Selvi Rao[2], S Sahaya Sathish[1], A Vimala[1] and V Thangarajan[1]

[1]Centre for Cryptogamic Studies, Department of Botany, St. Joseph's College (Autonomous), Tiruchirappalli - 620 002, Tamil Nadu.

[2]Department of Botany, Queen Mary's College (Autonomous), Chennai – 600 004, Tamilnadu

Abstract : *Enicostemma littorale* is a perennial herb belonging to the family Gentianaceae. It is cosmopolitan in nature. The plant is used in treating fever, skin diseases, and obesity and helps to regulate blood sugar levels. Authenticity assessment is one of the basic steps of herbal drug standardization. To assess the authenticity of medicinal plants the macroscopic and microscopic analyses are used. The microscopic study is the anatomical study which is done by taking an appropriate section of the plant parts to be studied. The medicinal properties are attributed to the phytochemicals derived from different parts of plants such as leaves, roots, and stem etc. The qualitative and quantitative estimation of these phytochemicals is important for the exploration of new lead compounds in the process of drug development. The main aim of this work is to standardize the plant by studying the anatomical features and a preliminary compilation of qualitative and quantitative phytochemical analysis and their antibacterial activity. The phytochemical analysis revealed the presence of alkaloids, flavonoids, triterpenoids, anthraquinones, phenols, glycosides, phytosterols, steroids, and tannins. The primary metabolites were abundant in leaves than roots whereas secondary metabolites were abundant in root when compared

to leaves. The ethanolic extracts of root and leaf exhibited antibacterial activity against *Staphylococcus aureus* and *Salmonella paratyphi* B.

Keywords: *Enicostemma littorale*, Gentianaceae,anatomical standardization, phytochemical, antibacterial

Correlation between climate changes and outbreaks of Japanese Encephalitis

Bhuwan Bhaskar Mishra, Pooja Agrahari
Vector Control Research Center, Gorakhpur Field Station, India

Abstract: Japanese encephalitis is a leading cause of viral encephalitis in Asian countries, with around 50,000 cases and 10,000 deaths per year. Currently, no cure is available for JE, none of the antiviral agents have found effective against JE virus and treatment is mainly supportive. Japanese encephalitis is considered a major public health challenge because of its high epidemic potential, and serious neurological damage among survivors. First case of JE was recognized in Japan in 1924. Due to immunization and other preventive efforts, the size of epidemics has steadily declined in Japan and China. On the contrary, new epidemic foci of JE were reported in neighboring southeastern Asian countries in 1969. In India, the first case was reported in Tamil Nadu in 1955. After 1973, the disease spread to various other parts of India. The reasons for this increased geographic distribution are uncertain but might include population shifts or changes in climate, ecology, agricultural practices, animal husbandry, or migratory bird patterns. The first outbreak of JE is closely associated with the pattern of precipitation, flooding and rice production systems. Local ecology, climate and season are considered as the risk factors for JE. Analysis of correlation between trends and different climatic factors can be helpful in designing suitable strategies for the prevention and control of JE. Monitoring of vector mosquito density and JE virus infection rates in mosquitoes can be helpful for the prediction of outbreak and in intervention programs. Several other findings have shown that the climatic changes followed by poor hygienic conditions in the rural and suburban areas are the risk factors for the outbreaks of Japanese encephalitis. And thus, continuous monitoring of climatic changes and awareness of the society towards environmental and hygienic aspects will help in predicting the outbreak of the disease as well as in running

the intervention programs.

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Agrarian Ecosystem: Present status and need for Sustainable Management

Chandra Bhushan Tiwary
Assistant Professor, Dept of Zoology, SMD MN Jalalpur, Gopalganj (Bihar)
Email ID: tiwary_cb@rediffmail.com

Abstract : The ecosystem can be defined as complex interactions among interdependent organisms that cohabitate in the same geographical area and with their environment. The physical environment along with organisms inhabiting a particular space is basic component of ecosystem. In a natural environment, an ecosystem follows a certain sequence of processes and events through the days, seasons and years. The processes include not only the biotic interactions in that particular ecosystem, but also the interactions between species and physical characteristics of the environment. Pesticides released into the environment may have several adverse ecological effects ranging from long-term effects to short-lived changes in the normal functioning of an ecosystem. Pesticides and fertilizers hold a unique position among environmental contaminants due to their high biological toxicity. Pesticides applied to the environment have shown to have long term residual effects while others have shown to have acute fatal effects when not properly handled.

Keywords: Cohabitate, Ecosystem, Fertilizers, Pesticides, toxicity, residual effects.

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Role of cuticular traits for water conservation in *Drosophila* species

Chanderkala Lambhod, Meenu Yadav and Ravi Parkash
Department of Genetics, Maharshi Dayanand University, Rohtak, Haryana
Email: chanda.malik071@gmail.com; Mob. : 9996074219

Abstract : The role of melanization and cuticular lipids in water conservation has been studied in many *Drosophila* species (Diptera: Drosophilidae). Nevertheless, a comparative approach to larval and adult stages of ecologically diverse, wild *Drosophila* species is still required. Based upon abdominal cuticular melanization patterns, wild caught *Drosophila* species were categorized as (1) melanic, (2) fixed melanic, or (3) non melanic. At the interspecific level, the ecological significance of melanization and cuticular lipids was determined by the inverse association of melanization and cuticular water loss in melanic species, and of cuticular lipids and cuticular water loss in fixed melanic and non melanic species. Interestingly, higher amounts of cuticular lipids were also evident in fixed as well as non melanic species, as compared to melanic species at larval stages, which is consistent with their differences in reduced water loss rates. Moreover, fixed melanic and non melanic species exhibited comparatively higher (ca. 1.8–2.0 fold) desiccation resistance. Thus, cuticular lipids provide a better waterproofing mechanism than melanization. Furthermore, acclimation to dehydration stress in adults improved desiccation resistance in melanic species, whereas such effects were lacking in fixed melanic and non melanic species. However, there were no changes in cuticular components as a consequence of desiccation acclimation. Thus, our results indicate that melanic, fixed melanic, and non melanic *Drosophila* species differ in the evolved physiological mechanisms of water conservation to adapt to dry conditions.

Keywords: Melanic species, Fixed melanic, non-melanic, Cuticular water loss, desiccation resistance

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Ecological significance of wing spot dimorphism in *Drosophila biarmipes* (Diptera: Drosophilidae).

Chanderkala Lambhod, Meenu Yadav and Ravi Parkash
Department of Genetics, Maharshi Dayanand University, Rohtak, Haryana
Email: chanda.malik071@gmail.com ; 9996074219

Abstract : Female preference for male ornament is favored by sexual selection. It is not clear whether the preference is limited to male ornament only or actually for genes that affect fitness of the progeny. In *Drosophila biarmipes*, females prefer to mate with males that are able to provide greater physiological tolerance to climatic stresses, *i. e.*, males provide direct benefit of fitness to the females or their offsprings. Laboratory studies in *D. biarmipes* have evidenced the role of wing spot during courtship but its ecological significance remains unclear. We tested the hypothesis whether spotted and spotless males and progeny from sexually preferred males of *D. biarmipes* vary in their levels of environmental stress tolerances. Our results showed that the male flies with spotted wings performed significantly better in their mating success under desiccation or cold stress than the males with spotless wings. In contrast, spotless males mated more frequently under highly humid conditions. We also found significantly higher fecundity of females mated with the males with spotted wings under drier condition and higher egg-to-adult viability of the resulting progeny. Our results are consistent with good gene sexual selection hypothesis, suggesting that mate choice could provide indirect benefits to females. This is the first report on the ecological significance of wing color dimorphism in a tropical species-*D. biarmipes*.

Keywords: *Drosophila biarmipes*, wing spot, dimorphism, sexual selection, good genes, mating preferences.

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Ecology, Diversity and Conservation Strategies of Pteridophytic Flora of Korba, District (Chhattisgarh) India

D.K. Gond[1]*, Km. Sunita[2] and Alok Kumar Singh
[1]Botany Division, C. M. P. Degree College Allahabad
[2]Plant Physiology & Biochemistry Lab, Dept. of Botany, DDU Gorakhpur University, Gorakhpur

Abstract : The paper enumerates the pteridophytic flora of Korba district of Chhattisgarh state. Extensive field trips were made during the year 2016-17 to collect plants both in the vegetative and reproductive stages from various localities of district. Review of available literature and relevant published papers reveal that pteridophytic flora of this region has not been explored previously; therefore the present communication reports 24 species of pteridophytes belonging to 18 genera of 18 families along with brief taxonomic description and population status.

Keywords: Conservation; Diversity; Korba.

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Management of Japanese encephalitis with Arctigenin form *Ipomoea cairica* L. (Sweet)

Deepa Srivastava
Department of Botany,
D.D.U.Gorakhpur University, Gorakhpur

Abstract : Japanese encephalitis commonly known as Brain Fever is a mosquito born disease that is widely prevalent in temperate and tropical zone of Asia. The etiologic agent, Japanese encephalitis virus (JEV), belongs to the family Flaviviridae and can be transmitted between animal and human hosts by Culex species of mosquitoes. Although vaccination is the most viable option to control JE, affordable vaccines are still not widely available. *Ipomoea cairica*, commonly known as rail road wine is an environmental weed, found in waste land areas. It grows in disturbed sites, such as roadsides and waste-ground in

urban areas, especially along river banks and coastal dunes. It has been reported as a promising medicinal plant due to presence of various phytochemicals such as alkaloids, flavonoids, Tannins, saponins, phenols, amino acids, glycosides, anthraquinones, steroids and lignans. The essential oil of *I. cairica* possesses remarkable larvicidal properties. It could induce 100% mortality in the larvae of *Culex tritaeniorhynchus, Aedes aegypti, Anopheles stephensi* and *Culex quinquefasciatus.* Arctigenin, a plant lignan which is also present in *Ipomoea cairica* is reported neuro-protective against Japanese encephalitis virus in a mouse model. Hence in the light of above reports we have taken *Ipomoea cairica* plant to manage Japanese Encephalitis in this area, as *Ipomoea cairica* is commonly found in this area we can control JE by two ways i) by controlling vectors by applying larvicidal properties of *Ipomoea cairica* and ii) by extraction of arctigenin in form of medicine to control neuro-inflammation produced by JEV. We have got initial success in extraction of Arctigenin through Column Chromatography; we have confirmed the compound by NMR, Mass Spectroscopy, Elemental analysis, and IR spectroscopy done in CDRI, Lucknow. The idea behind this research is to make the treatment for Japanese Encephalitis cost effective although collaborative approach is needed to achieve full success at ground level.

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Accumulation of heavy metals by earthworm *Eisenia fetida* during vermicomposting from different biological wastes

Deepak Kumar Bhartiya[2], Gorakh Nath[1] and Keshav Singh[2]

[1]Department of Zoology, S.V. M. M .P.G. College, Arya Nagar, Gorakhpur-273001
Mob. No.9795898689; Email-gorakhjee@gmail.com

[2]Vermibiotechnology Laboratory, Department of Zoology,
D. D. U. Gorakhpur University, Gorakhpur-273009 U.P. India.
Mob No: +91-9450433313, Email- keshav26singh@rediffmail.com

Abstract : Heavy metals are release in environment by volcanic activity, erosion of rocks, forest fire, human activity, paper mills and wastes products of various industries. Abundant use of chemical fertilizers and pesticides in agricultural field also increase the heavy metals in environment. These heavy metals

caused ill effects on different flora and fauna as well as on human health.

Generally human body is exposed to heavy metals by breathing, drinking and eating polluted air, water and food, which lead to accumulation of heavy metals in vital organs such as brain and kidney. Continuous accumulation of lead leads to death of affected person. In pregnant women accumulation of the lead may caused miscarriage. Sperm production in male human being is also reduced by lead exposure. Cadmium and Nickel accumulation in body is encountered in the workers of industries of pigment, metal plating, plastic and batteries. These heavy metals entered in the human body by ingestion of contaminated food stuffs specially grains, cereals and leafy vegetables. These metals caused respiratory irritation lung diseases, cancers and kidney problem. Accumulation of chromium in human body breathing problems such as asthma, cough and wheezing. Even skin contact may resulted skin ulcers. Chronic exposure can damage liver, kidney, blood cells and nerve tissues. Oral intake if cobalt caused hypercholesterolemia in human beings. Arsenic acts as carcinogens may cause cancer of skin, lungs, liver and bone marrows.

In a food chain of active ecosystem there is continuous accumulation of in successive trophic levels. This phenomenon is called biological magnification or biological amplification. Generally different heavy metals like arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), lead (Pb), mercury (Hg), selenium (Se) and silver (Ag) may be accumulated in human body of various routes and cause of different hazards. Complete removal of these heavy metals in the contaminated environment is difficult task. The earthworm *Eisenia fetida* play very important role in reducing the heavy metals accumulation in foodstuffs. The worms have ability to accumulate the various heavy metals viz Pb, Ni, Hg and Cd in their body. They can accumulate the metals and by transferring the heavy metals from the soil in their body so that it will be reduced the movement of hazardous metals in crops and vegetables. This remediation of soil will produced good quality consumable agricultural products.

Keywords: heavy metals, earthworm *Eisenia fetida*, vermicompost and biological wastes.

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Combinations of different wastes: Biotechnological tool for population enhancement of earthworm *Eisenia fetida*

Deepak Kumar Bhartiya[2], Gorakh Nath[1] and Keshav Singh[2]

[1]Department of Zoology, S.V.M. P.G. College, Arya Nagar, Gorakhpur-273001
Mob. No.9795898689; Email-gorakhjee@gmail.com

[2]Vermibiotechnology Laboratory, Department of Zoology,
D.D.U. Gorakhpur University, Gorakhpur-273009 U.P. India.
Mob No: +91-9450433313, Email- keshav26singh@rediffmail.com

Abstract: Chemical fertilizers and synthetic pesticides are serious threats to human, animal health and environment. Animal dung and municipal solid wastes are caused various problems, if they are not properly managed. Vermicomposting of these wastes is a suitable solution for proper management of biological wastes. The combinations of different animal dung with municipal solid wastes significantly enhance the population of *Eisenia fetida*. Combination of buffalo dung with municipal solid wastes (1:1 ratio) significantly increase the growth, development, and reproductive capacity of *E. fetida.* Significant decrease in pH, Electric conductivity, C : N ratio was noted in the final vermicompost whereas, increased total Kjeldhal nitrogen (TKN), total available phosphorus level (TAP), total potassium and calcium ultimately affects the growth of earthworm *Eisenia fetida* population. Use of buffalo dung with sewage sludge is suitable combination for better growth, reproduction and development of *Eisenia fetida.* The significant increase in number of earthworms with the help of combination of wastes as feed material, will be helpful for more conversion of more municipal solid wastes in beneficial vermicompost

Keywords: Animal dung, Vermicomposting, *Eisenia fetida*, municipal solid wastes.

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Versatility of carbon dioxide: Renewable applications & synthetic explorations

Devdutt Chaturvedi*

Department of Chemistry, School of Physical & Material Sciences, Mahatma Gandhi Central University, Motihari-845401(East Champaran), Bihar, India.

E-mails: devduttchaturvedi@gmail.com; devduttchaturvedi@mgcub.ac.in

Abstract: The production of carbon dioxide around the globe resulting the emergence of global warming day by day. Burning of coal, vehicles fuel, natural gas and nuclear explosions also generates carbon dioxide in the environment, has been the major constituents which majorly influences the global warming. This burden of carbon dioxide in our environment necessitates the need of transforming carbon dioxide into greener valuable products. Also, carbon dioxide has been playing an important role in balancing our environment through photosynthesis in plants.

In recent years, carbon dioxide has been employed as a cheap and safe alternative eliminating the use of harmful reagents such as CO and $COCl_2$. Recently, carbon dioxide has frequently been employed as a green reagent in its various conditions and forms for the syntheses of structurally diverse biologically potent scaffolds employing diversity of starting materials, reagents and catalytic systems. In the present talk, I will focus some of the greener applications of carbon dioxide as a source of renewable energy & its synthetic utility.

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Emerging trends in eco-friendly approach towards ticks control

Dilpreet kaur

Dept. of Zoology, Govt. Degree College, Hata, Kushinagar-274207

Email: dp.zoology@gmail.com

Abstract : Ticks are commonly controlled by using conventional synthetic acaricides, however it has certain drawbacks like high cost, non biodegradable,

toxic to environment, left residuals in animal body and above all development of resistance in ticks. Therefore, the search for herbal alternatives is ongoing process and various researchers are exploring different genera of plants for exploring plants to find extracts with acaricidal properties that can be used in association with or even as an alternative to synthetic compounds. Keeping the importance of green technology approach towards formulation of effective anti-tick agent, the present study is designed to evaluate medicinal plants for their anti-tick properties. The leaves of the plants were dried, powdered and extracted in organic solvents and evaluated by using standard toxicity bioassay. The results of bioassay indicated that all the plants showed variable toxicity against ticks in different extracts. The result will be presented and it proved that certain plants have potency to develop as a substitute of synthetic acaricides and thus can help in reducing the cost of tick control and loss due to development of resistance by the use of conventional acaricides.

Keywords: ixodid ticks, acaricidal, anti-tick etc.

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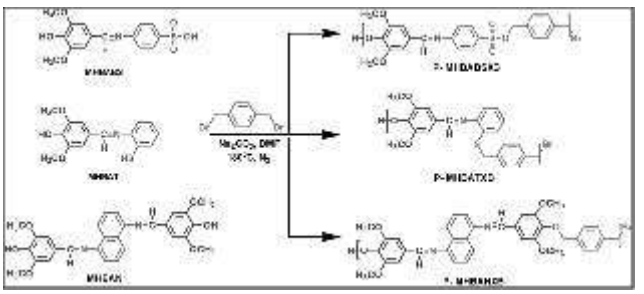
Synthesis and Characterization of Conducting Polymers derived from azomethines monomers containing syringaldehyde unit

Ekta Sonker[1, 2] and S. Krishnamoorthi[1]"

[1]Department of Chemistry, Centre of Advanced Studies,
Banaras Hindu University, Varanasi 221005,
[2]Department of Chemistry, Deen Dayal Upadhyay Gorakhpur University, Gorakhpur, 273009
*dr.skmoorthi@gmail.com

Abstract: Development of schiff base polymers or polyazomethines with conjugative bonds in the main chain have gained widespread interest during the last two decades, because of their useful electronic, optoelectronic, electrochemical, and nonlinear optical properties. Conjugated aromatic schiff base polymers can be used in numerous areas due to their semi-conductive properties. Major challenges in this field include the development of solution-processable, cheaper, thermally stable, fluorescent and high conducting materials. The present study, involves the synthesis of solution processable

polyazomethines derived from three novel synthesized azomethine monomers containing syringaldehyde unit, through condensation polymerization technique. The ð-conjugated azomethine monomers were acted with p-xylene dibromide in nitrogen environment, and the polymers containing, sulfonate ester, thioether and ether groups were obtained. The resulting polymers were characterized by spectral (^{1}H NMR and IR), thermal (TG-DTA), electrochemical (CV) techniques in addition to conductivity measurements. Morphologic properties of the synthesized polyazomethines were explained by SEM device. The resulting aromatic conjugated polyazomethine would be expected to possess not only high thermal stability, but also good semiconducting properties.



Scheme. Schematic representation of Synthesis of the azomethines polymers.

