



*Under the aegis of*



**NATIONAL CONFERENCE  
ON**

**ADVANCES IN BASIC & APPLIED SCIENCES  
(ABAS-2017)**

*APRIL 07-08, 2017*

***SOUVENIR***



*Organized by*

**School of Basic & Applied Sciences  
Career Point University, Tikker-Kharwarian, Hamirpur  
Himachal Pradesh-176041, INDIA**

*Sponsored by*

**Indian Council of Medical Research (ICMR)  
New Dehli-110029, INDIA**



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### **Message**

I am glad to know that School of Basic & Applied Sciences of Career Point University, Hamirpur is organizing two days National Conference on Advances in Basic & Applied Sciences (ABAS-2017) on 07<sup>th</sup> & 08<sup>th</sup> April, 2017 and a souvenir is also being brought out to mark the occasion.

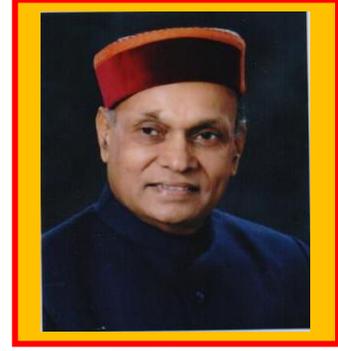
The conference, I believe will help the research scholars who work continuously towards the development of new ideas for the growth of Nation thereby benefitting people as a whole. Besides, this conference will go a long way in establishing the concept and propagating the knowledge of the emerging trends in Basic & Applied Sciences.

I hope the delegates would have an opportunity to share their experiences and knowledge for making this conference a success.

With best wishes.

(Virbhadra Singh)

PREM KUMAR DHUMAL  
प्रेम कुमार धूमल



Former Chief Minister  
Leader of Opposition  
पूर्व मुख्यमन्त्री एवं नेता प्रतिपक्ष

## Message

It gives me immense pleasure to know that the School of Basic & Applied Sciences of Career Point University, Hamirpur is hosting a two days National Conference, “Advances in Basic & Applied Sciences (ABAS-2017)” on 7<sup>th</sup> and 8<sup>th</sup> April, 2017. I congratulate the Management and Faculty of the University for hosting such a relevant conference at the University Campus.

The National Conference on Advances in Basic & Applied Sciences bears immense significance keeping in view the emerging trends in the modern day education system. Science is such a vast subject that it contains minutest details about the subject specific based on authentic outcomes of the various researches being carried by scientists in the different spheres all over the world. It would be an appropriate opportunity to the Science Students of the University to listen to the deliberations of eminent participating scientists and also interact with them to clear various doubts in their minds.

I hope renowned scientists from various Universities and Scientific Establishments would be participating in the National Conference which is bound to benefit the budding scientists of the country. I extend warm welcome to the participants to Career Point University Hamirpur and hope that fruitful discussions held during the conference would go a long way in establishing new mile stones in the field of Education and Applied Sciences.

My good wishes for the resounding success of the National Conference.

  
(Prem Kumar Dhumal)

Dr. V.M. Katoch  
MD, FNASc, FASc, FAMS, FNA  
NASI-ICMR Chair on Public Health Research at RUHS, Jaipur  
Former Secretary, Department of Health Research  
MoHFW, Govt of India  
Former Director-General  
Indian Council of Medical Research, New Dehli

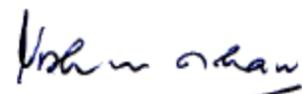


### Message

I am happy to know that School of Basic & Applied Sciences of Career Point University, Hamirpur (Himachal Pradesh) is organizing a National Conference, “*Advances in Basic & Applied Sciences (ABAS-2017)*” on 07<sup>th</sup> and 08<sup>th</sup> April, 2017.

Basic sciences are the bricks which we use to build our dreams of better life through spectrum of applied sciences including engineering, medical, veterinary, agricultural and many others. Recent years have broken rigid walls among various sciences. Need for convergence, synergy and merger among different science streams is felt by most of us. I am optimistic that this National Conference will not only facilitate exchange of ideas on various technological advances, innovations and new knowledge but will help in moving towards convergence for mutual benefit. I am confident that these deliberations will be of equal interest to those working in Basic and Applied Sciences.