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Room Temperature Superconductivity – A New Horizon for Energy Crisis

Kaman Singh

Superconductivity Research Laboratory, Department of Chemistry,
Babasaheb Bhimrao Ambedkar University
(A Central University)
Lucknow-226025, Uttar Pradesh (INDIA)
E-mail –drkamansingh@yahoo.com/singh.kaman@bbau.ac.in

Abstract : In 1911, the Dutch physicist, Heike Kammerlingh Onnes discovered superconductivity. Since then it has been a subject of hot discussion among scientists due to cryogenic requirements of low-temperature superconductors. Today, however, superconductivity is being applied in various areas such as medicine, theoretical and experimental science, the military, transportation,

power production, electronics, as well as many other areas. With the discovery of high-T_C superconductors, which can operate at liquid nitrogen temperatures (77K), it has emerged as an effective tool for various industrial and scientific applications. The transition temperature T_c of superconductor signals the onset of superconductivity. We were curious to see the variation of T_c with the formula mass (F_M) of well studied high T_c oxide superconductors to observe whether there exists any correlation between T_c and F_M of these oxide superconductors. Interestingly, it is observed that the variation of T_c with formula mass F_M, ratios of T_c /F_m of 8 different high-T_c superconductors which exhibit transition temperature greater than 90 K, converge to show a ratio of 0.136 with 14% deviation. Other superconductor and bismuth-based which have T_c less than 90 K differ significantly. Extrapolating the transition temperature to 25°C, a formula mass F_M of high-T_c oxide superconductor turns to be 2239 with only 14% deviation in different materials which have T_c e" 90 K. This means if oxide superconductors of formula mass 2239 are synthesized, then that materials could possibly exhibit room temperature superconductivity. The discovery of ceramic type HTS materials in 1986, which exhibit superconductivity at liquid nitrogen temperature, has led to extensive research into materials formulation, characterization and methods of fabrication. Small scale devices have been commercially available for some time. The major problems for large-scale applications have been achieving high critical transport currents under high magnetic fields. The technical performance of long, state of the Art BSCCO wires have allowed prototypes to be constructed for large scale applications, such as magnets and transmission cables, and HTS transmission cables have already come into commercial use where the advantage of high current density are crucial. It is expected that there will be further progress in bringing down the costs of these materials, leading to significant advantages in efficiency and energy saving. Recently, researchers discovered new evidence of superconductivity at near ambient temperature. So, what initially seemed to be a mere theoretical concept, has a lot of potential for the welfare of humankind in the New Millenium.

Keywords: T_c / F_M ratio, YBCO polymerized RT superconductor

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Dissemination of improved package and practices of chickpea cultivation through Front Line Demonstrations

Mamta Singh, A.K. Singh and K.S. Yadav
Scientist KVK Sagar, Scientist KVK Jabalpur, Senior Scientist & Head KVK Sagar

Abstract: Chickpea is one of the most important pulse crops of Madhya Pradesh, which is used as a primary source of protein for human beings as well as nitrogen source for many cropping system. In Sagar district chickpea was grown in183000 ha. area with productivity of 1400 kg/ha. Due to the unavailability of improved wilt resistant variety and non-adoption of recommended package of practices are major constraints of low production of chickpea in the district. .To overcome these problems, Krishi Vigyan Kendra had conducted Front Line Demonstrations (FLD) on chickpea at farmers field using new wilt resistant variety with improved crop production technologies during 2015-16 and 2016-17. FLD was initiated with the objectives of showing the productive potentials of the new production technologies under real farm situation over locally cultivated crop and traditional practices were maintained in case of local checks. In demonstrated plots, a few critical inputs in the form of quality seed, fungicide, PSB, *Rhizobium, Trichoderma* and insecticide etc. were provided. During 2015-16 and 2016-17, total 150 demonstrations were conducted on 60 ha. area in Rahatgarh and Rahli block of Sagar district with high yielding wilt resistant variety JG-63. In the demonstrations, seed yield was increased tune of 55.27% over local check. The new technologies will eventually lead to the farmers to discontinue of old varieties with new technology. Extension gaps emphasized the need to educate the farmers through various means for the adoption of improved agricultural production technologies with high yielding varieties. The technology gap observed may be attributed to the dissimilarity in the soil fertility status and weather conditions. The technology index shows the feasibility of the demonstrated technology at farmer's field.

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Approach towards Green Chemistry in treating Water Pollution

Manmohan Krishna Upadhyay
Dept. of Chemistry, Govt. Degree College, Hata, Kushinagar-274207
Email: mkupadhyaya1@gmail.com

Abstract: Green chemistry is more eco-friendly alternative to conventional chemistry practices. To prevent the concentration of water pollution, efficient safety measures have been employed that prevent point-source and nonpoint-source pollution. An effective way to deal with the water pollution problem is to use less harmful ways to prohibit contaminants. Chromatography methods and separation chemistry principles offer a variety of encouraging methods to attain these attainable goals. Proper remediation has been provided to aid correct contamination of groundwater, which affects nearly hundred million people worldwide. A variability of novel methods has been included for prevention and remediation of water pollution that occasion radical reaction and the utilization of advanced nano-based techniques. This current paper is mainly focusing on current aspect of water pollution control strategies with green chemistry.

Keywords: Green Chemistry, Water pollution, pollutants etc.

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Particulate matter (PM) in air a health hazard

Navneet Kumar, Vinay Kumar Singh and Shiv Kumar
Assistant Professor, Department of Zoology,
Maharana Pratap Post Graduate College Jungle Dhushan Gorakhpur, Uttar Pradesh, INDIA
Email – navneetsonkar72@gmail.com

Abstract: Globally, 7 million deaths were attributable to the joint effects of household (HAP) and ambient air pollution (AAP) in 2016. About 94% of these deaths occur in low and middle income (LMI) countries. The South East Asian and Western Pacific regions bear most of the burden with 2.4 and 2.2 million deaths, respectively. About 9,80,000 deaths occur in Africa, 4,75,000 in the

Europe 2,33,000 in the Americas. The remaining deaths occur in high income countries of Europe (2,08,000), Americas (96,000), Western Pacific (83 000), and Eastern Mediterranean (18, 000) **Health Observatory WHO Global 2018.**

India, the second-most populous country in the world, is recognized as a hotspot for aerosol. Ambient PM2.5 exposure was observed to increase rapidly over the past decade (2001–2010). The annual premature mortality burden from ambient PM2.5 exposure in India is currently estimated to be large by the Global Burden of Disease project (~1.0 million), though such. Air pollution represents the biggest environmental risk to health. In 2012 (WHO), one out of every nine, deaths was the result of air pollution-related conditions. Of those deaths, around 3 million are attributable solely to ambient (outdoor) air pollution, measurements for about 3000 cities and towns worldwide. The estimates indicate that in 2014 only about one in ten people breathe clean air. Particulate matter (also called particle pollution): the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small they can only be detected using an electron microscope. Particle pollution includes: **PM_{10}** : inhalable particles, with diameters that are generally 10 micrometers and smaller. **$PM_{2.5}$** : fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller. $PM_{2.5}$ is more easily transported, which implies more toxicity and harmful substances that can penetrate deep into the human body. $PM_{2.5}$ can stay in the atmosphere for a long time and travel for a long distance. Therefore, it has a greater impact on human health and the quality of the atmospheric environment. It has potential health risks due to cardiovascular and respiratory diseases leading to premature mortality. It has always been a hot topic in various related research fields around the world. Which are mainly related to the spatial and temporal distribution of $PM_{2.5}$ concentrations, emission inventory, emission characteristics, source analysis and impact of $PM_{2.5}$ on atmospheric visibility and humans.

Keywords: PM 2.5, PM10, Aerosol etc

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Impact of Global Climate Warming on Animal Ecology and Human Health

Ravi Parkash
Department of Genetics, Maharshi Dayanand University, Rohtak - 124001.
Email: rpgenetics@gmail.com; 09466260460

Abstract: During the last fifty years, a rapid increase in temperature has been reported on the earth's surface as well as in the oceans. Climate change is reflected in extreme weather conditions such as tsunamis, cyclones, heat waves, wild fires, etc. Ocean acidification has caused massive harm to marine organisms such as corals, lobsters, sea urchins and fishes, etc. Warmer temperatures have caused floods through melting of glaciers leading to rise in sea level. Two important ecological impacts of climate change are shift in species range and/or in phenology i.e. changes in the seasonal timings of biological activities. Arctic region is heating up two times as rapidly as rest of the planet. Climate warming has greatly impacted ice-dependent animals such as polar bear, caribou, seals and walruses, etc. Further, there is growing concern on the impact of climate warming on vector-borne and water-borne diseases in humans (malaria, dengue, diarrhoeal diseases, chikungunya, parasitic diseases, etc.). Climate change has posed serious consequences among developing countries and thus, climate change is a significant and emerging threat to public health. There is need to understand the consequences of climate change by students at the level of schools, colleges and universities so as to help public mitigate the possible deleterious effects of climate change.

Keywords: Climate change, Causes and evidences, Pole ward shift of butterflies, Coral bleaching, Assisted colonization, Phenology, Artic melting, Infectious diseases

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Stem Cell Biology: Science of future for human welfare

Ravi Parkash
Department of Genetics, Maharshi Dayanand University Rohtak -124001
Email: rpgenetics@gmail.com (m): 09466260460

Abstract: John Gurdon and Shinya Yamanaka were awarded nobel prize in 2012 for their work on stem cells. There are enormous medical applications of stem cells. For example, stem cells hold the key to cure injuries in brain and spinal cord as well as eye defects. They also have potential to cure some cancer types. There are three main areas of research (a) embryonic stem cells, (b) adult stem cells, (c) induced pluripotent stem cells, (iPS). Some ethical considerations restrict the research on embryonic stem cells. However, embryonic stem cells can be made to turn into any kind of tissue i.e. from brain to muscle to bone. Thus, embryonic stem cells are pluripotent. The major aim of stem cells research is to supply cells for repair of damaged or diseased organs. For example, insulin producing pancreatic cells for people with type 1 Diabetes. Also, to provide certain kinds of brain cells for people with Parkinson disease or Huntington's disease.

In contrast, adult stem cells lack some of totipotent potential of embryonic cells and are present in very low numbers. This makes use of adult stem cells problematic. However, adult stem cells from bone marrow have been used as a source of immune system cells in patients whose own immune system are non-functional because of radiation treatment of cancer. A major breakthrough is the reprogramming of differentiated cells to act like ES cells which was first demonstrated in 2007. In the field of regenerative medicine, a patient's own cells could be reprogrammed into induced pluripotent cells (iPS) and are used to replace non-functional tissues such as insulin producing cells of the pancreas. Human iPS cells lines have been developed from individuals suffering from neurodegenerative diseases (atleast of a dozen types). Thus, iPS cells can provide tailor-made "replacement cells" for patients without using any human eggs or embryos which form the brain of ethical objections to stem cells research in different countries of the world.

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Perceptions of farmers of Chaukmafi village: Survey through PRA

***R.K. Singh, R.P. Singh, A. K. Singh, V.P. Singh and S.P. Upadhyay**

*SMS/ Scientist-Agril. Extension, MahayogiGorakhnathKrishiVigyan Kendra, Chaukmafi (Peppeganj), Gorakhpur (U.P.) - 273 165

Corresponding author Email: rahulrrrext91@gmail.com

Abstract: Socio-economic characteristics and status are the foremost issues all over the world especially in developing countries. The study of perception of farmers towards agriculture, try to explain the actual situation of population in particular region at very micro level such as village and ward level. The study area of Chaukmafi village adopted earlier by MGKVK located nearly 25 km away from the district head office. The PRA technique has been used to know the perception of farmers of the Chaukmafivillage in the agricultural year 2017-18.The structured schedule developed keeping in view the objectives & variables under study. The primary data collected from two group of farmers one of male and second of femalethrough focus group interview approach. The percentage, mean, standard deviation and correlation were used for calculation and drawing the inferences accordingly. The study expose very surprising fact in this village is that there is no any existing agencies to support agriculture like Co-operative societies, Primary health centre, Seed store, Govt. and Private seed store etc. The status of soil health card in the village was almost nill. Most of the farmers are using too much dose of fertilizer for their cereal crops in the absence of soil health card and unawareness towards recommended dose of fertilizer. Input supply dealer play a vital role and have mean score of 0.65 with rank Ist for knowledge gathering through various agencies to support the agriculture and their allied activities followed by Line departments (0.60) IInd, NGOs (0.50) IIIrd, Private agencies (0.45) IVth, Kisan Call Centre (0.30) Vth, KVK (0.15) VIth, State Agriculture Universities (0.10) VIIth, respectively. The farmers of Chaukmafi village The study reveal that mobile phone have mean score of 1.65 and was rank Ist, followed by television (1.05) was rank IInd, Community radio (1.0) was ranked IIIrd, Internet service (0.80) was rank IVth, books (0.65) was rank Vth, Landline phone (0.45)was rank VIth and Computer system/ Laptop (0.25) was rank VIIth, respectively for their usefulness of ICTs in famer's decision making. Lack of proper marketing, Unawareness of farmers

regarding technological know-how, Lack of farm machinery, Unavailability of high yielding variety seeds etc. were the major constraints faced by the respondents in a particular study.

Keywords: Perception, Survey, PRA, ICTs, NGOs, KVK, Constraints etc.

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Enhancement in Pulses Production through Innovative Technologies: A Way Towards Nutritional Security and Farmers'Income

R.P. Singh, A.K. Singh, R.K. Singh, S.P. Upadhyay and V.P. Singh
MGKVK, Chaumafi, Peppeganj, Gorakhpur, Uttar Pradesh
E-mail: rpskvk.22@gmail.com

Abstract: Pulses in India have a special role in meeting the protein requirement of predominantly vegetarian population and its critical role in agriculture production as a driver for economic growth and food security. Its soil rejuvenation qualities such as fixation of atmospheric nitrogen through biological activities, recycling of soil nutrients, and addition of organic matter and other nutrients make pulses an ideal crop of sustainable agriculture in the tropical and sub-tropical regions.The productivity of pulses of Uttar Pradesh and in district Gorakhpur is quite low as compare to potential yield and other states. Among various constraints, poor crop management and plant protection measure assume primary position. In order to overcome these problems, the Ministry of Agriculture, Government of India taken the innovative interventions to increase the productivity and profitability of pulses viz. pigeon pea, chickpea, blackgram, greengram, lentil and field pea etc.Considering the facts of low yield of pulses due to technological gap and various other constraints, Mahayogi Gorakhnath Krishi Vigyan Kendra, Gorakhpur of Uttar Pradesh conducted 60front line demonstration on improved agricultural technologies of major pulse crops i.e. chickpea and pigeon pea for establishing production potential and economic benefit of improved technologies at farmers' field during 2017-18. The innovative technologies on pulse crops i.e. chickpea improved variety GNG-1581 (line sowing),pigeon pea improved variety Narendra arhar-2 + intercropping with maize and groundnut (skip method of sowing) with balanced

dose of fertilizer (DAP @ 100kg/ha), use of *Trichodermaharzianum* @ 10 gm/kg of seed as seed treatment and plant protection measures with biorational insecticideIndoxacarb 15.8 EC@ 500ml/ha at 50% flowering and Spinosad 45% SC @ 150ml/ha at 50% pod filling stage were taken. The control plots were farmer's practices. The performance of improved technologyfound most effective in controlling least number of affected plants/m^2 as well as least number of pods/plant. The average per cent reduction in affected plant/m^2 and per cent reduction in affected pod/plant were recorded 45.50 and 38.98 in chickpea and 48.80 and 40.25 in pigeon pea, respectively. The improved technologies recorded mean grain yield of 16.95 q/ha and 14.64 q/ha in chickpea and pigeon pea which was 42.67 and 42.55 percent higher than farmers practices, respectively. Improved crop production technology and integrated approaches gave higher net returns of Rs. 53409.00/ha in chickpea and Rs. 53008.00/ha in pigeon pea with a benefit cost ratio 2.75 and 2.77, respectively over the farmers practice. All the pulses of frontline technologies showed a significant increase in yield of demonstration over farmers practice. The enhanced yield achieved through adoption of innovative technology in pulse crops that solve their problem of nutritional insecurity and income of farming communities.

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Integrated Approach to Manage False Smut in Rice (*Oryza sativa* L.): A Farmers Participatory Trial

R.P. Singh, S.P. Upadhyay, A.K. Singh, R.K. Singh and V.P. Singh

MGKVK, Chaumafi, Peppeganj, Gorakhpur, Uttar Pradesh
E-mail: rpskvk.22@gmail.com

Abstract: False smut caused by *Ustilaginoideavirens* is becoming a major disease of rice causing yield losses where rice is cultivated. In India, the disease has spread widely in recent years. In most part of the Uttar Pradesh including Gorakhpur district also the trend is same. Considering the facts, integrated approaches were comprised under farmer's participatory trial for false smut management. Technological gap between improved management package and farmers practices were studied based on survey and group discussion with

farmers. Full gap was observed in case of use of seed/seedling treatment and partial gap was in use of varieties, method of transplanting, number of hill/m^2, use of fertilizers, weed management and plant protection measures, which definitely was the reason of not achieving potential yield. The average incidence of false smut in paddy i.e. 5.25% was recorded in demonstrated plot while it was 10.25% in farmers practice.On an average disease reduction was 42.65 per cent noticed with the use of integrated disease management approach over farmer's practice. The recommended rice cultivar yielded 50.25q/ha yield during kharif 2017 while 49.50q/ha was noticed in kharif 2018, it was 19.64 and 20.15 per cent more over farmer's practice. The average net returns i.e. Rs. 49793.75/ ha was received in demonstrated plots while farmers were obtained Rs. 38785.00/ha by their own practices. On an average benefit cost ratio 2.74 was found under demonstrated technologies while it was 2.45 in farmer's practices. The outcome of the trial inspired the farming communities to replace their old non-descriptive varieties with high yielding varieties and other technological options including IPM strategies which are being adopted in their cultivation.

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Antimicrobial,antioxidant and phytochemical studies on *andrographis echioides* (l.) nees – a medicinal plant

Sahaya Sathish S, Bavya S,Vimala A, and Thangarajan V

Centre for Cryptogamic Studies, Department of Botany, St. Joseph's College (Autonomous), Tiruchirappalli - 620 002, Tamil Nadu.

Abstract: The medicinal value of plants is attributed to the presence of bioactive compounds. Thus it is important to explore the plants for its phytochemicals. The present study involves the phytochemical analysis of the medicinal plant *Andrographis echioides* and evaluation of their antioxidant and antimicrobial activities. The *Invitro* antimicrobial activity of acetone, ethanol and petroleum ether extracts of stem and leaf were evaluated against the selected pathogens. The results showed that the plant extract was active against *Serratia marcescens*, *Bacillus cereus*, *Staphylococcus lentus* and *Candida albicans* and also exhibit potent antioxidant activities. The ethanolic extract was subjected

to UV-Vis, FTIR and GC-MS analysis. The study reveals the presence of secondary metabolites belonging to category of aldehyde, ether, phenolics, lauric acid, ketone, alcohol compound which are of pharmacologically significant. Thus this plant may be explored further for the presence of lead compounds.

Keywords: *Andrographis echioides,* GC-MS, antioxidant, *Invitro* antimicrobial activity

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Ground Water Arsenic Contamination in Ghaghra Basin and Associated Health Risk

Sanjay Dwivedi[1], Seema Mishra[2], Vishnu Kumar[1,3], Pragya Sharma[1], Amit Kumar[1] and R.D. Tripathi[1]

[1]Plant Ecology and Climate Change Division,
CSIR- National Botanical Research Institute, Lucknow - 226 001, India;
[2]Department of Chemistry, Deen Dayal Upadhyay Gorakhpur University,
Gorakhpur, 273009 (U.P.), India;
[3]Academy of Scientific & Innovative Research (AcSIR),
Ghaziabad- 201002 (U.P.), India.

Abstract: Chronic arsenic (As) toxicity from ingestion of contaminated drinking water has been reported from many countries of the world, including India. In India, eighteen states and three union territories are facing ground water arsenic problem. Uttar Pradesh, one of the severely arsenic affected states, is located at north of India bordering on Nepal. The Ghaghara, sub-basin of Ganga basin has a total catchment area of 58,634 Sq.km. where two big rivers flowing from the northwest to the south-east are Ghaghara and Sarda. Up to now the As contamination has been said to be mostly confined in Ganga basin originating from Himalaya. However, recent studies have shown that ground water of several district situated in Ghaghara basin is also highly As contaminated. The Terai plain of Ghaghara is particularly As contaminated. Ghaghara basin covers 6 districts of Nepal (two are arsenic affected), fifteen of Uttar Pradesh (nine are arsenic affected) and three of Bihar (no study reported) in India. These arsenic affected districts of Ghaghara basin having different levels of ground water arsenic contamination. In Ghaghara basin, the maximum arsenic

concentration in ground water is reported in Ballia (1310 ppb) followed by Gonda (510 ppb), Faizabad (350 ppb), Basti (150 ppb) and Bahraich (100 ppb). The results of different studies revealed that the ground water of hilly region of Ghaghara basin is less arsenic polluted being maximum (4.7ppb) in Mugu district of Nepal. In these districts cereal crops like rice and animal based food are the main As exposure to human due to transfer of As to higher tropic level through food chain contamination. The local inhabitants of many districts of Ghaghra basin are suffering from different disease such as arsenicosis induced by arsenic accumulation in their body. The highest amount of arsenic has been detected in their hairs followed by nails and urine.

Keywords: Ghaghara basin, Arsenic, Arsenic Ground water problem, Arsenicosis

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Study of Diversity of *Pleurotus* by Random Amplified polymorphic DNA analysis and neutraceutical and dye degradation properties

Sanjay Kumar Vishwakarma[1], Km. Sunita[2], Ankit Kumar Patel[3] and Yashvant Patel[3]

[1]Department of Biotechnology, Mohammad Hasan P.G. College, Jaunpur
[2]Plant Physiology & Biochemistry Lab, Dept. of Botany, DDU Gorakhpur University, Gorakhpur
[3]National Institutes of Biomedical Genomics, Kalyani, W.B., India
[3]Cytogenetics Laboratories, Department of Zoology, Banaras Hindu University, Varanasi

Abstract: The *Pleurotus* comprises of species of edible mushrooms, known as oyster mushrooms. They are distributed throughout Asia and possess many bio-potentialities like neutraceuticals, bioremediation, etc. To find out the genetic diversity amongst species of *Pleurotus*, different samples were collected from the various eco-edaphic regions and subjected to characterization by RAPD-PCR. A total of 51 RAPD bands appeared from which we found out the gene frequency that varied from 0.012 to 0.987, and the average gene diversity for all RAPD loci was 0.2444 ± 0.1159. The Shannon's Information Index was found to be 0.3972±0.1547, which with Nei's (1978) unbiased genetic similarity among all pairs of isolates varied from 0.36 to 0.93 with a mean of

0.64. For evaluation of nutritional composition, total proteins, carbohydrates and phenolics were estimated i.e., the quantity of total proteins, carbohydrates and phenolics were 18.10 to 28.48 mg/0.1g, 3.55 to 5.43 mg/g and 21.18 to 36.31 mg/g, respectively. Dye degradation capacity against Malachite greenG (MG) and Bromophenol blue (BPB) were also studied in *in vitro*. Among all collected isolates #06 found to be the most distant isolates that, which was found as most suitable candidate for degradation of Malachite greenG, however, other isolates also showed good degradation capacity for Bromophenol blue. A significant genetic, nutraceutical and dye degradation activity diversity within the *Pleurotus* genus were found.

Keywords: Random amplified polymorphic DNA, Molecular markers, Genetic diversity, *Pleurotus* species, white rot fungi

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Archaeological Chemistry

Dr Shashi Prabha Singh
Associate Professor, Chemistry Department,
Digvijai Nath PG College, Gorakhpur

Abstract: Archaeological chemistry deals with the application of the chemical science to the study of ancient man and his material activities. We know that Ancient India is the place where most civilized people used to live. But not much work has been done in this field in our country.

This paper gives a theoritical knowledge of developments and applications of analytical techniques in determination of the nature of ancient materials, their provinance and age, and the analysis of human and animal remains such as bones, dried blood, coprolites, which yields information of ancient diets, kinship and migratory patterns.

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Innovations in Medical Science

Shivangi Rao
Department of Forensic Science,
Babasaheb Bhimrao Ambedkar University, Lucknow, U.P. India

Abstract: Everyday medical professionals are working to save lives across the globe, combining medical knowledge and skills with incredible medical innovations and inventions – miracles don't seem so farfetched anymore!

Saving lives, preventing the spread of disease, allowing for quicker and more accurate diagnosis and better patient care are just some of the great benefits medical inventions and technologies have made to our world. And the industry continues the rapidly change. What once was a major medical breakthrough may now be a common place surgery or medication, but we shouldn't forget the incredible strides and changes that the medical profession has made in keeping us all healthy and living a better life.

If ever a field needed remodelling, it is medicine. Chaotic, inefficient, and often ineffective, health care is dying for innovation. Innovation and medicine go together. Today, innovation in medical sciences and technologies is about to take off. In next few years, medical technology innovations will fundamentally transform health care delivery system too. Nowadays, there is an enthusiasm to deliver breakthrough medical innovations that can eliminate the potential for errors, Improve the quality of healthcare delivery and save lives. This review article attempts to describe how innovation in medicine can be considered as a revolution in healthcare helping to extend lives of people.

Keywords: Medical Innovations, Technologies, Introduction, Medical breakthroughs

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Synthesis of Nd doped Lanthanum Oxide Nanoparticles by percipitation method

Shubham Singh
MSc (Applied Chemistry)
Amity University Noida, Uttar Pradesh, India

Abstract: This work investigates synthesis of the 1 at % Nd doped Lanthanum Oxide (Nd:La_2O_3) nanoparticles by the route of precipitation method. In this work we investigated the effect of the various concentrations of the precipitating agent and dispersant on the size and morphology of the nanoparticles.

Calcinations of the precursor was done at 900 ^{0}C for two hours to get the final product. Lanthanum oxide nanoparticles have been characterized by the X-Ray Diffraction and Scanning Electron Microscopy.

Experimental results confirms formation of hexagonal phase pure La_2O_3 nanoparticles and Scanning Electron Microscopy reveals that the particles are having spherical morphology of size approximately 30nm for as synthesized nanoparticles. These results shows that the phase pure nanopowders with homogenous distribution were synthesized by the precipitation route.

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Eco-friendly strategies for post-harvest management of rice

Smita Puri[1] and I.K.Tiwari[2]
[1]Regional Agricultural Research Station, Bhopal Road,
Sagar- 470001 (M.P.), INDIA
[2]G 4, New KVK Building, Krishi nagar-2, Bhopal Road,
Sagar- 470001 (M.P.), INDIA

Abstract: Rice crop is a major staple crop grown during *kharif* or wet season in India. It is suffering from contamination with natural mycotoxins after harvesting. Frequent and heavy rainfall and floods, particularly near harvest, in coastal areas in eastern, southern, and western regions of the country wet the crop and make panicles more prone to invasion by fungi and bacteria.

Mycotoxin-producing moulds could contaminate the grain and produce important quantities of mycotoxins during storage. Antifungal chemicals have been used for the preservation of stored grains. Health hazards from exposure to toxic chemicals and economic considerations make natural plant extracts ideal alternatives to protect food and feed from fungal contamination. Clove is an extremely safe and consumer-beneficial treatment alternative to prevent storage fungi in rice grains. Eugenol has been extracted and purified from cloves and from *Ocimum gratissimum*. On rice treated at 2.4 mg eugenol/g of grains, the inoculum of *Aspergillus flavus* failed to grow. Some *Trichoderma* strains also inhibited the growth of *A.flavus*. In the area of rice storage techniques and equipment, technological advances have been occurred and FAO recommended use of the small metal silo as a feasible and valuable option for reducing small- and medium-scale rice farmers' food losses. This technology is already improving the socio-economic conditions of agricultural communities.

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Impact of Climate Change on Plant Diseases

Smita Tiwari and R.K. Saraf
Regional Agricultural Research Station, Bhopal Road,
Sagar- 470001 (M.P.), INDIA

Abstract: Global climate is changing day by day due to emissions of green-house gases into the atmosphere, intervention of human activities such as burning of fossil fuels and agricultural activities. Changes in raining pattern, delayed monsoon, melting of Himalayas, flooding of rivers as in the North East and Southern part of the country recently; tsunamis and cyclones almost every year are all-natural calamities resulting out of climate change and global warming brought on indirectly by human beings. Agriculture production is highly dependent on climate since crop growth is influenced by temperature, solar radiation and precipitation etc. Crop production is also sensitive to climatic variability and weather extremes (drought, floods, and severe storms). Climate change also disrupts and alters the distribution of pests and diseases, which poses a threat to agriculture. The potentially rapid onset of disease makes it difficult to anticipate the best timing of management measures, especially in areas with high levels of interannual variability in climatic conditions.

Considering this, climate change may affect the actual, spatial and temporal distribution of diseases; however, the magnitude of these effects remains unclear. Because the security of food could be at risk due to a change in the incidence of diseases, more research efforts are needed. Disease risk analyses based on host-pathogen interactions should be performed, and research on host response and adaptation should be conducted to understand how an imminent change in the climate could affect plant diseases.

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Eastern Plain Agro-ecological Zone of India and their Salient Features which Influences the Crop Production in Uttar Pradesh

S.P. Upadhyay, G. Pandey, R.K. Singh and A.K. Shrivastava
Mahayogi Gorakhnath Krishi Vigyan Kendra, Gorakhpur- 273165 (U.P.)
Carmel School, Civil Lines, Gorakhpur- 273001 (U.P.)
Corresponding author E mail: ***sandeepupadhyay383@gmail.com***

Abstract: For sustainable agricultural development a proper understanding of potential and limitations of natural resources is necessary at local, regional and country level. The crop production depends largely on the components like climate, soil and landforms. The delineation of homogenous agricultural environments called agro-ecological regions (AER) on the basis of soil characteristics, landforms, climate and biodiversity helps in better crop selection, agro- technology transfer for sustainable land use and land resource planning.

An agro- climatic region is a land use unit in terms of major climate and growing period which is climatically suitable for certain range of crops and cultivars, Whereas an agro-ecological region is characterized by distinct ecological responses to macroclimates as expressed in vegetation and reflected in soil, fauna and aquatic systems. Therefore, an agro-ecological region is the land unit on earth's surface carved out of agro-climatic region when superimposed on different landforms and soil conditions that act as modifiers to the length of growing periods (LGP) and crop environmental needs. The ecoregion of eastern plain is hot subhumid (Moist) ecoregion, with alluvium derived soils and LGP 180-210 days. 11.1 M ha area and comprises 3.4 % of

total geographical area. Distribution of this region comprises Uttar Pradesh and Jharkhand. Major soil orders are Entisols, Alfisols and Inceptisols. Major constraints are flooding and imperfect drainage, salinity and/or sodicity, nutrient deficiency viz. N, P and Zn. Major crops grown in this zone are rice, wheat, sorghum, chickpea, black gram, mustard, safflower, black gram, mustard, fodder cowpea, pearlmillet, pigeonpea, fodder legume, maize, soyabean etc.

Therefore, for efficient crop planning in an area and transfer of technology, information concerning requirements of the crops and kinds of soils, their extent, geographic distribution and most important the local agro-climatic conditions or information of agro-ecological zone is essential for better crop selection and enhancing the yield.

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Recent Approaches for Soil Fertility Evaluation and Fertilizer Recommendation

S.P. Upadhyay, R.P. Singh, R.K. Singh, A.K. singh and V.P. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Gorakhpur- 273165 (U.P.)
Corresponding author E mail: ***sandeepupadhyay383@gmail.com***

Abstract: Agriculture plays an important role in Indian economy even then most of farmers are economically poor in India. Therefore there is a need to grow crops having good profit margin. Efficient fertilizer management through soil testing is important for accessing the production potential of crops. Since plant derives nutrients from both soil and fertilizer, it is necessary to minimize the wastage of fertilizer use for maintaining nutrient status of the soil through the new approaches and tools of soil testing and fertilizer recommendation. The soil testing is assuming greater significance in the backdrop of widespread accounts of soil fertility decline and stagnation of crop yields under intensive agriculture.

The analysis of 0.25 million soil samples for micronutrients from 20 states of the country has indicated deficiencies of zinc, iron, manganese, and copper to the tune of 49, 12, 5 and 3% respectively. Likewise, the analysis of over 60,000 soil samples from the country have revealed sulphur deficiency of 5-83% in different states with an overall mean of 41%. The Universal soil

extraction procedure is widely used to extract more than one class of elements and ions from a soil. A single step removes P as well as major cations (K,Ca, Mg) and micronutrients B, Cu, Fe, Mn, the heavy metals as, As, Se, etc. GIS based decision support tool helps in delineating the fertility management zones within the study area and the maps generated through this approach can give a clear visual indication of changing fertility scenario with time, which is important for nutrient management planning. A number of approaches are used to make soil test based fertilizer recommendation. However, the data and calibration generated in relation to its predictability are as far less in proportion to the widely varying range of soils, crops, and agro-climatic regions of the country. Improvement in growth parameters due to application of fertilizers on STCR basis and application of both fertilizers and organic manures with/without bio fertilizer inoculations may be attributed to the increased supply of nutrients.

Soil testing shall play crucial role in precision agriculture, areas of organic farming and in rain fed areas. Standardization of soil test methods and strengthening of soil testing services is needed in our country. Refinement in fertilizer recommendations is needed in different agro-ecological sub regions. In future GIS, GPS technique will be used for preparation of soil fertility maps and soil testing methods such as AB-DTPA and universal soil extraction technique will be as efficient as the routine standard method for soil testing and fertilizer recommendation.

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Impact of Zinc Micronutrient in Nutrient Management of Paddy (*Oryza sativa*) Grown in *Tarai* Soils of Uttar Pradesh

S.P. Upadhyay, R.P. Singh, R.K. Singh, A.K. singh and V.P. Singh
Mahayogi Gorakhnath Krishi Vigyan Kendra, Gorakhpur- 273165 (U.P.)
Corresponding author E mail: ***sandeepupadhyay383@gmail.com***

Abstract: Food security depends on the ability to increase production with decreasing availability of resources to grow crops. Imbalanced use of fertilizers in the fields without information on soil fertility status and nutrient requirement by crop causes adverse effects on soil and crop regarding both nutrient toxicity

and deficiency. Soil test based fertilizer application not only helpful for higher response of nutrients but also harness the synergistic effects of balance fertilization. Also in *tarai* soils of Uttar Pradesh the zinc deficiency found which causes the *Khaira* disease in which on lower leaves small brown/ bronze color appears, later spots merged and leaves dry also grain number decrease and weight decreases so ultimately the yield of paddy decreased because zinc plays an important role to catalyze the enzymatic activities and oxidation reduction reactions.

Keeping above fact in mind ten front line demonstrations (FLDs) were conducted on the basis of soil testing during *kharif* 2017-18 in *tarai* soil of Harpur, Pachganwa and Chaukmaafi villages, block Jangal kaudiya, Gorakhpur district, Uttar Pradesh for finding the response of zinc micronutrient on paddy (*var. Sambha Sab- 1*) under Mahayogi Gorakhnath Krishi Vigyan Kendra, Chaukmaafi to promote the need based use of zinc micronutrient in paddy crop for achievement of targeted yield on the basis of initial soil fertility and recommended nutrient dose. Response to recommended fertilizer dose of N: P: K @ 120:60:40 farmer's share basis and 25 kg/ha zinc sulphate of paddy was studied. Verification trial was also conducted during *kharif* 2018-19 to validate the response and need of zinc in the main experiment.

Results of the experiments revealed that average yield of rice (50.78 q ha^{-1}) have been achieved in treated field with zinc micronutrients over farmer's practice (42.69) and the per cent increase in yield was 18.90 % over farmer's practice. The net returns of zinc micronutrient treated field was higher (Rs. 49647/ha) over farmer's practice (Rs. 39366/ha). The B: C ratio was also obtained higher (2.71) in treated fields over farmer's practice (2.47).

Thus, nutrient management on the basis of soil testing will not only ensure sustainable crop production but will also steer the farmers towards economic use of costly fertilizer inputs depending on their financial status and prevailing market price of the crops. Also these findings may be used as guide for efficient fertilizer management for paddy by reducing cost of cultivation and increasing fertilizer use efficiency with the application of zinc micronutrient in zinc deficiency areas.

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भारत में हाईड्रोजन ऊर्जा एवं हाईड्रोजन ऊर्जा की उपयोगिता

ठाकुर प्रसाद यादव
हाइड्रोजन ऊर्जा केन्द्र, भौतिकी विभाग,
काशी हिन्दू विश्वविद्यालय, वाराणसी – 221 005

पेट्रोलियम पदार्थों की बढ़ती कीमतों और उनसे हो रहे प्रदूषण व पर्यावरण को नुकसान ने मानव को वैकल्पिक ऊर्जा के बारे में सोचने पर विवश कर दिया है। भारत में ऊर्जा की मांग 9 से 10 प्रतिशत वार्षिक की दर से बढ़ रही है। भारत में तात्कालिक ऊर्जा मांग के दो–तिहाई भाग की पूर्ति 6 व्यापारिक स्रोतों – कोयला, लिग्नाइट, तेल, प्राकृतिक गैस, जल एवं परमाणु से होती है। शेष एक तिहाई की पूर्ति गैर व्यापारिक स्रोतों (कृषि अवशेष, लकड़ी आदि) से होती है तथा अन्य गैर–परंपरागत स्रोत – सौर ऊर्जा, वायु ऊर्जा, बायोगैस आदि से भी ऊर्जा प्राप्त की जा रही है परन्तु इनका योगदान बहुत कम है। सोवियत वैज्ञानिकों ने 4:1 में पेट्रोल और पानी की एक विशेष प्रकार की टंकी में वाइब्रेटर की सहायता से मिलाया। यह देखा गया कि इस तरह से मिले हुए पेट्रोल और पानी का ईधन दो हफ्तों तक ज्यों का त्यों बना रहा, यानि एक बार बनाने के बाद अगले दो हफ्तों तक इस नए पेट्रोल का उपयोग किया जा सकता है।

भारतीय वैज्ञानिक भी सोवियत वैज्ञानिकों से पीछे नही हैं। भारतीय वैज्ञानिकों ने तो विशुद्ध पानी से हाईड्रोजन बनाकर हाईड्रोजन चलित मोटरसाइकिल, तिपहिया वाहन एवं छोटी कार चलाकर चमत्कारी आविष्कार कर दिखाया है। बनारस हिन्दू विश्वविद्यालय के हाईड्रोजन ऊर्जा केन्द्र, भौतिक विज्ञान विभाग में इस तरह का शोधकार्य किया जा रहा है जिसमें उपरोक्त वाहनों का दक्षता बढ़ाने का प्रयास हो रहा है।

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Microhabitat and diurnal changes in the saturation deficit under field conditions impact heat and drought resistance of tropical drosophilid *Zaprionus indianus*

T N Girish[1], B E Pradeep[1], Ravi Prakash[2]

[1]Department of Biosciences, Sri Sathya Sai Institute of Higher Learning, Puttaparthi, India;
[2]Department of Genetics, Maharshi Dayanand University, Rohtak, India.

Abstract: Recent colonization of tropical drosophilid *Zaprionus indianus* is likely to involve genetic and plastic effects to survive and invade new environments. However, assessment of plastic responses to climatic stressors has received little attention so far. In the present study, we tested plastic responses of *Z. indianus* to daily changes in hot and drier conditions in the field. *Z. indianus* flies collected from sunny and shady microhabitats as well as flies sampled daily after every 6h showed significant plastic changes in the heat knockdown time, heat hardening capacity, heat-shock survival and for desiccation related traits. Diurnal as well as microhabitat specific changes in the saturation deficit of the air are significantly correlated with relative heat hardening capacity as well as plastic changes in the cuticular lipid mass and dehydration tolerance. Wild flies from sunny locale revealed higher level of energy metabolites (~40% more proline and 15-20% in four other metabolites) as compared to wild flies from shady locale. Although the age of flies in the field is unknown, trends of plastic changes were quite similar in a two-year field study. Therefore, *Z. indianus* flies in the field are capable of rapidly adapting through plastic changes induced by variable levels of hot and drier conditions. The observed greater plasticity responses of *Z. indianus* might help in its invasion potential.