I convey my greetings to organizers as well as participants and wish this conference a grand success.

  
(V.M. Katoch)

Pramod Maheshwari  
Chancellor  
Career Point University  
Hamirpur-176041 (H.P.)



### **Message**

It is a matter of immense pleasure for me that the Career Point University, Hamirpur is organizing two days National Conference, “*Advances in Basic and Applied Sciences*” on 7<sup>th</sup> and 8<sup>th</sup> April, 2017. I hope the conference will provide a platform to the faculty, research scholars and scientists to deliberate latest innovations in Basic and Applied Sciences.

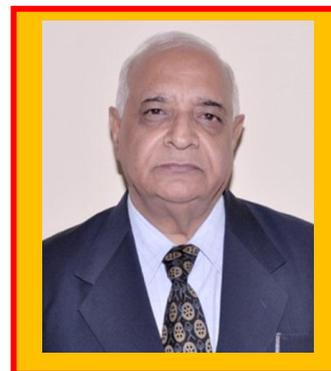
This National Conference addresses many issues through the presentations and exhibitions, bringing together experts, representatives, and delegates to find global partners for future collaboration. The National Conference facilitates innovations, ideas, and their transformation in the development of science. I am confident that deliberations, inputs, and the outcome of the conference will yield good results in the fields of Basic and Applied Sciences.

I extend my best wishes for the grand success of the conference.

A handwritten signature in black ink, which appears to read "Pramod Maheshwari".

(Pramod Maheshwari)

Prof. P.L. Gautam  
Vice Chancellor  
Career Point University  
Hamirpur-176041 (H.P.)



### Message

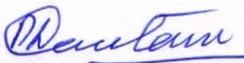
I am extremely happy that the School of Basic and Applied Sciences, Career Point University Hamirpur is organizing National conference on “*Advance in Basic and Applied Sciences*” during April 7 & 8, 2017.

In order to achieve excellence, the academia has to regularly collaborate and brain storm on emerging issues in science. The conferences, seminars and workshops provide effective and useful platform for exchange of experience, knowledge and innovations. Such platform enhances the expertise in the thematic areas under discussion. It provides researchers a new insight in the domain of their expertise.

I abundantly value and gratefully acknowledge the Indian Council of Medical Research New Delhi for sponsoring the event.

While congratulating the organizers, researchers, and participants, I wish the conference a grand success.

I look forward for the professionally gainful and enriching proceedings of the event.

  
(P.L. Gautam)

Dr. G.D. Kakkar  
Director, Higher Education  
Career Point Universe  
Kota-324005 (Rajasthan)



### Message

I am glad to know that School of Basic & Applied Sciences of Career Point University, Hamirpur is organizing two days National Conference, “*Advances in Basic & Applied Sciences*” (ABAS-2017) on 07<sup>th</sup>-08<sup>th</sup> April, 2017.

This conference would offer a platform for the dissemination and exchange of ideas. During the course of the event participants will acquire a better understanding and awareness of latest developments in sciences, and its positive impact on your societies at large.

I extend my heartiest congratulations and best wishes to the officers, faculty members and participants on this auspicious event.

With best wishes.

A handwritten signature in blue ink, appearing to read 'G.D. Kakkar', written in a cursive style.

**(G.D. Kakkar)**

Prof. M.R. Sharma  
Dean Academic Affairs  
Career Point University  
Hamirpur-176041 (H.P.)



### **Message**

It is my proud privilege to have you all in the conference and wish you very fruitful results. I am immensely happy that the university is organizing a two days National Conference, “*Advances in Basic & Applied Sciences*” on 7<sup>th</sup> and 8<sup>th</sup> April, 2017.

I extend warm welcome to all the participants for their participation in the conference. I am confident that this conference will help young scientists, research scholars, and colleagues to deliberate in their areas of interest.

In the end I express my heartiest congratulations on this auspicious occasion to the delegates, guests, participants, faculty members, students and other staff members who are working hard to make the conference a grand success.