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Recent Development in Surface Enhanced Raman Scattering for Detection of Single Molecule

Udai B. Singh*, Vineet Kumar Singh, Sintu Kumar, Ravi S. Singh
Department of Physics, Deen Dayal Upadhyaya Gorakhpur University,
Gorakhpur, India-273009
(*E-mail: udaibhansingh123@gmail.com)

Abstract : It is very critical to detect low concentration of biological and chemical speciess 1and in some disease (e.g., cancer), early detection is exceptionally important for the survival of patients2. Surface enhanced Raman scattering (SERS) have made an enormous impact due to detection ability of even a single molecule. In order to extra enhacement in SERS sensitivity, various synthesis techniques have been developed to generate SERS substrates integrated with numerous hot spots. Most of SERS work to date has focused on designing the substrate to maximize the density, sensitivity, and reproducibility of hot spots in order to give the strongest possible SERS signal. However, it is challenging to significantly enhance SERS sensitivity by solely optimizing the plasmonic structures of SERS substrates. Ciracì et al.3developed the anunique system which shows the extremely huge enhancement and this system is known as Nanoparticle-Film with Gap (NFG).

Recently in five years, most of the works4, 5on SERS substrate have focused to design NFG system in such way to attain the strongest possible signal by increasing the density, sensitivity, and reproducibility of hot spots. Therefore, the gap between NPs and thin film turns out to be an extremely important parameter governing the effective coupling. However it is quite challenging to reduce the gap of NFG system using conventional techniques.

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In vitro callus induction and plantlet regeneration of *Artemisia indica* willd., a medicinal plant.

V. Thangarajan, S. Sahaya Sathish, S. Bavya and A. Vimala
Centre for Cryptogamic Studies, Department of Botany,
St. Joseph's College (Autonomous), Tiruchirappalli - 620 002, Tamil Nadu.

Abstract: The callus induction and *invitro* plantlet regeneration for the plant *Artemisia indica* was optimized by studying the influence of the explant (leaf) on age and different concentrations of plant growth regulators. Explants from 10 to 15 day old seedlings showed maximum callus induction. Callus formation and shoot differentiation was initiated on Murashige-Skoog (MS) medium containing Auxin in combination with BAP in all explant types. The best results were obtained using leaf explants 80% callusing was achieved in MS medium supplemented with Auxin and combination of BAP. However the results reflected the existence of high inter-explant variability in response to growth regulators. Rootinduction was achieved in MS medium containing 3 mg/l IBA. Application of this protocol has potential for mass multiplication of the target species in limited time period.

Keywords: *Artemisia indica,*Asteraceae, leaf explant, MS with Auxin and BAP -callus,MS with 3 mg/l IBA -Rootinduction.

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Effect of different combination of wastes on the reproduction and development of earthworm *Eisenia fetida*

Vandana Singh[2], Gorakh Nath [1] and Keshav Singh[2]
[1]Department of Zoology, S.V. M. M .P.G. College, Arya Nagar, Gorakhpur-273001
Mob. No.9795898689; Email-gorakhjee@gmail.com
[2]Vermibiotechnology Laboratory, Department of Zoology,
D. D. U. Gorakhpur University, Gorakhpur-273009 U.P. India.
Mob No: +91-9450433313, Email- keshav26singh@rediffmail.com

Abstract: Organic forming through vermicomposting is a better option for

management of wastes and production of agricultural crops and vegetables. Its integrated and coordinated use will contribute a broad spectral relationship among food production, environment quality, on animal and human health safety. It is an important biotechnological tool of organic forming without much financial involvement with the help of earthworm *Eisenia fetida*. This worm is suitable species for conversion of biological wastes into valuable product "Vermicompost". It has more tolerance against increased temperature and humidity and other ecological variations. *Eisenia fetida* is highly resistance to many pesticide and heavy metals, worm could overcome all these effect by increasing mucous secretion and restricting the movement. Present study demonstrated that there is significant increase in the growth, reproduction and development of *E. fetida* in different feed mixture of biological wastes. Production of more number of earthworms will be helpful to more conversion of wastes into biofertilizer. Vermicompost is easily biodegradable, less expensive than synthetic fertilizer. The production of more number of healthy earthworms by the use of combination of different biological wastes is more advantageous in recycling of nutrients in the environment.

Keywords: Combination of wastes, Reproduction and development, Earthworm, *Eisenia fetida*

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Green Synthesis, *in-vitro* anticancer activity of silver nanoparticles on MCF - 7 breast cancer cell line

Vimala A, Sahaya Sathish S, Bavya S and V. Thangarajan
Centre for Cryptogamic Studies, Department of Botany,
St. Joseph's College (Autonomous), Tiruchirappalli - 620 002, Tamil Nadu.

Abstract: Cancer is a leading cause of death worldwide and persistent focus is on the discovery and development of new anticancer drugs, especially from plants. The aim of this is work is to characterize and investigate on the cytotoxic properties of synthesized Ag-NPs using the moss plant *Campylopus flexuosus* (bryophyte), by human breast cancer cell line studies. Colour changes during the incubation of extract with $AgNO_3$ from pale yellow to reddish brown

indicating the silver nanoparticle formation. Silver nanoparticles were characterized by UV–Vis spectrophotometer and the highest peak was identified in the 436 nm. Presence of Carbonyl compounds were acted as a capping agent to the production of silver nanoparticles was identified by the FTIR. FESEM and XRD analysis revealed the average size of the nanoparticles as 58nm. -25mv obtained in zeta potential showed a good stability. Cytotoxic activity of AgNps was confirmed by MTT, Caspase assay and Gene expression study. Treatment of MCF - 7 breast cancer cells with various concentrations of AgNPs (25–500 ìg/ml) were carried. The Ag-NPs caused a dose-dependent decrease in cell viability. Furthermore, the apoptotic effects of AgNPs were confirmed by activation of caspase 3, 9 and Bcl-2 gene expression. Caspase assay measured for free pNA were cleaved by the AgNps. Gene expression was studied by RT–PCR. Bcl - 2 expressed high level in AgNps compared to the pure plant extract. It confirms the apoptotic effect of synthesized silver nanoparticles. The present findings suggest that CfAgNPs could contribute to the development of a suitable anticancer drug, which may lead to the development of a novel nanomedicine for the treatment of cancers.

Keywords: *Campylopus flexuosus*, Silver nanoparticles, Characterization, MCF – 7 breast cancer cells, Apoptotic effect, Anticancer drug.

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Incorporation of NGS data to improvise precision breeding: Insights from *Morus* Genome and Transcriptome

Vinay Kumar Baranwal*[1,2]

*,[2]Department of Botany, Swami Devanand Post Graduate College, Math-Lar, Sonarbari Road, Lar, Deoria, U.P. India, 274502

[1]Department of Plant Molecular Biology, University of Delhi South Campus, Benito Juarez Road, Dhaula Kuan, New Delhi, India, 110021

vinaydu@gmail.com

Abstract: Molecular breeding is conceived as tool of the future to feed the burgeoning population. In order to tackle Malthusian catastrophe, the humankind need to utilize natural resources at optimal level.Mulberry sustain

the silk-worm on which the whole silk industry is dependent. This sector provides employment to lakhs of people, and generate revenue for the government coffer. The output in Indian system has been stagnant for almost a decade and certain promising parental lines to prepare hybrids have been identified. *Morus laevigata* and *Morus serrata* have been predicted to have great potential as parental lines in breeding programs of Mulberry. They exhibit tolerance to various biotic and abiotic stresses. We have sequenced their transcriptomes and compared them after their *de novo* assembly from the leaf samples. This data has been used for identification of markers and deferentially expressed genes in certain conditions. This led to the identification of a group of different types of markers which could be utilized for assessment of hybrids. Utilizing this resource, certain gene families including ARF, Lectin, MIPs, NAC and WRKY of Mulberry were identified and the pattern of their expression wasassessed in developmental tissues and stressed conditions. Our data led to the identification of certain novel types of WRKY and NAC genes in mulberry. Their roles are yet to be ascertained. Further, a comparative transcriptomics analysis was done to find out the genes regulating the habitat of three different species of mulberry. Their putative promoter regions (2K upstream) were compared to get a clue to identify the regulatory regimen followed by these habitat shaping genes. To ascertain the evolution of these genes in Mulberry species, neo-functionalisation of such genes, phylogenetic trees and Gene Ontology Enrichment Analysis were made. Origin of these genes by duplication events, or by neo-functionalisation were found when the transcriptome of contrasting species were compared. Our data is ready to be used by *Morus* scientific fraternity to study the further advancement and to address Mulberry development and stress biology.

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Impact of mineral mixture and de-wormer in livestock production system

Vivek Pratap Singh, A.K. Singh, R.K. Singh and R.P. Singh*
Subject Matter Specialist, *Senior Scientist & Head
Mahayogi Gorakhnath Krishi Vigyan Kendra, Chauk Mafi, Gorakhpur
Email: vpslpm@gmail.com

Abstract : Buffalo play significant role in ensuring livestock security to the millions of small and marginal farmer, landless labourers and rural folk. Low productivity of animals with higher genetic potential is primarily attributed to the imbalanced and inadequate feeding. The nutritional needs of dairy animals with respect to energy, protein, minerals and vitamins have long been known, and these have been refined in recent decades. Deficiency of micronutrient and infestation of endo-parasites is the major problem of livestock rears in Gorakhpur district, however its low milk production and delay in heat is due to deficiency of micronutrient in feeds. In order to overcome these problems MGKVK Gorakhpur conducted trial to find out the impact of mineral mixture and de-wormer on improving milk production and reproduction efficiency in milch buffaloes and suggests that there is considerable scope for enhancing milk production with strategic use of the existing feed resources. The animals were assigned into treatments having T_1 = no use of mineral mixture and de-wormer with similar concentrate mixture and assessed technology i.e. mineral mixture @ 50gm per animal per day and de-wormer @ 1 Tab per 3 month per animal were used and designated as $T_{2.}$ Results showed that the highest milk yield were obtained in T2 (mineral mixture and de-wormer), however the lowest milk yield were found in T1 (no use of mineral mixture and de-wormer). The average milk production was 6.49 and 5.25 lit./day/animal respectively which is 23.61% higher milk production over farmer practices. The performances of the animals on the mineral mixture in the diets and use of de-wormer were found superior to that of without mineral mixture based diet.

Keywords: Buffalo, Mineral, De-wormer, Milk Production, Feed.

Efficacy of Ayurvedic Amalaki Rasayana in developmental processes of wild type *Drosophila melanogater* revealed through next generation sequencing

Yashvant Patel and S.C. Lakhotia
Cytogenetics Laboratory, Department of Zoology,
Banaras Hindu University, Varanasi

Abstract: Ayurvedic medicines are popularly useful in a number of diseases; however, we were largely unaware of the underlying basis of cellular, molecular mechanism of the action. So, to explain and examine the mechanisms of effects of Ayurvedic formulation (Amalaki Rasayana), we used NGS technique taken *Drosophila* as a model system. In the present study, we tested Amalaki Rasayana (AR), an herbal derivative prepared from Indian gooseberry or Amla (*Phyllanthus emblica*) on the development of wild type *Drosophila melanogaster* by transcriptome profiling through next generation sequencing. Total mRNA was isolated from late third instar larvae of *D. melanogaster* reared on the food supplemented with AR (0.5% w/v) and normal food (as control) and used for further sequencing to evaluate the effects of feeding of AR on the expression profile of genes involved in life-history traits, development of various physiological like digestive system, respiratory system and also in the improved activities for muscle, eyes, neurons and gonads. Level of expression were also validated through real time-q PCR for some of the genes *viz. Notch, Nej, Not1, Brwd, Bchs, Jeb, Mask, Dp, Hdc, Spen, Sls* and *Pros* involved in a wide range of biological processes which also coherent with sequencing data. AR feeding substantially change in expression of genes of many pathway including life history traits and fecundity of flies explained by transcriptome analysis, which is already explained in previous report from our lab through genetics and immunostaining. Therefore, our finding suggests a substantial change in transcriptome profile carried out by Amalaki Rasayana showing improvement in life's traits of wild type *Drosophila*. Further, *Drosophila* used as a model system to study the molecular and biological basics of different ayurvedic formulations.

Keywords: Amalaki Rasayana, *Drosophila melanogaster*, Transcriptome

analysis, Life history traits, Next generation sequences.

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Studies on vermiwash of weeds and sugarcane bagasse with biopesticides on growth and productivity of different plants and pest infestation

Yogendra Kumar[2], Gorakh Nath[1] and Keshav Singh[2]

[1]Department of Zoology, S.V. M. M .P.G. College, Arya Nagar, Gorakhpur-273001
Mob. No.9795898689; Email-gorakhjee@gmail.com
[2]Vermibiotechnology Laboratory, Department of Zoology,
D.D.U. Gorakhpur University, Gorakhpur-273009 U.P. India.
Mob No: +91-9450433313, Email- keshav26singh@rediffmail.com

Abstract: Indiscriminate use of chemical fertilizers disturbs the soil texture and physico-chemical properties of soil, which ultimately affects the human health and environment. The use of chemical fertilizers has posed a serious threat to the environment and caused destruction of useful microorganisms, insects and worms in soil. Lack of proper management and disposal practices of biological wastes caused environmental hazards and various negative effects on human life and their domesticated animals. Organic farming with use of vermicompost is a better option for management of wastes and improvement of soil quality. It is one of the important biotechnological tool which makes a sustainable interrelationship among food, environment, human and animal health.

The problem of handling of weeds like *Eiccornia* (water hyacinth), Parthenium grass and agricultural wastes in the form of sugarcane bagasse needs attention for tackling it on war footing basis. These weeds grows faster in the sewage ponds and agricultural land and creates problems in the form of eutrophication and decrease the growth and productivity of crops. Instead of it, insects and pathogen are major pests of agricultural crops and vegetables all over the world. Indiscriminate use of chemical pesticides had caused serious threat to the environment. These chemical pesticides contaminating the soil which pose many health hazard to human as well as animals. Vermicomposting is an easy and effective way to recycling of biological wastes in to nutritious

vermicompost by earthworm. During these process important plant nutrient such as nitrogen, phosphorus potassium, calcium etc. present in feed materials are converted in to more absorbable form for crops. These plant nutrients also act as growth regulators of beneficial bacterial and actinomycetes population in worms which ultimately increases the porosity, aeration and water holding capacity of soil, so that irrigation water requirement for crops significantly reduced. It improves nutrients availability and act as complex fertilizer.

Eisenia fetida is commonly known as red worm because of their red color of body and distributed through out the country because of their migratory habits. These worms are hardy can tolerate wide variation of ecological factor like temperature, humidity and also survive on wide variety of degradable wastes. Earthworms play an important role in stabilization of inorganic plant nutrients to organic form and increased the soil fertility. These worms added their cast with compost and increased the inorganic nutrients many times along with some plant growth hormones and vitamins. They are also help the in the management of rotting solid organic waste in dumping site, which creates problems of odor, pollution of soil/water/air. Vermiwash is the coelomic fluid extraction; it contains several enzymes, plants hormones like auxines, cytokinin, gibberellins and vitamins, especially B_{12} along with micro-nutrients. This liquid manure is collected in the liquid form and used as foliar spray, which stimulate the growth and yield of crops. Vermiwash is easily producible, biodegradable, less expensive, and manageable. Mixing of different plant pesticide with vermiwash is very advantageous. Spraying of this mixture has dual function which acts as bio fertilizer as well as bio-pesticide. This production will safe for environment and human health. Use of this biotechnological tool is ecologically safe and culturally more acceptable among farmers.

Keywords: vermiwash, sugarcane bagasse, biopesticides, growth and productivity, crops, pest infestation

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Effect of soil pollutants on the diversity of earthworms in eastern Uttar Pradesh

Yogendra Kumar [2] ,Gorakh Nath [1] and Keshav Singh[2]

[1]Department of Zoology, S.V. M. M .P.G. College, Arya Nagar, Gorakhpur-273001
Mob. No.9795898689; Email-gorakhjee@gmail.com
[2]Vermibiotechnology Laboratory, Department of Zoology,
D.D.U. Gorakhpur University, Gorakhpur-273009 U.P. India.
Mob No: +91-9450433313, Email- keshav26singh@rediffmail.com

Abstract: Indiscriminate use of chemical fertilizers and pesticides disturbs the soil texture and physico-chemical properties of agricultural fields. The use of agrochemical viz. pesticides, herbicides, fungicides, nematicides, bactericide, weedicides and fertilizers had posed a serious threat to the environment which ultimately destroy the beneficial microorganisms, insects and worms in soil. Various heavy metals were also added in the agriculture field with these agrochemicals. Earthworms are the major macrofauna in the soil community. Earthworm can be used as bio-indicators for the monitoring of ecosystem state and changes. Due to the recent agricultural practices and soil contamination as well as disturbed soil physico-chemical texture, the earthworm population decreased. Earthworms play an important role in stabilization of inorganic plant nutrients to organic form and increased the soil fertility. The worms added their cast with compost and increased the inorganic nutrients many times along with some plant growth hormones and vitamins. The earthworms occur in large numbers and have wide distribution pattern with less mobile habit. The earthworms require carbon and nitrogen for their growth and reproduction. Food quality influences not only the size of the earthworm populations but also their growth and reproduction rates and hence determines their distribution trends in an ecosystem. Similarly, distribution of earthworms also depends on physical conditions including water content and availability of organic matter in the soils. Soil moisture, pH, organic carbon and organic nitrogen also play important role in the distribution of earthworms. The aim of present study, to investigate the impact of the pollutants on earthworms diversity and physico-chemical properties of a soil in eastern Uttar Pradesh.

Keywords: Earthworms, soil pollutants, diversity, bio-indicators

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On New-approach in Theoretical Physics

Ravi S. Singh, Sintu Kumar, Udai B. Singh and Vineet Kumar Singh
Department of Physics,
Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur-273009 (U.P.) India

Abstract : Any phenomenon and its evolution occurring in universe can be understood and predicted by following two mutually exclusive theories: General theory of relativity propounded by A. Einstein and Quantum field theory evolved by the discovery of quantization of P.A.M. Dirac. EM field experimental findings in observational astronomy demands that general theory of relativity must be synthesized with Quantum field theory. One such theory, namely, String theory has been evolved without the experimental verification of strings. Researchers have not accepted string theory and, therefore, following novel approaches prevalent in quantum Information theory. One may try to build theory underlying Quantum cosmology wherein quantum field theory and general theory of relativity gets combined.

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द्रव क्रिस्टल पदार्थ : वर्तमान एंव भविष्य

सुग्रीव नाथ तिवारी
भौतिकी विभाग, दीनदयाल उपाध्याय गोरखपुर विश्वविद्यालय, गोरखपुर

मानव पदार्थों की तीन अवस्थाओं से आदिकाल से परिचित है। ठोस, द्रव एवं गैस के अतिरिक्त एक चौथी अवस्था का ज्ञान आज से लगभग सवा सौ वर्षों पहले सन 1888 में हुआ था, जिसे द्रव क्रिस्टल कहते हैं। ठोस, द्रव और गैस के अलावा, ये पदार्थ ऐसे होते हैं जो असमदिग्वर्त क्रिस्टल से सीधे समदिग्वर्त द्रव में नहीं बदलते हैं, बल्कि इसके विपरीत एक मध्यवर्ती संरचना से गुजरते हैं, जिसमें द्रव के कुछ विशिष्ट गुणों के साथ–साथ क्रिस्टल के गुण भी विद्यमान होते हैं। इस तरह के मध्यवर्ती प्रावस्था को द्रव क्रिस्टल अथवा मेसोमोर्फिक प्रावस्था कहा जाता है। ऐसे चरणों को प्रदर्शित करने में सक्षम पदार्थों को द्रव क्रिस्टल या मेसोजेन्स कहा जाता है। अभिविन्यास निर्भर, संघनित चरणों के भीतर अणुओं के बीच गैर–सहसंयोजक अन्तः क्रिया इस स्थिति को जन्म देती है। द्रव क्रिस्टल की दोहरी प्रकृति और

बाहरी उत्तेजनाओं जैसे वैद्युतकीय, चुंबकीय और सतह बलों के लिए उनकी आसान प्रतिक्रिया ने विविध क्षेत्रों में लगे वैज्ञानिकों, इंजीनियरों और प्रौद्योगिकीविदों की रुचि को उत्तरोत्तर आकर्षित किया है। संख्यात्मक प्रदर्शन, तापमान संवेदक, उच्च रिजॉल्यूशन टी वी डिस्प्ले, प्रोजेक्शन सिस्टम, ऑप्टिकल कंप्यूटिंग, स्टील, पेंटिंग्स और रासायनिक, इस्पात से भी अधिक तन्यता ताकत वाले तंतुओं के साथ–साथ जैविक संवेदन के रूप में असंख्य अनुप्रयोगों के कारण वर्तमान में द्रव क्रिस्टल अनुसंधान का एक बहुआयामी एवम उर्ध्वगामी क्षेत्र का गठन करती है।

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Seasonal variations of Lead and Cadmium in edible tissues of Labio rohita and Catla catla

Geeta Singh
Assistant Professor, Department of Chemistry
D.D.U. Gorakhpur University, Gorakhpur, U.P.
(geetasanger@gmail.com)

Abstract : Lead and Cadmium both are very toxic heavy metals and widely dispersed in nature. Fish are a valuable source of high-grade protein and nutritious component of the human diet and occupy an important position in the socio-economic conditions of south Asian countries. Fishes have a natural tendency to concentrate heavy metals in their bodies. The two most commercially important fresh water fish species namely; Labio rohita and Catla catla were collected from different fish markets of Agra city and analyzed for the metals concentration. The present study is undertaken to gauge the accumulation of lead and Cadmium in tissues of Labio rohita and Catla catla seasonally. The metal concentration was evaluated using a Perkin Elmer AA analyst 100 atomic absorption spectrophotometer. Wet digestion method was used for analysis of metals with nitric acid and sulfuric acid. The level of Lead was observed higher in summer season (7.25 $mgkg^{-1}$) followed by winter (6.25 $mgkg^{-1}$) and rainy (6.0 $mgkg^{-1}$) seasons. Cadmium concentration followed the same trend, summer (8.25 $mgkg^{-1}$) e" winter (6.6 $mgkg^{-1}$) e" rainy season (5.3 $mgkg^{-1}$). Lead was higher in summer season in L. rohita in comparison to cadmium in both the fish species. The frequency of heavy metal contamination

was higher in Labio rohita in comparison of Catla catla. Similar trend of seasonal variation in metal concentrations were observed in both the species. The present study showed that the levels of metals are different in both the fish species but within the maximum residue levels recommended at National and International standards.

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Emerging trends in laser technology and light matter interaction

Sintu Kumar, Udai B. Singh, Vineet Kumar Singh, Ravi S. Singh
Department of Physics, DDU Gorakhpur University, Gorakhpur, India-273009

Abstract: The laser is one of the most important inventions of the 20th century. After the development of Ruby laser by Maiman in 1960, a large number of scientists and researchers have worked and made revolutions in different types of laser systems. Nowadays development is still evolving, and currently, laser research is more efficient research field than it has ever been. Since 1960, different groups of the researcher in the world were finding the behavior of the atom, in the existence of an applied field. The laser is a great source of the high field, and it provides new solutions to advance these studies. The invention of pulsed laser emerges new interesting research area in the field of laser-matter interaction.A consistent advancement happened towards the new types of laser development after seeing the laser benefits for light-matter-interactions, atomic and molecular structure. This further lead to developing more powerful, more broadly tunable and efficient laser systems. According to their need, laser systems can be made with ultra-broadband or ultra-narrow, and a tremendous range of achievable powers and repetition rates for pulsed lasers. The major step was the development of dye laser for spectroscopy point view, and the next step was the generation of the: Sapphire laser, which are broadly tunable, and narrow-band lies in the range of visible and near-infrared.The great variety of ultrashort laser pulses can be generated by laser-matter interaction. These schemes are capable of generating pulses with duration lies from a few femtoseconds to hundreds of femtoseconds and picoseconds. Laser-matter interaction gives various nonlinear phenomenon such as self-compression, self-

focusing/ defocusing, harmonic generation, several instabilities and nonlinearities etc. Compression of the laser pulse in nonlinear media is a most prominent research area for an ultrashort pulse generation. When a laser pulse interacts with a medium, medium gets polarized and medium responds nonlinearly to the laser. Moreover, the medium polarization density depends on laser field. From Maxwell equation, the nonlinear response of polarization density will be a source of new frequency emission. However, the optical properties of the medium are also modified due to laser matter interaction, and short laser pulses can be generated due to laser matter interactions.

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Recent advances in Solar Energy in India

Vineet Kumar Singh, Udai B Singh, Sintu Kumar, Ravi S. Singh
Department of Physics, DDU Gorakhpur University, Gorakhpur-273009

Abstract: Solar energy is one of the important sources of energy on earth. Earth received 4.38 *10^{20} W energy in an hour. According to the report of global energy statistical book, the total consumption of energy by the world in 2017 was 1.51*10^{17} Wh. That is whatever the energy world requires in a year, earth receives only in few hours. The generation of solar energy is completely environment friendly. This doesn't generate any carbon pollutant. This is completely noise free production. Solar panels are easy to carry and decentralized systems. Still good for hilly, forest and remote areas.

Currently, India has capacity of 12.2GW. In last three years India improved its total capacity by more than 370% i.e from 2.5GW to 12.2GW. India has target to achieve the capacity of 175GW till 2022.

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Food and Nutritional Security for Mounting Indian Population

Rana Pratap Singh
Department of Environmental Science
Babasaheb Bhimrao Ambedkar University
Vidya Vihar, Raebareli Road, Lucknow
[1]Affiliation, E-mail: ccseditor@gmail.com

Abstract : India is one of the populus country which adopted green revolution package in 1960s and onwards in many croping systems which detoriated agro-ecosystems due to loss of below ground and above ground biodiversity, on one hand and contamination of the soil, water, air and food with multiple known and unknown toxic substances used as agrochemicals on the other. The food and nutritional security in India is not limited to the concerns on food production but also food storage, practices of cost saving and eco-friendly innovative technologies and effective marketing network which can attract educated young people in agriculture sector. Indian agriculture is predominated with small scale and marginal farmers who are poor, uneducated and having low or no risk bearing capacity. The forward and backward linkages of agriculture, use of innovative technologies suitable for such conditions and low external input ecological farming with good marketing management can help the young farmers to get attracted, get strethegned and get educated for evaolving a new agroecosystem for uncontaminated healthy and safe food security. Protien, miniral and vitamin malnutrition are another concern for food security in India which can be managed by increasing the acrage and yield of pulses, vegetables and fruits etc. The technologies and research methodologies available with research institutes and universities dealing with agriculture are not reaching to the farmers because of poor extention and outreach services in the country and low or no education in the farmers. The emerging crisis related to climate change and global warming are another major concern for food and nutritional security in the world in general and India in particular agriculture, horticulture, fishery and animal husbandury etc. are considered as one of the most vulnerable sectors to changes in cliamtic and edaphic factors. India is required to evolve a new stretegies for attracting people in production, processing and marketing in agriculture, horticulture, fishery and animal husbandury etc. Local

and organic inputs with desired technological interventions can help in achieving non-toxic food in a sustained way with low investment on one hand and can help in etablishing small and medium scale rural, semi-urban and urban industries which can involve a large unskilled or semiskilled youthful population. It will help in obtaining peace, stability and income through the agricultural practices. The semi-mechanised and mechanised tools and machines operated by renewable energy sources e.g. solar pannels and bio-fuel etc. can reduce the involvement of labor and reduce the emission of Green House Gases (GHGs) from the agriculture sector. The construction of green house, poly house, tunnels etc. can enhance the area of protected and multitier agriculture in less acrage. The farmers cooperative or commercial agriculture can be operated in big land area which will be more economic and high risk bearing.

Keywords: Agro-ecosystem management, Ecological agriculture, Marketing network, Protected agriculture, Small scal industries.

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Aayurveda as Modern Medicine: Prospects, Limitations and Challenges

Anant Narayan Bhatt

Institute of Nuclear Medicine and Allied Sciences, Timarpur, Delhi – 110054, India

anbhatt@yahoo.com, anant@inmas.drdo.in

Abstract : Ayurveda is considered as the knowledge to live healthy and happy life. The concept of Ayurveda is based on a combined study of body, sense organs, mind and soul. Therefore, unlike the various systems of medicine, like allopathy or homeopathy, Ayurveda is not a system of medicine but a science of life and longevity. The modern definition of health according to the World Health Organization (WHO) also says it is "the state of complete physical, mental and social wellbeing and not necessarily the absence of disease and infirmity". Ayurveda believes that body is a delicate balance between biophysiological forces (*dosha*) and constitution (*prakriti*), which is influenced by mind (*manas*) and "metabolic fire" (*agni*) and all these four thing together determine health and disease. Ayurveda's principle therapeutic aim is to harmoniously restore that balance between these four aspects of life. Moreover,

Ayurveda has a health-oriented approach, while Allopathy has largely a disease-oriented approach. Since last two centuries we have seen that diseases oriented approach is failing continuously for example microbes are becoming resistant to antibiotics, many cancers showing resistance to established radio and chemo-therapies etc. Whereas, Ayurveda works by treating the symptoms of a disease and it helps individuals to strengthen their immune system, which is a holistic approach helps the person in restoring the harmony and overcoming the disease. According to Ayurveda's "no two individuals are alike" even when they suffer from similar ailments, therefore different people needs different treatment, which is the basis of Ayurveda and we call this as "Personalized Medicine" in modern medical science. Therefore Ayurveda, which is based on personalized treatments for similar ailments in different patients, can be the future of personalized medicine in modern medical sciences.

The most important challenge in Ayurveda is precise diagnosis of the disease; along with symptoms, the practitioner needs to identify the "prakriti" and "dosh" of the patient. Clinical diagnostic and imaging methods of Modern medical science can play an important role in this. The next important challenge in Ayurveda is preparation of the drug/ formulation. The classical formulation are already defined in Ayurveda, however traditional Ayurvedic practitioners often modify them to suit the individual constitution (*prakriti*), which confers genetic predisposition (Personalized medicine) toward disease and therapy response, and is vital to ensure medication safety, which determines the efficacy. Modern medicine focuses on one active ingredient molecule in the extract however, in Ayurvedic formulation's medicinal power is a function of its milieu composing many molecules, not merely due to any single plant extract. Therefore, Ayurveda takes the patient and the medicinal herb both as a whole. When we take a molecule or fractionated extract, the synergy is lost, leading to side effects. Whereas, Ayurvedic medicines do not have side effects.

The major limitation of Ayurvedic drug is the selection of the source plant material. Naturally grown medicinal herbs are believed to be better than cultivated herbs. Similarly, several other factors like season of harvest, geographical location etc. makes the difference in medicinal effects of the medicinal plants. These changes results in batch to batch variation in herbal drugs leading to variable effects in patients. This problem needs to be answered to make Ayurvedic drugs more precise and effective.

Keeping all these virtues of Ayurveda in mind, we can say Ayurveda is medicine with intelligence. It gives personalized approach of treatment, which is the science of 21st century and beyond. However, the potential of Ayurvedic philosophy and medicines needs to be recognized and converted into real life treatment paradigm. We need to interpret logic of Ayurveda when, adopting modern science tools in drug development and validation. Validation of a combined (Ayurveda and modern medicine) therapeutic approach with superior efficacy and safety is likely to be a major leap in overcoming some of the current frustrations to treat difficult chronic disorders like Cancer, diabetes mellitus, arthritis using only modern medicines. Ayurveda may not be a complete alternative to modern medicine, but it certainly is a complementary therapy that can be used alongside modern medicine. Another important aspect is to document the cases and publish the case study in some good scientific and medical journals to establish it as evidence based medicine on global platforms.

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Morphological variation in Green Paech Aphid, *Myzus Persicae* (Sulzer) (Homoptera : Aphididae) by The Effact of Temperature.

Ajeet Kumar Tiwari
Department of Zoology Buddha P. G. College, Kushinagar, 274403

Abstract : Temperature is an important ecological factor, which affect the organisms life in various ways. Morphological variation of insect population in response to the temperature is an important phenomenon. In the present study, we discussed the variation in morphological characters of *Myzus persicae* individuals reared at five different range of temperatures (15°C ± 1°C, 20°C ± 1°C, 25°C ± 1°C, 30°C ± 1°C, 35°C ± 1°C), with 70 ± 5% RH and 16:8 L:D photoperiod. The samples of aphids were used as to compare the temperature response of single genotype, and thus to distinguish genotypic and environmental contributions to the phenotypic response. In this study the analysis was based on a large data set obtained by measuring sixteen morphological characters of 50 wingless viviparous adult female *Myzus persicae*

clones. In each clones of *Myzus persicae,* the result displayed a linear correlation in shortening the body size and other jointed appendages with increasing temperatures. The optimum temperature for better growth is 25°C ± 1°C. The clones was attained much larger length of body and other appendages when at lower temperature ranges (15°C ± 1°C, 20°C ± 1°C) to optimum and was much less at higher range of temperatures 30°C ± 1°C, 35°C ± 1°C) beyond optimum. In the present study the clones of aphids revealed a significant difference in eleven characters namely- length of body, length of a.s. III, IV, V and VI base, length of siphunculi, length of cauda, length of forefemer, midtibia, hindfemur and hindtibia. Results demonstrated that the morphology of *Myzus persicae* was affected by changing temperature.

Keywords : *Myzus persicae*, Morphological variation, Temperature.

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Impact of NaCl on antioxidant defence mechanism in medicinally important legume *Tephrosia purpurea*.

Kumari Sunita[1] and Malvika Srivastava

[1]Plant Physiology and Biochemistry Lab, Department of Botany,DDU Gorakhpur University Gorakhpur

ksunita78@gmail.com, drmalvika.srivastava@gmail.com

Abstract : *Tephrosia* L. or Sarpunkha ,belongs to family Leguminosae (Sub family -Papilionaceae) is a plant of high economic value due to the presence of phytochemicals like flavonoid, alkaloid, carbohydrates, tannins and phenols, gums and mucilage, fixed oils,fats,saponins. Flavonoids have antioxidants and strong antimicrobial activity. The plant also relieves dental pain, asthma, leprosy, arrests bleeding. In the present study, the effect of progressive increase in salinity on membrane integrity and non–enzymatic scavenger like carotenoid, alkaloid and flavonoids were studied in medicinally important wild legumes *Tephrosia purpurea.* Plants were treated with different NaCl concentration (50,100,200,300mM).Normally irrigated plants were treated as control.

Observations were recorded from day 25 upto day 65 at ten days interval. Electrical conductivity increased with increasing salt concentration. Plant

showed decrease in electrolyte leakage at 100 mM NaCl concentration, which relates the tolerance capacity of the plants when exposed to mild stress. In *Tephrosia purpurea* carotenoid, alkaloid and flavonoid content were increase with increasing in salt concentration. The maximum flavonoid and carotenoid and alkaloid were recorded at 45 DAS followed by a gradual decline till day 65.The result indicated that plant showed higher adaptive potential under salinity stress as judged by higher accumulation of flavonoid and carotenoid and alkaloid content. The greater amount of phenolic compounds leads to more potent radical scavenging effect.

Keywords: antioxidant, alkaloid, Electrical conductivity, flavonoid,

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Intervention of Technology in Higher Education

Deepak Bishla
IT-Head, Ambedkar University Delhi
d.bishla @gmail.com

Abstract : This paper addresses the gaps to implement the technology in higher education. In my research I try to overcome these factor based on the some parameters and its help to implement digital infrastructure as per individual university requirement and also help senior administration/ manager/ finance officer to adopt the latest trend in education technology.

In 21st century nobody can think about the education without any technology intervention. Each and every University has to develop themselves with latest technology. Implementation of technology in University it's totally depending on their location, process, awareness of their employee with technology, types of program offered, University affiliation etc. Between in these things supreme authority like senior administration/ manager/ finance officer cannot understand what is the exact requirement of different-different type of University hence they make a generic policy for all and in a result it's not work for all and Universities are on same stage or in confusion. Also IT companies are not able to understand what academic institutes want to implement. There is a huge gap between technical requirement of educational/ academic institute and technical understanding level of software development team in corporate

sector for education as per the latest trend in education. Although automation and digitalization are well mature in other sectors like banking, transaction, management, decision making in corporate sector in India. Universities are still lagging behind in this area.

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Study the efffect of E-waste on environment and human health

Lokendra Kumar Ojha

[1]Regional Institute of Education and Research, Bhopal

Abstract: "E-waste" is a popular, informal name for electronic products nearing the end of their "useful life."E-wastes are considered dangerous, as certain components of some electronic products contain materials that are hazardous, depending on their condition and density. E-waste contains over 1,000 different substances and chemicals, many of which are toxic and are likely to create serious problems for the environment and human health if not handled properly. However, classification of e-waste as hazardous, or otherwise, depends on the amount of hazardous constituents present in it. E-waste contains many toxics such as heavy metals, including lead, cadmium, mercury, Polychlorinated Biphenyls (PCBs), Poly Vinyl Chloride (PVC), etc, in some components. The highly toxic chemicals found in the different components of computer parts can contaminate soil, groundwater and air, as well as affect the workers of the unit and the community living around it. Moreover, the workers in computer waste recycling operations may face dangerous working conditions where health and environmental conditions are compromised. This paper highlights the adverse effects of E- waste on environment and human health.

Keywords: E-waste, Waste Management, Hazardous chemical, Lead, Cadmium, Mercury.