A handwritten signature in black ink, appearing to read 'M.R. Sharma'.

(M.R. Sharma)

Prof. K.L. Verma  
Dean Basic & Applied Sciences  
Career Point University  
Hamirpur-176041 (H.P.)



### Message

I am glad to know that School of Basic and Applied Sciences, Career Point University, Hamirpur is organizing National conference, “*Advances in Applied and Basic Sciences*” on 7<sup>th</sup> and 8<sup>th</sup> April, 2017.

I extend warm welcome to all the participants for their participation in the conference. I am confident that this conference will help young scientists and research scholars to deliberate in their areas of interest.

In the end, I express my heartiest congratulations on this auspicious occasion to the delegates, guests, participants, faculty members, students and other staff members who are working hard to make the conference a grand success.

A handwritten signature in blue ink, appearing to read 'K.L. Verma', written over a light pink background.

(K.L. Verma)

Prof. D.K. Gautam  
Dean Engineering  
Career Point University  
Hamirpur-176041 (H.P.)



### Message

It is indeed my distinct honor and privilege to cordially extend a warm welcome to the National Conference, “*Advances in Basic & Applied Sciences (ABAS-2017)*” at main campus of Career Point University Hamirpur. This conference aims to provide researchers a forum, discussion, and a networking place where they can share their finalized or is in process research work of any fields of study, including the natural sciences, social sciences, behavioral sciences, applied sciences, health sciences and so on, at the conference. Meet inspiring speakers and experts at our conference of disciplinary and interdisciplinary approaches, within the various faculties of CPUH and across the country is a promising aspect of this event. Towards a sustainable and prospective future join us at **ABAS-2017** and get a chance to explore & learn more about your field of expertise.

Every participant, presenter or chair, discussant or audience member, must be thanked for dedicating his/her time to this National Conference of CPUH.

I wish you an inspiring conference.

A handwritten signature in blue ink, consisting of a stylized 'D' and 'G' followed by a long horizontal line.

(D.K. Gautam)

Dr. Sanjeev Sharma  
Registrar  
Career Point University  
Hamirpur-176041 (H.P.)



## Message

It is a matter of proud privilege and immense pleasure that Career Point University, Hamirpur is hosting two days National Conference on “*Advances in Basic & Applied Sciences*” on April 07 and 08, 2017. The conference will give an exposure to the academicians, researchers and students on recent developments in science and technology.

The Career Point University acts as a fertile ground for innovating new ideas and values for the benefit of end users. This conference will deliberate upon new technologies for its transfer from lab to land.

I congratulate the organizers, participants and researchers and extend my best wishes for the grand success of the conference. I also thank the sponsors, especially Indian Council of Medical Research for the financial support.

A handwritten signature in blue ink, which appears to be 'Sanjeev Sharma'. The signature is stylized and written over a light blue background. Below the signature, the name '(Sanjeev Sharma)' is printed in a simple black font.

(Sanjeev Sharma)

Dr. Naveen Thakur  
Convener, ABAS-2017  
Career Point University  
Hamirpur-176041 (H.P.)



### **Message**

It is a matter of pleasure and pride for us at Career Point University Hamirpur to organize Two Days National Conference on “*Advances in Basic & Applied Sciences (ABAS-2017)*”. This National event is an opportunity to share the evidence based research conducted at various Universities and Institutions of India and Abroad. We accept the responsibility to share and exchange this knowledge not only at this platform but at International level in the form of research publications.

We are highly obliged to acknowledge the overwhelming response and the zeal of participants and their mentoring faculty members who shared with us their novel research work and agreed to present in two formats-Oral and Poster Presentations.

Last but not the least we are grateful to the Chancellor, Vice Chancellor, Deans, Registrars and other dignitaries, and faculty members for their unstinted support. Our thanks are also due to the Indian Council of Medical Research New Delhi for financial assistance.

A handwritten signature in blue ink, appearing to read 'Naveen Thakur', written in a cursive style.