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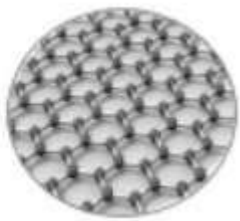
फुलरीन/ग्रेफीनः इक्कीसवीं सदी की प्रौद्योगिकी के भाग्य निर्धारण में नये कार्बन पदार्थो की भूमिका

प्रो. कमान सिंह, आचार्य,
विभागाध्यक्ष – रसायन विज्ञान विभाग, बाबा साहेब भीमराव अम्बेडकर (केन्द्रीय) विश्वविद्यालय, लखनऊ–226 025
संकायाध्यक्ष – भौतिकीय एवं निर्णय विज्ञान विद्यापीठ, बाबा साहेब भीमराव अम्बेडकर (केन्द्रीय) विश्वविद्यालय, लखनऊ



यह कहने में कोई अतिष्योक्ति नहीं है कि हम ''कार्बन युग'' में रह रहे हैं तथा इराक युद्ध भी कार्बन (पेट्रोलियम) के लिये लड़ा गया। हर कोई जानता है कि ''हीरा'' एक चमकदार ''बहुमूल्य पत्थर'' है तथा ''ग्रेफाइट'' पेंसिल में उपस्थित ''लेड'' है। इसलिये शायद प्रतीकात्मक स्वरूप कार्बन के एक अपररूप ''डायमण्ड'' को प्रतिष्ठित ''साइन्स'' पत्रिका ने 1990 में ''मॉलिक्यूल ऑफ द ईयर'' घोषित किया था और प्रतियोगिता में दूसरा स्थान पाने वाला कार्बन का ही नवजात अपररूप फुलरीन (कार्बन 60) था जिसने वैज्ञानिक जगत में सनसनी पैदा कर दी है।

फुलरीन कार्बन का तीसरा नवीनतम (1985) अपररूप है जिसे 1967 में अमेरिकी मण्डप (अल्पान्तरी गुम्बद) के निर्माणकर्ता प्रसिद्ध वास्तुविद् बकमिनिस्टरफुलर के नाम से ''बकमिनिस्टरफुलरीन'' भी कहा जाता है। यह कार्बन की निष्चित 60 परमाणुओं की त्रिविमीय खोखली संरचना है जिसमें एरोमेटिक निकाय संगलित चक्र के रूप में चारों ओर से बंद होकर एक चक्रीय फुटबाल के आकार का अणु बनाती है जिसमें 20 हेक्सागन तथा 12 पेण्टागन होते है। इसलिए कार्बन 60 को ''बकीबाल'' भी कहा जाता है।

इसे **''सर्वाधिक संभव सममित संरचना वाला अणु''** कहा जाता है। पंचभुजीय वलय में दो कार्बन परमाणुओं की मध्य दूरी 1.43 A° होती है जबकि षट्भुजी वलय में 140 A°

होती है। अणु में कुल मिलाकर 90 बन्ध होते हैं जिसमें 30 छोटे व 60 लम्बे होते हैं। गेंद के पंजर का व्यास लगभग 70 pm होता है जो कि हाइड्रोजन परमाणु के व्यास का लगभग 6–10 गुना होता है जबकि वान्डरबाल त्रिज्या 3.3–3.4 A° होती है। बेंजीन के समान इसमें 12500 से भी अधिक कैकुले संरचनायें होती हैं। जिनमें से केवल एक संरचना में स्थानीकृत द्विबन्ध होता है। गेंद पंजर अत्यधिक स्थायी होता है और 1375 K पर भी विघटित नहीं होता है।

सर्वप्रथम 1970 में आकाश गंगा में कार्बन क्लस्टर (समूह) के रूप फुलरीन की पुष्टि हुई। तद्पोरान्त वैज्ञानिक इसे प्रयोगशाला में बनाने का सपना देखने लगे और यह सपना 1985 में पूर्ण हुआ जब कोटो, कर्ल एवं स्मेले ने इसे ग्रेफाइट से बनाने में सफलता प्राप्त की। अब हालांकि अन्य फुलरीन जैसे कार्बन 70, कार्बन 76, कार्बन 84, कार्बन 240 एवं कार्बन 300 भी खोजे गये हैं। इस दुर्लभ खोज ने विज्ञान जगत में सनसनी पैदा कर दी और इसे 1991 में **''वर्ष का अणु'' (मॉलिक्यूल ऑफ दी ईयर)** घोषित किया गया तथा इसके खोजकर्ताओं को वर्ष 1996 में रसायन शास्त्र के नोबेल पुरूस्कार से सम्मानित किया गया। इसके बाद कार्बन, काजल, बेंजीन तथा कोल आदि से बनाया गया। इस अद्वितीय अणु ने अन्तर्विषयी शोध जैसे – सैद्धान्तिक एवं व्यावहारिक विज्ञान, जैव विज्ञान, मेडिकल सांइस, गणितीय विज्ञान, नैनो टैक्नोलाजी, विद्युत उत्पादन, इलेक्ट्रोनिक्स, सैन्य आदि क्षेत्रों के लिए दरवाजे खोल दिये हैं। वर्तमान में शुद्व फुलरीन की बाजार में कीमत 500 से 2000 यू.एस. डालर प्रति 10 ग्राम है।

फुलरीन खोज की ऐतिहासिक पृष्ठभूमि

1966 : जोन्स ने फुलरीन अणु की तरह एक कार्बनिक अणु की कल्पना की।

1970 : ओसाबा ने कार्बन–60 संरचना की संभावनायें प्रस्तुत की।

1971 : योसीबा तथा ओसाबा ने ''सुपरा–एरोमेटिसिटी'' में कार्बन 60 जैसे अणु का विस्तृत वर्णन प्रस्तुत किया।

1973 : बोलचर और गेल्पर्न ने कार्बन–60 की हकल गणनायें प्रस्तुत की।

1980 : डेविसन ने ''ग्राफ सिद्धान्त'' द्वारा कार्बन 60 की हकूल गणनाओं हेतु बीजगणितीय हल प्रस्तुत किया।

1959–1963 : हिन्टवर्जर एवं उनके साथियों के अनुसार कार्बन–33 परमाणु की स्पीशीज कार्बन–आर्क से प्राप्त की जा सकती है।

1984 : रोलफ्रिग, काक्स एवं कालडोर को पता चला कि ग्रेंफाइट के वाष्पीकरण से एक बड़ा आर्क क्ल्स्टर (समूह) उत्पन्न किया जा सकता है।

1985 : ग्रेफाइट से फुलरीन के संश्लेषण की घोषणा।

1991 : फुलरीन को ''वर्ष का अणु'' (मॉलिक्यूल ऑफ दी ईयर) घोषित किया गया।

1996 : डब्लू क्रोटो, राबर्ट कर्ल एवं रिचर्ड स्मेले को इस अद्वितीय अणु की खोज हेतु रसायन शास्त्र का नोबेल पुरूस्कार से सम्मानित किया गया।

फुलरीन शोध का राष्ट्रीय परिदृश्य

फुलरीन खोज के तुरन्त पश्चात् भारत में निम्नलिखित विभिन्न शोध संस्थानों, विश्वविद्यालयों एवं राष्ट्रीय प्रयोगशालाओं में शोध प्रारम्भ हुआ –

1. भारतीय विज्ञान संस्थान, बंगलौर
2. राष्ट्रीय भौतिक प्रयोगशाला, नई दिल्ली
3. टाटा मूल भूत शोध संस्थान, मुंबई
4. राष्ट्रीय रसायन प्रयोगशाला, पुणे
5. इन्दिरा गाँधी परमाणु शोध केन्द्र, कलपक्कम तमिलनाडु
6. भारतीय प्रौद्यौगिकी संस्थान कानपुर, दिल्ली, मुबंई, चेन्नई खड़गपुर
7. भाभा परमाणु शोध केन्द्र, मुंबई
8. बनारस हिन्दू विश्वविद्यालय, वाराणसी
9. कोलकता विश्वविद्यालय, कोलकता
10. दिल्ली विश्वविद्यालय, दिल्ली
11. हैदराबाद विश्वविद्यालय, हैदराबाद
12. रक्षा सामग्री और भंडार अनुसंधान और विकास प्रतिष्ठान, कानपुर
13. राष्ट्रीय शर्करा संस्था, कानपुर
14. लखनऊ विश्वविद्यालय, लखनऊ एवं अन्य संस्थान

फुलरीन पेटेन्ट (केवल संयुक्त राष्ट्र पर आधारित आँकड़े)

वर्ष	पेटेन्ट की संख्या
1992	09
1993	24
1994	36

1995	29
1996	21

आकाश गंगा में शर्करा की खोज से फुलरीन की खोज की अधिकल्पना

2002 में ऐरीजोना के वैज्ञानिक आकाश में शर्करा की खोज करने में सफल हुए। वैज्ञानिक कहते हैं कि अन्तराकाशी आणविक बादलों के बीच ''टेबिल शुगर'' के चचेरे भाई ग्लाइकोडिल्हाड की खोज से **ब्रह्माण्ड** में जीवन की संभावनायें मीठी हो गई हैं। इस खोज से आदिकाल में पृथ्वी में जीवन की उत्पत्ति का रहस्य मालूम हो सकेगा। यह उल्लेखनीय है कि ग्लाइकोल्डिहाइड संकुल शर्करा की तुलना में अपेक्षाकृत सर्वाधिक सरल शर्करा है जो प्राकृतिक रूप से राइबोज एवं ग्लूकोज (डी–शर्करा) में पाई जाती है। राइबोज शर्करा आर.एन.ए. की आधारशिला है जो जीव कोशिकाओं में प्रोटीन संश्लेषण में भाग लेती है, ग्लूकोज सर्वाधिक सामान्य शर्करा है जो पादप रसों एवं फलों में पाई जाती है। चूंकि ग्लाइकोल्डिहाइड, शर्करा परिवार में एक मात्र शर्करा है जिसकी अन्तराकाशी बादलों के बीच में पहचान हो चुकी है। 2002 में मैंने ने अनुमान लगाया कि आकाश में शर्करा के सिद्धांत का अनुप्रयोग कर सर्वाधिक सुन्दर अणु फुलरीन (कार्बन 60) को प्रयोगशाला में बनाया जा सकता है। यह एक सर्वमान्य धारणा है कि फुलरीन सर्वप्रथम 1970 में बाह्य क्षेत्र में कार्बन क्लस्टर के रूप में जानी गई थी। और इसकी पहचान से ही फुलरीन खोज का रास्ता सामने आया। इस प्रकार आकाश गंगा में शर्करा (कार्बन यौगिक) की खोज ने मुझे प्रयोगशाला में कार्बन 60 के संश्लेषण हेतु पुनः प्रयास करने की प्रेरणा प्रदान दी। यह उल्लेखनीय है कि शर्करा कार्बन, हाइड्रोजन तथा आक्सीजन के यौगिक हैं और प्रकृति में प्रचुर मात्रा में पाये जाते हैं। इन यौगिकों का सामान्य सूत्र होता है जिसमें हाइड्रोजन एवं आक्सीजन का अनुपातः 2:1 होता है जैसा कि पानी में पाया जाता है। इसलिये फ्रांसीसी इसे ''हाइड्रेटस् ऑफ कार्बन'' कहते है। यदि इन यौगिकों में से समस्त हाइड्रोजन एवं आक्सीजन को पानी के रूप में निष्कासित कर दिया जाये तो कार्बन–60 प्रकार के यौगिक बनाये जा सकते हैं। इसकी निम्न सामान्य संतुलित रासायनिक समीकरण द्वारा स्पष्ट कल्पना की जा सकती है।

$$10C_6H_{12}O_6 \xrightarrow{\text{उच्च ताप एवं अक्रिय वातावरण}} C_{60}+60H_2O$$

प्रकृति हमें इन ''जीवन अणु'' को दान करने में अति दयालु है और शायद इनका उपयोग कार्बन–60 प्रकार के यौगिक बनाने में किया जा सके। चूँकि प्रो. प्रसाद एवं उनके साथियों ने इसे इक्षु शर्करा से बनाने का दावा किया है। अतः समानता के कारण लेखक ने इस अद्वितीय अणु (फुलरीन) के संश्लेषण में शर्कराओं के महत्व को स्वीकार करते हुये एक नया नाम

''शुगर–फुलरीन'' या **''शुगरीन्स''** या **''शुगर बकीबाल्स''** रखा गया है।

फुलरीन का शोधन

फुलरीन मिश्रण का पृथक्करण एवं शुद्धीकरण क्रोमेटोग्राफी द्वारा किया जाता है। यह फुलरीन पृथक्कीकरण की अद्वितीय विधि मानी जाती है। फुलरीन का कार्बनिक विलायकों जैसे बैंजीन, टालुईन, क्लोरोबेंजीन या क्लोरोफार्म से क्रोमेटोग्राफी द्वारा पृथक किया जाता है।

फुलरीन का परीक्षण

अवरक्त स्पेक्ट्रमिकी कार्बन 60 की पहचान हेतु वास्तव में ''अंगुलीछाप स्पेक्ट्रम'' के रूप में एक भावी तकनीक स्थापित हुई है। फुलरीन का उपयुक्त विलायकों में विलयन बनाकर द्रव्यमान स्पेक्ट्रमिकी द्वारा भी फुलरीन की पहचान की जा सकती है।

फुलरीन के गुण

कार्बन 60 फलक केन्द्रितत घनीय व्यवस्था में क्रिस्टलीकृत होता है। फुलरीन, डायमण्ड और ग्रेफाइट से प्रमुखतः इस बात में भिन्न होता है कि डायमण्ड और ग्रेफाइट जालक बनाते हैं जबकि फुलरीन विविक्त अणुओं के रूप में है। ग्रेफाइट और डायमण्ड जालीय ठोस होने के कारण द्रव विलायकों में अघुलनशील होते हैं, जबकि फुलरीन जो कि आणविक रूप में होता है, उपरोक्त उपयुक्त विलायकों में घोला जा सकता है। खोखले पंजर के अन्दर धातु आयनों के लिये जगह उपलब्ध रहती है। फुलरीन की खोज के मात्र 6 साल बाद इसके यौगिकों के विषय में पता लगना शुरू हुआ जिनमें अतिचालकता की महत्वपूर्ण संभावनायें पायी गयी है। ये क्षारीय धातुओं (Li, K, Cs) और संक्रमण धातुओं (Fe, Ni आदि) के साथ ऋणात्मक आवेशित **''पंजर व क्लेथरेट्स''** बनाते हैं जिन्हें **''फुलेराइडस्''** कहा जाता है, जिनमें प्रतिरोध विहीन विद्युत चालकता की संभावनायें पाई गयी है। वह भी निम्न परम्परागत अतिचालकता ताप पर नहीं बल्कि सामान्य कमरे के ताप पर उदाहरण के लिए पोटेशियम फुल्लेराइड 18 केल्विन से नीचे एक अतिचालक के रूप में कार्य करता है। उच्च ताप फुलरीन अतिचालकों की खोज के बाद ये विभिन्न औद्यौगिक तथा वैज्ञानिक अनुप्रयोगों के लिये कारगर उपाय बनकर सामने आये हैं। फुलरीन पोटेशियम सायनाइड से क्रिया करके द्विलक C_{120} बनाता है इसका विद्युत रासायनिक रूप से अपचयन किया जा सकता है तथा प्रथम समूह के तत्वों के साथ यह ठोस बनाते है इसकी अल्प उपस्थिति से पॉलीस्टाइरीन की वैद्युत चालकता में कई गुना वृद्धि हो जाती है।

अनुप्रयोग

फुलरीन आज एक महत्वपूर्ण शोध का विषय बन चुका है। फुलरीन खोज के तुरन्त बाद वैज्ञानिकों ने इस विचित्र ओर नये अणु के व्यावहारिक अनुप्रयोगों के बारे में सोचना प्रारम्भ कर दिया था। यह कहने में कोई अतिशयोक्ति नहीं होगी कि फुलरीन की विभिन्न क्षेत्रों में अपार संभावनायें है जैसे– उच्च तकनीक से नैनों तकनीक तक, इलेक्ट्रोनिक्स से विभिन्न रासायनिक उद्योगों हेतु उत्प्रेरकों तक तथा रक्षा क्षेत्र से केन्सर, एड्स, वायरल, एण्टीवायरल हेतु ड्रग के निर्माण तथा एम.आर.आई. तक (आज इसका नैदानिक चिकित्सा में भरपूर उपयोग हो रहा है।) गेंद के समान संरचना के कारण ये विशिष्ट स्नेहक हैं जो कि सरलता से विभिन्न पर्तों में से सरक सकते है। इनके प्रकाश सीमित गुणों की रक्षा क्षेत्र में बहुत अधिक मांग है। वर्तमान में फुलरीन शोध के क्षेत्र में जिस तेजी से प्रगति हो रही है उससे यह उम्मीद की जा सकती है कि इसके उपयोगों की कोई सीमा नहीं है। इसलिए प्रारम्भ में जो मात्र एक अणु की खोज के रूप में देखा जा रहा था, उसमें इक्कीसवी सदीं में मानवता के कल्याण की अपार संभावनायें विद्यमान हैं।

फुलरीन के उपयोग के क्षेत्र

1. **व्यावसायिक** : अद्भुत स्नेहक के रूप में, नैनोट्यूविंग, रसायन उद्योग? उच्च ताप (350–650°C) बहुलकों के निर्माण में, शाखित बहुलकों के निर्माण में, उत्प्रेरण में, चुंबक, सेन्सर और ट्रान्सडयूसर, चुंम्बकीय कवच, लौहचुम्बकत्व, चुम्बकीय प्रशीतक, कार्बन रेशे, कार्बन 60 फुलरीन टेट्राकिस (डाईमेथिल एमीनों) एथिलीन का उपयोग घूर्णीय चुम्बक के रूप में किया जाता है। पृष्ठीय आवरण में, चुम्बकीय द्रव्य, टोनर एं डेफलवर के संघटन में। विस्तीर्ण बैण्ड तापीय प्रकाश सीमान्तक जिसका उपयोग आँखों एवं संसूचकों के सुरक्षा में किया जाता है, टोपी रहित पतली कार्बन नैनोंटयूब्स के निर्माण में। खरपतवारनाशी, पादप वृद्धि नियामक में।

2. **चिकित्सा** : चुम्बकीय अनुनाद इमेजिंग (एम.आर.आई.), कैन्सर, एड्स, वायरल, एंटी वायरल ड्रग के संश्लेषण में, ड्रग एवं फार्मास्युटिकल उद्योगों हेतु जीवसक्रिय योगिकों के संश्लेषण में, नाड़ी एवं रोगहर चिकित्सा संबंधी रोगों के निदान में।

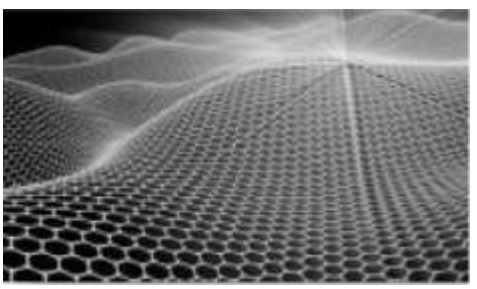
3. **रक्षा** : राकेट ईंधन, राकेट एवं मिसाइल आदि में घर्षण, निर्वात एवं दाब रोधक के रूप में, प्रकाश सीमान्तक, बेलेस्टिक मिसाईल कवच के रूप में।

4. **विद्युत उत्पादन एवं भण्डारण** : वैद्युत उत्पादन, सोलर ऊर्जा परिवर्तन में, इलेक्ट्रोनिक उत्प्रेरकीय उत्क्रमणीय अभिक्रियों में, ऊर्जा भण्डारण, परमाणविक स्केल इलेक्ट्रॉनिक स्विच,

ईंधन सेल, ठोस वैद्युत रसायनिक सेल के इलेक्ट्रोड (कैथोड), फोटोबोल्टिक सेल, फोटोडायोड्स, संयुग्मित बहुलक–ग्राही विषमसंधि डायोड बनाने में, वैद्युत भण्डारण उपकरणों के निर्माण में, ठोस/गैस द्विक परत धारित्र के रूप में।

5. **सुपरचालकों एवं अर्धचालकों के निर्माण में।**
6. **फुलरीन आधारीत यौगिकों के निर्माण में** : नैनो पार्टिकल्स, नैनो टयुबिंग, सुपरचालक विस (फेरोसीन) कार्बन 60–फुलरीन, आवेश–स्थानान्तरण संकुलों के निर्माण में।
7. **अन्य** : नाभिकीय पदार्थो के भण्डारण में, उच्च विभव स्थापन में, लेजर को क्षीण करने के उपयोग में, राकेट ईंधन के रूप में।

ग्रेफीन



Sugar And Slice Make Graphene Real Nice

Rice University Lab Table Sugar

- Metallic Sheets produce pristine graphene in one step
- Future computers may run a little sweeter, thanks to a refinement in the manufacture of graphene at Rice University
- James Tour, Chair in Chemistry as well as a Professor of Mechanical Engineering and Materials Science and of Computer Science reported in the online version of the journal Nature in 2010 (Nov. issue)
- Zhengzong Sun, a 4th year graduate student in James's lab and primary author of the paper, found that carbon-rich sources on Cu and Ni substrates produced graphene in any form he desired; single, bi- or multiplayer sheets that could be highly useful in a number of applications.
- Sun and his colleagues also found that the process adapts easily to producing doped graphene; this allows the manipulation of the materials

electronic and optical properties, which is important for making switching and logic devices.

- Doped graphene opens more possibilities for electronic use, James said and Sun found it fairly simple to make
- Co-authors of the study were Rice graduate students Zheng Yan, Jun Hai and Elvira Beiler and Postdoctoral Research Associate Yu Zhu.
- The Air Force Office of Scientific Research and the Office of Naval Research Multidisciplinary Research Program on graphene supported the research

Conclusion

The use of the most common sugars as raw materials for Fullerene and Graphene is scalable for industrial production and these materials have potential to play key role in the technology of the 21st century.

❖❖❖

Peroxidases as Reagents in Organic Synthesis

Dr. Shiv Kumar Vernwal
Assistant Professor and Head
Department of Chemistry, Maharana Pratap P. G. College,
Jungle Dhusan, Gorakhpur-273014

General Introduction:

Peroxidases [E.C. 1.11.1.7] are heme containing enzymes that use H_2O_2 as oxidant to oxidise a large variety of substrates such as phenols, aromatic amines, ascorbic acid and certain inorganic ions. These enzymes are widely distributed in the plant kingdom and peroxidase isoenzymes are known to occur in a variety of plant tissues. They also found in microorganisms and in some animal tissues. They perform a variety of physiological functions like lignifications of cell wall and in defense mechanism against pathogenic attacks. Some of the peroxidases play crucial roles delignification of lignocellulosic materials and in delignification of recalcitrant organic pollutants.

Enzymatic transformations are becoming increasingly acceptable in organic synthesis. One of the major challenges in organic synthesis is the development of environmentally acceptable chemical processes for the synthesis of enantiomerically pure compounds, which are of increasing importance as pharmaceuticals and as agrochemicals. Enzymes meet this challenge! Peroxidases are very useful enzymes for a number of transformations in organic chemistry[1,2]. For example, a variety of peroxidases effectively catalyse numerous selective oxidation of electron rich substrates, which include the hydroxylation of arenes, the oxidation of phenols and aromatic amines, the epoxidation and halogenation of olefins, the oxygenation of hetero atoms, and the enantioselective reduction of racemic hydro peroxides. The reason for the increasing acceptance of enzymes as reagents in organic synthesis is that the enzymes are efficient catalysts under mild conditions.

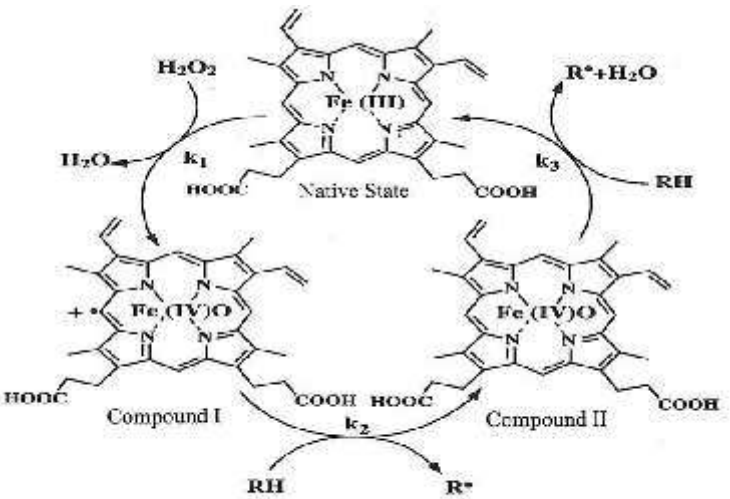
The peroxidase catalysed reactions may be represented as (RH = Organic substrate)

$$2\,RH + H_2O_2 \xrightarrow{\text{Peroxidase}} 2\,R^{\bullet} + 2\,H_2O$$

Keeping these applications in mind, studies on plant peroxidases have been initiated and two cheap sources of peroxidases have been identified. I have analyzed the Musa paradisiaca stem juice and Solanum melongena fruit juice for peroxidase activity and have found that these are good sources of peroxidase. The partial purification of these peroxidases have been achieved and K_m, p*H* and temperature optima of these enzymes have been determined.

Mechanism of Peroxidase Catalysis:

A brief description of features of peroxidase catalysed reaction[3] is essential. The first step of the reaction path involves the addition of H_2O_2 to the Fe (III) resting state to form an iron-oxo derivative known as compound I, which contains a Fe(IV)=O structure and a ð-cation radical. In the second step, the reduction of the ð-cation radical by a suitable substrate is accompanied by an electron transfer to compound I and proton transfer to a distal basic group, leading to compound II. The native state is regenerated on one electron reduction of compound II by another molecule of reducing substrate. This cycle of catalysis involves highly reactive enzyme intermediate which could be utilized for bringing useful organic transformations. The mechanism of peroxidase catalyzed reaction is shown in the following Fig.



Catalytic cycle of heme peroxidases.

Isolation of *Musa paradisiaca* Stem Peroxidase[4] :

Musa paradisiaca stem was collected from local garden. The enzyme was isolated by cutting the stem of *Musa paradisiaca* into small pieces, crushing the pieces in mortar with pestle and extracting the juice by keeping the crushed material in four layers cheese cloth and squeezing it. The juice was centrifuged using Sigma (Germany) model 3K 30 refrigerated centrifuges at 4000 g for 20 minutes at 4°C to remove the cloudiness of the juice. The clear juice was concentrated 20 times in an Amicon (U.S.A.) Concentration cell model 8200 using PM10 ultra filtration membrane with molecular weight cut off value of 10,000. The concentrated enzyme was stored at 4°C. The enzyme stored in this way does not lose any activity even after six months.

Isolation of *Solanum melongena* Fruit Peroxidase[5]:

The fruits of *Solanum melongena* were procured from local market. The enzymes was isolated by cutting the Solanum melongena fruit into small pieces, crushing them into mortar with pestle and filtering the juice through four layers of cheese cloth. The resulting filtered juice was saturated up to 60% with ammonium sulphate and was centrifuged using Sigma (Germany) model 3K 30 refrigerated centrifuged at 4000g for 20 minutes at 4° C. The precipitate was discarded and the resulting supernatant was saturated up to 90% by further addition of ammonium sulphate. The resulting suspension was centrifuged by repeating the same process of centrifugation and the supernatant was discarded. The precipitate was dissolved in 0.2 M sodium acetate/ acetic acid buffer pH 4.5 and was dialysed against 10 mM sodium phosphate buffer p*H* 7.0 with three changes at the intervals of 6 hours. The dialysed enzyme does not loose activity for three months if kept in the fridge at 4°C.

Enzyme Assay:

Peroxidase activity of the enzyme was measured in 50 mM sodium phosphate buffer pH 7.0 at 30° C using guaiacol 5 mM, hydrogen peroxide 0.6mM as the substrate and by monitoring the absorbance changes at 470 nm using molar extinction coefficient value of $2.66\times10^4\ M^{-1}\ cm^{-1}$ for the product tetraguiacol formed by the enzymatic reactions.

Hydrogen peroxide used in both the above cases was freshly prepared each time by measuring absorbance at 240 nm using molar extinction

coefficient value of 39.4 M^{-1} cm^{-1} and suitably diluting the solution. All spectrophotometeric measurements were done with UV/VIS spectrophotometer Hitachi (Japan) model U-2000 which was fitted with electronic control unit for variation of temperature in cuvettes. The least count of the absorbance measurement was 0.001 and one enzyme unit is the amount of enzyme, which produces 1 µmole/min of the product.

The crude sample of the enzyme was partially purified by passing through sephadex G-100 column. 1.5 mL fractions were collected and their protein concentrations and enzyme activity were analysed. The active enzyme fractions were pooled together; freeze dried, and was subjected to SDS-polyacrylamide gel electrophoresis.

Musa paradisiaca Stem Peroxidase:

Figure 1(a) is a typical plot showing the variation of absorbance at ë=470 nm vs time in a peroxidase assay solution containing *Musa paradisiaca* stem juice. Figures 1(b) and 1(c) are corresponding plots for the same assay solution containing no juice and juice which was denatured by boiling in water for one hour respectively. In case of assay solution containing active juice absorbance at ë=470 nm increases with time whereas in case of assay solution containing no juice or juice which was denatured by boiling, absorbance does not change with time indicating clearly that *Musa paradisiaca* stem juice contains peroxidase activity. The calculation has shown that the juice contains approximately 0.1 enzyme unit/mL of the juice indicating that it is a good source of peroxidase enzyme for biotransformations.

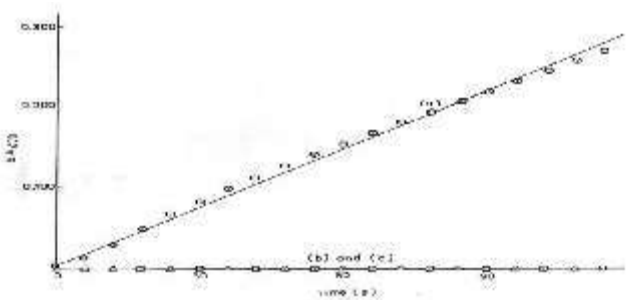


Fig. 1 — Peroxidase activity of *Musa paradisiaca* stem juice

Assay solution contains 3 mM guaiacol and 3 mM hydrogen peroxide in 50 mM sodium phosphate buffer pH 4.5 at 40° C and 40 µL of enzyme stock having 0.1 enzyme unit/mL has been added.

(a) Active enzyme (●)
(b) Boiled enzyme (Δ)
(c) No enzyme (□)

Musa paradisiaca stem juice peroxidase has been tested for Michaelis-Menten type kinetics using guaiacol as the variable substrate and at the saturating concentration of hydrogen peroxide and also using hydrogen peroxide as the variable substrate at the saturating concentration of guaiacol. Figures 2 and 3 show Michaelis-Menten plots for *Musa paradisiaca* stem peroxidase using guaiacol and hydrogen peroxide as the variable substrates respectively.

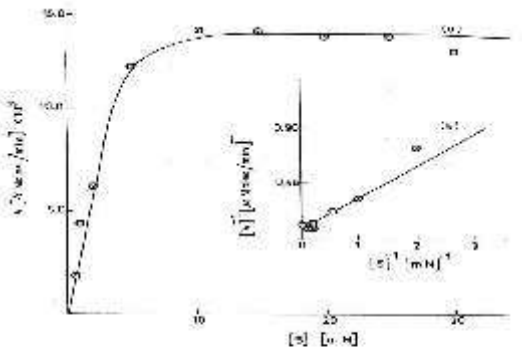


Fig. 2— Michaelis-Menten and double reciprocal plots for *Musa paradisiaca* stem peroxidase using guaiacol as the variable substrate.
Assay solution compositions are the same as mentioned in the legend to Fig.1 except the concentration of guaiacol which was varied.
(a) Michaelis-Menten plot
(b) Double reciprocal plot

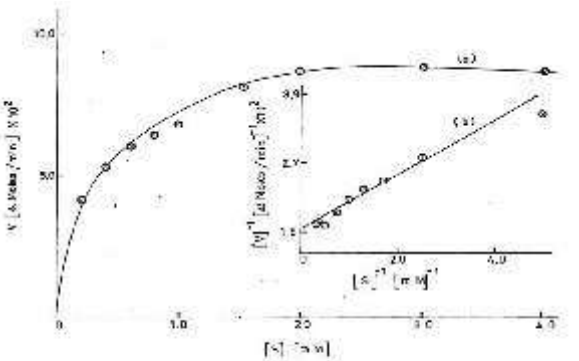


Fig. 3 Michaelis-Menten and double reciprocal plots for *Musa paradisiaca* stem peroxidase using hydrogen peroxide as the variable substrate.
Assay solution contains 10 mM guaiacol in 50 mM sodium phosphate buffer, pH 6.0 at 30°C and 200 µL of enzyme stock having 0.1 enzyme unit/mL has been added, concentration of hydrogen peroxide varied.
(a) Michaelis-Menten plot
(b) Double reciprocal plot

The double reciprocal plots shown as inserts are straight lines in both the cases confirming that the reported enzyme obeys Michaelis-Menten kinetics. The calculated K_m values for the substrates guaiacol and hydrogen peroxide are 2.4 mM and 0.28 mM respectively.

In order to find the optimum conditions for the functioning of this peroxidase as an efficient biocatalyst, the activities of this peroxidase at varying p*H* and varying temperature have been studied. The results are plotted in Figures 4 and 5. It is obvious from these figures that this peroxidase has p*H* optimum around 4.5 and temperature optimum around 62.5 °C.

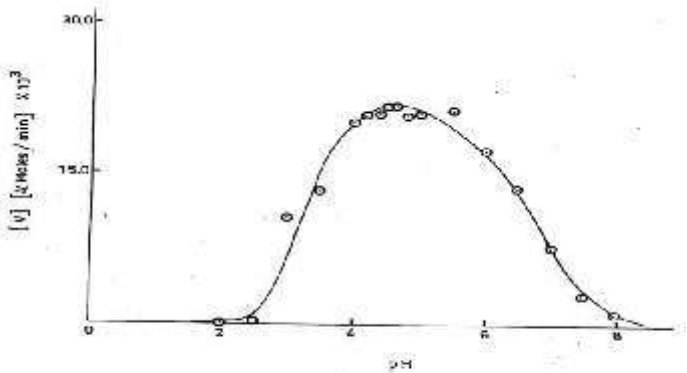


Fig. 4— Dependence of the enzyme activity on *p*H of the assay solution.

Assay solution composition is the same as mentioned in the legend to Fig.1 except the *p*H of the reaction medium which has been varied.

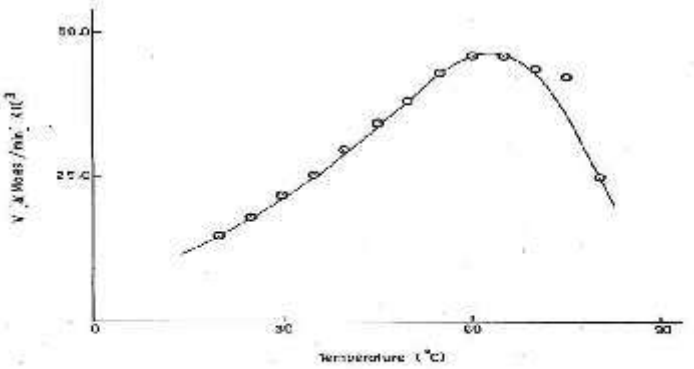


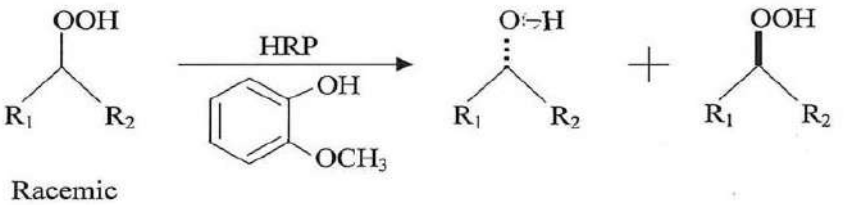
Fig. 5 Dependence of the enzyme activity on temperature of the assay solution.

Assay solution composition is the same as mentioned in the legend to Fig.1 except the temperature of the reaction medium which has been varied.

Biotransformations with Peroxidases:

The biotransformations[6-8] which could be achieved by peroxidases, include enantioselective reduction of hydroperoxides, hydroxylation of arenes, oxidation of phenols and aromatic amines, epoxidation of olefins, N-oxidation and sulfoxidation. Some possible biotransformations using peroxidases are given below.

1. Enantioselective Reduction of Hydroperoxides:

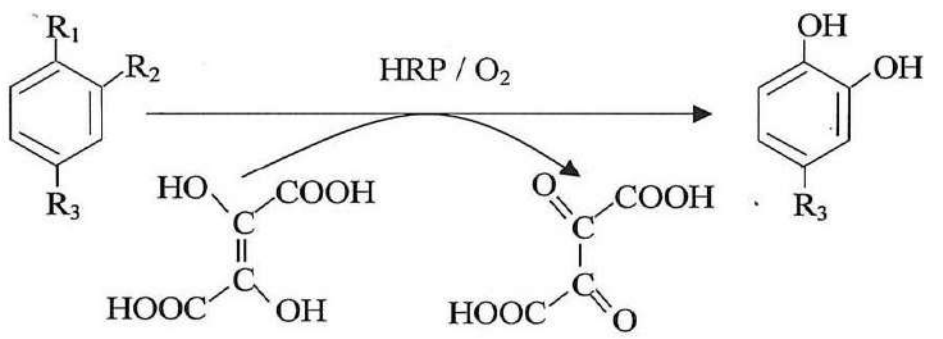


Racemic

a: R_1=phenyl, R_2=methyl b: R_1=p-chlorophenyl, R_2=methyl
c: R_1=phenyl, R_2=ethyl d: R_1=phenyl, R_2=isopropyl

In case of aryl alkyl substituted hydroperoxides the peroxidase accepts the (R)- enantiomer as substrate with the concurrent formation of (R)- alcohols and (S)- hydroperoxides are left behind.

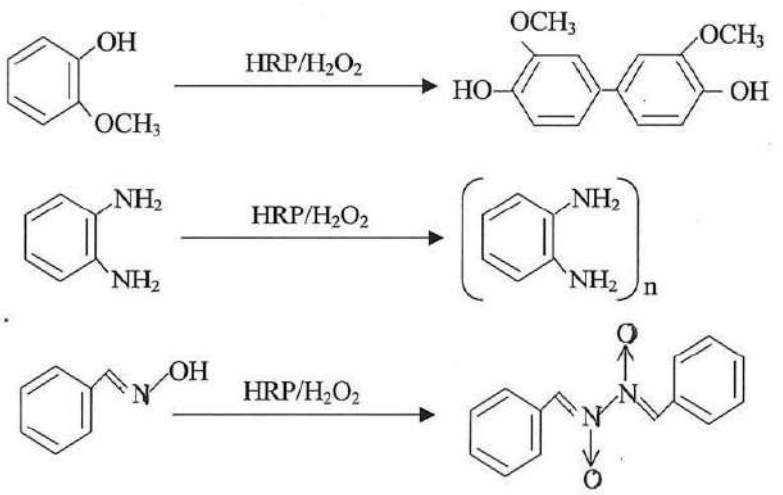
2. Hydroxylation of Arenes :



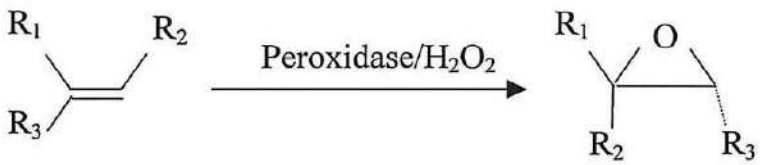
a : R_1=OH, R_2=H, R_3=$CH_2CH(NH_2)COOH$
b : R_1=OH, R_2=H, R_3=$CH(NH_2)COOH$
c : R_1=H, R_2=OH, R_3=$CH(OH)CH_2NHCH_3$
d : R_1=OH, R_2=H, R_3=H

3. Oxidation of Phenols and Aromatic Amines :

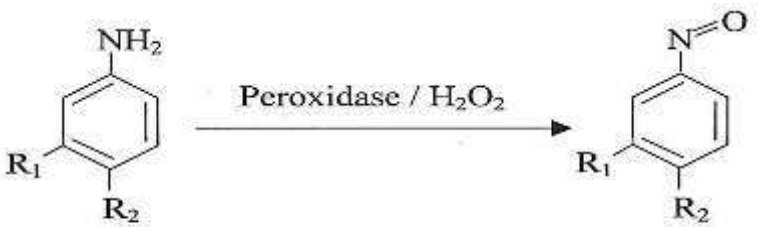
These compounds are oxidised by hydrogen peroxide or hydroperoxides under peroxidase catalysis to generate radicals, which react with further aromatic substrates to form dimeric, oligomeric or polymeric products.



4. Epoxidation of Olefins :

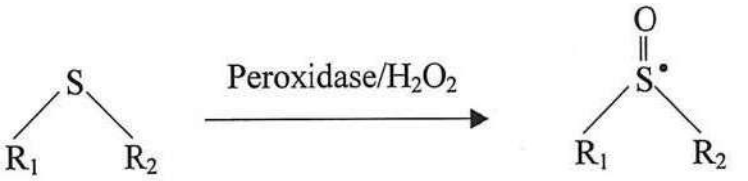


5. N-Oxidation :



a : R_1=H, R_2=CH_3 b : R_1=H, R_2=Cl
c : R_1=Cl, R_2=Cl d : R_1=H, R_2=NO_2

6. Sulfoxidation :



a : R_1=C_6H_5, R_2=CH_3 b : R_1= C_6H_5, R_2=C_2H_5

c : R_1=$C_6H_5CH_2$, R_2=CH_3 d : R_1= $C_6H_5CH_2$, R_2=C_2H_5

Peroxidases from *Musa paradisiaca* stem juice and *Solanum melongena* fruit juice have to be used to see the suitability for the above conversions. The important parameters to be determined are conversion yield and turnover number of the enzyme, which is related to the time required for conversion.

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In the Pious Memory of

ब्रह्मलीन पूज्य महंत अवेद्यनाथ जी महाराज

(18.5.1919 - 12.9.2014)

कल्याण सभी जन का मन से
है किया कि सभी अभय होवें,
होकर अवेद्य भी वेद्य धरा पर
संत प्रवर की जय होवे।

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राजनीति पढ़ाने वाले बोले, चुनाव में गेमचेंजर साबित हो सकता है

बजट संतुलित, सर्वकल्याणकारी और विकास परक है। आगामी लोकसभा चुनाव को देखते हुए सबको साधने की कोशिश की गई है। इसका लाभ भाजपा को मिलेगा। वोटिंग बढ़ेगी। **-प्रो. श्रीप्रकाश मणि त्रिपाठी,** गोरखपुर विश्वविद्यालय

गरीब, किसान, मजदूर और मध्यमवर्गीय परिवारों को बहुत कुछ मिला है। यह तबका ऐसा है, जो अनिवार्य रूप से मतदान करता है। अब भाजपा कार्यकर्ता, पदाधिकारी उत्साह से जनता के बीच जाएंगे और वोट मांगेंगे। लोकलुभावन बजट ने विपक्ष की चुनौती बढ़ा दी है। **-डॉ. अविनाश सिंह,** असिस्टेंट प्रोफेसर एमपी पीजी कॉलेज जंगलधूसड़

सरकार के खिलाफ जो असंतोष और नकारात्मक का माहौल बना था, अब वह सकारात्मक होगा। लोगों का नजरिया बदलेगा। वह आगे की सोचकर वोट करेंगे। टैक्स स्लैब बढ़ाने और किसानों के खाते में पैसा भेजने का दांव गेमचेंजर साबित हो सकता है। **-डॉ. वीना गोपाल मिश्रा,** एसोसिएट प्रोफेसर डीवीएन पीजी कॉलेज

टैक्स स्लैब में छूट और ग्रेच्युटी दोगुनी कर दी गई है। साथ ही किसानों के बैंक अकाउंट में हर चार महीने में दो-दो हजार रुपये भेजने का प्रावधान किया गया है। अंतरिम बजट में की गई घोषणाओं का आगामी लोकसभा चुनाव में निश्चित तौर पर राजनीतिक फायदा भाजपा को मिलेगा।

-डॉ. ब्रजेश मिश्रा, विभागाध्यक्ष राजनीतिशास्त्र अखिल भाग्य पीजी कॉलेज

हिन्दुस्तान
गोरखपुर • शनिवार • 02 फरवरी 2019. 11

अब लैब से जनता तक पहुंचाएं शोध के नतीजे

गोरखपुर | वरिष्ठ संवाददाता

अब समय आ गया है कि विश्वविद्यालयों, महाविद्यालयों एवं शोध संस्थानों की प्रयोगशालाओं में हो रहे शोध नीचे की ओर चलते हुए जनता तक पहुंचे। विज्ञान को लोक कल्याण मुखी होना होगा। दुनिया में विज्ञान में युगानुकूल चुनौतियों को ध्यान में रखकर अनेक जीवन प्रवृत्तियां विकसित हो रही हैं। तेजी से बदलते युग और विज्ञान के शोधों में हो रहे परिवर्तन की गति में समन्वय साधना बड़ी चुनौती है।

यह बातें महाराणा प्रताप पीजी कॉलेज जंगल धूसड़ में 'विज्ञान में नवीन प्रवृत्तियां' विषय पर आयोजित दो दिवसीय राष्ट्रीय संगोष्ठी का उद्घाटन करते हुए मुख्य अतिथि भारत सरकार के बायोटेक्नोलॉजी विभाग के पूर्व सलाहकार डॉ. ए निनावे ने शुक्रवार को कही। अध्यक्षता करते हुए एमएमएमयूटी के कुलपति प्रो. श्रीनिवास सिंह ने कहा कि राष्ट्रीय संगोष्ठियां, व्याख्यान, कार्यशाला के माध्यम से हम विज्ञान में दिन-प्रतिदिन उत्पन्न हो रही नवीन प्रवृत्तियों को एक दूसरे से साझा करते हुए विज्ञान को निरन्तर नया आयाम देते रह सकते हैं। 21वीं शताब्दी असीमित वैज्ञानिक उपलब्धियों का युग बनने जा रही है।

संगोष्ठी का बीज वक्तव्य प्रस्तुत करते हुए डी.डी.यू प्राणि विज्ञान विभाग के पूर्व अध्यक्ष प्रो. डीके सिंह ने कहा कि 1961 तक मनुष्य ने विश्व में उपलब्ध वैश्विक संसाधनों का 70 प्रतिशत हिस्सा उपभोग कर लिया था। 1999 तक हम उपलब्ध संसाधनों का 12 प्रतिशत तक प्रयोग करने लगे थे। आज संसाधनों के पुनरूत्पादन की गति से अधिक तेजी से हम उपयोग कर रहे हैं। पर्यावरण संकट आज सबसे बड़ी चुनौती है। 21वीं सदी के समक्ष उत्पन्न तीन मुख्य परिवर्तनों पर विज्ञान अपनी दिशा तय कर रहा है।

गोरखपुर, 2 फरवरी 2019 दैनिक जागरण 13

विज्ञान को लोक कल्याणमुखी होने की जरूरत : डॉ. ए .निनावे

जागरण संवाददाता, गोरखपुर : दुनिया में विज्ञान में युगानुकूल चुनौतियों को ध्यान में रखकर अनेक जीवन प्रवृत्तियां विकसित हो रही हैं। अब समय आ गया है कि विश्वविद्यालयों, महाविद्यालयों एवं शोध संस्थानों की प्रयोगशालाओं में हो रहा शोध क्रमशः नीचे की ओर और अंततः जनता तक पहुंचे। विज्ञान को लोक- कल्याणमुखी होना होगा।

यह बातें महाराणा प्रताप पीजी कॉलेज, जंगल धूसड़ में 'विज्ञान में नवीन प्रवृत्तियां' विषय पर आयोजित दो दिनी राष्ट्रीय संगोष्ठी के उद्घाटन सत्र में बतौर मुख्य अतिथि भारत सरकार के बायोटेक्नोलॉजी विभाग के पूर्व सलाहकार डॉ. ए.निनावे ने कही। संगोष्ठी की अध्यक्षता करते हुए मदन मोहन मालवीय प्रौद्योगिकी विश्वविद्यालय के कुलपति प्रो. श्रीनिवास सिंह ने कहा कि 21वीं सदी असीमित वैज्ञानिक उपलब्धियों का युग बनने जा रहा है। संगोष्ठी का बीज वक्तव्य गोरखपुर विवि के प्राणि विज्ञान विभाग के पूर्व अध्यक्ष प्रो. डीके सिंह ने प्रस्तुत किया।

हिन्दुस्तान
गोरखपुर • शनिवार • 02 फरवरी 2019 12

एमपी पीजी कॉलेज में राष्ट्रीय संगोष्ठी आज से

गोरखपुर। एमपी पीजी कॉलेज जंगल धूसड़ में इमर्जिंग ट्रेंड्स इन साइंस विषय पर दो दिवसीय राष्ट्रीय संगोष्ठी आज से शुरू होगी। सचिव आईआईटी बीएचयू के वैज्ञानिक एवं शोधार्थी मनीष ने बताया कि मुख्य अतिथि केंद्र सरकार के बायोटेक्नोलॉजी विभाग के पूर्व सलाहकार डॉ. ए निनावे होंगे।

अमर उजाला | गोरखपुर | रविवार, 3 फरवरी 2019 | 7

विज्ञान, अध्यात्म से साकार होंगी स्वर्ग की परिकल्पनाएं

राष्ट्रीय संगोष्ठी में बोले वैज्ञानिक डॉ. अनंत नारायण भट्ट

अमर उजाला ब्यूरो

गोरखपुर। वरिष्ठ वैज्ञानिक डॉ. अनंत नारायण भट्ट का कहना है कि विज्ञान ने मानव की कल्पनाएं साकार की हैं। मानव नित नए आविष्कार कर रहा है। विज्ञान को अध्यात्म का सहारा मिल जाए तो हम एक ऐसी खूबसूरत दुनिया बना सकेंगे, जहां स्वर्ग की सभी परिकल्पनाएं साकार होंगी। इंस्टीट्यूट ऑफ न्यूक्लियर मेडिसिन एंड एलाइड साइंसेज, नई दिल्ली के वरिष्ठ वैज्ञानिक डॉ. भट्ट महाराणा प्रताप पीजी कॉलेज, जंगल धूसड़ में 'विज्ञान में नवीन प्रवृत्तियां' विषय पर आयोजित राष्ट्रीय संगोष्ठी के समापन अवसर पर बतौर मुख्य अतिथि बोल रहे थे।

कार्यक्रम की अध्यक्षता कर रहे गोरखपुर विश्वविद्यालय के कुलपति प्रो. वीके सिंह ने कहा कि भविष्य एक नए उदीयमान भारत का है। भारत दुनिया की उभरती महाशक्ति है। भारत के युवा वैज्ञानिक पूरी क्षमता से देश की ही नहीं, दुनिया भर की प्रयोगशालाओं में कार्य कर रहे हैं। मुख्य वक्ता बीएचयू आईटी के प्रो. वी रामानाथन ने कहा कि शोध विज्ञान की आत्मा है। शोध को परिणाम तक पहुंचाने में तपस्या करनी होती है। इस मौके पर कॉलेज प्राचार्य डॉ. प्रदीप राव ने संगोष्ठी के महत्व को रेखांकित किया। संचालन गोरखपुर विश्वविद्यालय के रसायन विज्ञान विभाग की असिस्टेंट प्रोफेसर डॉ. गीता सिंह ने किया। दो दिनी संगोष्ठी में 98 शोध पत्रों में विमर्श भी हुआ।

कुलपति प्रो. वीके सिंह ने संगोष्ठी के समापन अवसर पर संबोधित किया।

गोरखपुर। रविवार • 3 फरवरी • 2019 | राष्ट्रीय सहारा

विज्ञान व आध्यात्म के संगम से दुनिया बनेगी खूबसूरत : डॉ. अनन्त

गोरखपुर (एसएनबी)। विज्ञान ने आज कल्पनाएं साकार की हैं। धरती-आकाश-पाताल तक की दूरी विज्ञान माप रहा है। दुनिया को सक्षम, सुन्दर और मानव-क्षमता के पूर्ण विकास से परिपूर्ण बनाने में लगे विज्ञान को अध्यात्म का सहारा मिल जाए तो

एमपीपीजी कॉलेज में दो दिवसीय राष्ट्रीय संगोष्ठी का समापन

भारत की ज्ञान-विज्ञान की परंपरा हो रही पुनर्जीवित : कुलपति

शोध को परिणाम तक पहुंचाने में तपस्या जरूरीः प्रो.वी.रामानाथन

हम एक ऐसी खूबसूरत दुनियाँ बनाएंगे जहाँ स्वर्ग की सभी परिकल्पनाएं साकार होंगी।

उक्त बाते महाराणा प्रताप पीजी. कॉलेज जंगल धूसड़ में 'विज्ञान में नवीन प्रवृत्तियां' विषय पर आयोजित दो दिवसीय राष्ट्रीय संगोष्ठी के समारोप के अवसर पर मुख्य अतिथि एवं वरिष्ठ वैज्ञानिक डॉ.अनन्त नारायण भट्ट इन्स्टीच्यूट ऑफ न्यूक्लियर मेडिसिन एण्ड एलाइड साईंसेस नई दिल्ली ने कही।

समापन समारोह की अध्यक्षता करते हुए दीदउ गोविवि के प्रो. वी. के. सिंह ने कहा कि भारत की ज्ञान-विज्ञान की परम्परा आज पुनर्जीवित हो रही है। भारत के युवा वैज्ञानिक दृष्टि का विकास करें। मुख्य वक्ता काशी हिन्दू विश्वविद्यालय वाराणसी आईटी के प्रो.वी रामानाथन ने कहा कि शोध विज्ञान की आत्मा है। शोध को परिणाम तक पहुंचाने में तपस्या करनी होती है। प्राचार्य डॉ. प्रदीप कुमार राव ने सभी अतिथियों का स्वागत किया। राष्ट्रीय संगोष्ठी के आयोजन सचिव एवं बीएचयू आईटी के युवा वैज्ञानिक मनीष कुमार तिवारी ने दो दिवसीय राष्ट्रीय संगोष्ठी का प्रतिवेदन प्रस्तुत किया। राष्ट्रीय संगोष्ठी में कुल 98 शोध-पत्रों पर विमर्श हुआ। इस अवसर पर प्रो. हरिजी सिंह पूर्व विभागाध्यक्ष रसायन विज्ञान, प्रो.ओपी पाण्डेय अध्यक्ष रसायन विभाग, लखनऊ प्रो. शीला मिश्रा अध्यक्ष रसायन विभाग लखनऊ, प्रो. कमान सिंह अध्यक्ष भीमराव अम्बेडकर विवि लखनऊ, प्रो.विनय सिंह, प्रो. सत्यनारायण, प्रो.आरपी सिंह, डॉ. केशव सिंह, डॉ.दीपा श्रीवास्तव, डॉ.वीके.बर्नवाल, डॉ.चन्द्रेश शर्मा आदि ने शोध-पत्र प्रस्तुत किया।

एमपीपीजी कालेज जंगल धूसड़ में आयोजित दो दिवसीय राष्ट्रीय संगोष्ठी के समापन अवसर पर सम्बोधित करते कुलपति प्रो.वीके सिंह।

एमपीपीजी कॉलेज में 'विज्ञान में नवीन प्रवृत्तियां' विषय पर गोष्ठी

मनुष्य की कल्पनाएं साकार कर रहा विज्ञान

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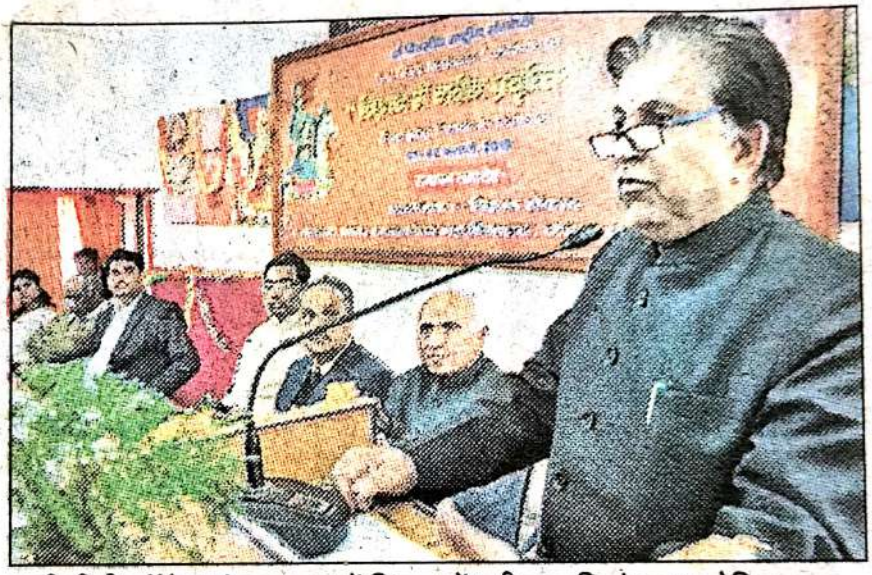
विज्ञान आज लोगों की कल्पना साकार कर रहा है। धरती, आकाश व पाताल तक की दूरी माप रहा है। विज्ञान ने मानव इच्छाओं के पर लगा दिए हैं। उड़ती कारों, अन्तरिक्ष कालोनियों, चन्द्रमा और मंगल पर मानव घर, रोबोट द्वारा मानव जनित कार्यों का विकल्प, मानव क्लोन, मानव-रहित विमानों, कृत्रिम वर्षा, कृत्रिम धूप, निर्मूल बीमारियों, नाभकीय ऊर्जा, सौर ऊर्जा, सौर ऊर्जा से धरती को ऊर्जा संकट से मुक्त करने, शुद्ध पर्यावरण हेतु नवीन तकनीकों विकास का 21वीं शताब्दी के विज्ञान के लक्ष्य हैं।

महाराणा प्रताप पीजी कॉलेज जंगल धूसड़ में 'विज्ञान में नवीन प्रवृत्तियॉ' विषय पर आयोजित दो दिवसीय राष्ट्रीय संगोष्ठी के समापन समारोह में यह बातें इन्स्टीच्यूट ऑफ न्यूक्लियर मेडिसिन एण्ड एलाइड साइंसेस, नई दिल्ली के वरिष्ठ वैज्ञानिक डॉ. अनन्त नारायण भट्ट ने बतौर मुख्य अतिथि कही। उन्होंने कहा कि दुनिया को सक्षम, सुन्दर और मानव क्षमता के पूर्ण विकास से परिपूर्ण बनाने में लगे विज्ञान को अध्यात्म का सहारा मिल जाए तो हम एक ऐसी खूबसूरत दुनिया बनाएंगे जहां स्वर्ग की सभी परिकल्पनाएं साकार हो सकती हैं। कार्यक्रम की अध्यक्षता करते हुए डीडीयू के कुलपति प्रो. वीके सिंह ने कहा कि विज्ञान ने एक नयी दुनिया बनायी है। भारत की ज्ञान-विज्ञान की परम्परा आज पुनर्जीवित हो रही है। युवा वैज्ञानिक दृष्टि का विकास करें। भविष्य एक नए उदीयमान भारत का है। भारत दुनिया की उभरती महाशक्ति है। भारत के युवा वैज्ञानिक अपनी पूरी क्षमता से भारत की नहीं बल्कि दुनिया भर की प्रयोगशालाओं में कार्य कर रहे हैं। मुख्य वक्ता बीएचयू में आईआईटी के प्रो. वी रामानाथन ने कहा कि शोध विज्ञान की आत्मा है। शोध को परिणाम तक पहुंचाने में तपस्या करनी होती है। परिश्रम एवं वैज्ञानिक दृष्टि से विज्ञान की नवीन प्रवृत्तियों का अभ्युदय होता है। प्राचार्य डॉ.प्रदीप कुमार राव ने अतिथियों का स्वागत किया तथा सफलता पूर्वक राष्ट्रीय संगोष्ठी को समापन पर विद्वानों, वैज्ञानिकों व शोधार्थियों के प्रति आभार व्यक्त किया। संचालन संगोष्ठी के संयोजक एवं डीडीयू में रसायन विज्ञान विभाग की असिस्टेंट प्रोफेसर डॉ. गीता सिंह ने किया। राष्ट्रीय संगोष्ठी के आयोजन सचिव एवं बीएचयू. आईआईटी के युवा वैज्ञानिक मनीष कुमार तिवारी ने दो दिवसीय राष्ट्रीय संगोष्ठी का प्रतिवेदन प्रस्तुत किया।



एमपी पीजी कॉलेज जंगल धूसड में विज्ञान में नवीन प्रवृत्तियां पर आयोजित संगोष्ठी को सम्बोधित करते डीडीयू कुलपति प्रो. वीके सिंह। • हिन्दुस्तान