(Naveen Thakur)

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## Preface

It gives us immense pleasure to bring out the **Souvenir** of the National Conference on “**Advances in Basic & Applied Sciences (ABAS-2017)**” to be held at the Career Point University Hamirpur (H.P.) India. The publication will highlight the importance of recent advances in the fields of Physical, Chemical, Mathematical, Life, and Environmental Sciences, which will improve the National economy vis-a-vis the living standard of common masses.

The Souvenir has **198** abstracts which offer a cross-sectional view of the ongoing work in various areas of Basic and Applied Sciences.

The abstracts are presented in the form of Technical Sessions of the **ABAS-2017**, which include: **10** Invited Talks, **79** Oral Presentations and **119** Poster Presentations.

**Editor**

## **Acknowledgement**

**ABAS-2017** is a great opportunity for us, as both organizers and participants, to share mutual experience in such an important field. **ABAS-2017** will be attended by **200 delegates** from different parts of **India** and **Abroad**. We acknowledge the enthusiasm and interest of the participants and look forward for fruitful interactions.

We place on record the guidance and financial support rendered by the Indian Council of Medical Research New Delhi. Success of the **ABAS-2017** shall be attributed to the whole-hearted involvement of invited speakers, delegates, and members of different committees constituted for organizing the event.

**ABAS-2017** is a mega-event to deliberate on distinct researches in the fields of Basic & Applied Sciences. We express our sincere appreciation to institutional and industry partners for joining hands with us in this endeavor.

Last but not the least we are grateful to the Chancellor, Vice Chancellor, Deans, and Registrar for allowing us to host this conference at the campus of Career Point University Hamirpur.

**Organizers**

IT-01

### **Zinc oxide Nanostructures: Growth, Properties and Applications**

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Zinc oxide (ZnO), a typical member of wurtzite family of structure is unique material that has diverse nanostructures grown under specific experimental conditions. The nanostructures of this material with tailored properties are of particular interest in device fabrications. Moreover, ZnO is a material with richest family of both nanostructures and properties. However, there has been also much interest in fabrication of multifunctional nanostructures of ZnO, and it is because of its key advantages that include direct wide band gap (3.37 eV), large excitation binding energy (60 meV) noncentral symmetry, biocompatibility etc., which held its ability to exhibit near UV emission and transparent conductivity, piezoelectricity, biomedical applications. By discussing the structural dimensionalities of ZnO, it is aimed to provide some scientific insights into the fabrication and assembly of nanostructures of ZnO in this talk. Applications in fields such as catalysis, chemical sensing, etc., which have been pursued for various nanostructures of ZnO from some recent studies reported in literature as well as from our own work will also form the subject matter of this talk.

IT-02

### **Innovations in Materials Science in 20<sup>th</sup> and 21<sup>st</sup> Centuries**

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In the present talk we will discuss the major innovations in materials science in 20<sup>th</sup> and 21<sup>st</sup> centuries, which have been realized in applications. In prospective of future technological applications, colossal magneto resistance (CMR) materials, spintronics materials, multiferroic materials and nano materials will be discussed in details. All these materials were discovered during the last decade of 20<sup>th</sup> century and they transformed into technology in the first decade of 21<sup>st</sup> century. There is an enormous potential to develop such research area. In this talk we will present the materials developed by our group.

IT-03

### **Cryptography and RSA Cryptosystem in Everyday Life**

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In the present time, it has become the necessity of almost every person across the world to make use of different means of communications like e-mails, whatsapp; money transactions

means like ATM bank cards, internet banking; the fundamental instrument of democracy that is e-voting systems; e-commerce, online shopping etc. The security goals of all these means are important issues. Cryptography addresses these issues. In this talk, we discuss the cryptography and RSA cryptosystem. Further, we discuss how cryptography is helpful to us to provide the security to the information which travels over the insecure channels.

**IT-04**

**FeRAM Memory Changing Landscape for Next Generation Semiconductor  
Technology**

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Over the past two decades, numerous memory technologies have been fetched to the semiconductor market with varying degrees of commercial successes, for example: RAM (SRAM), Flash, EPROM, EEPROM, DRAM etc. The embedded memory technologies that dominate the computing industry today are, DRAM and NAND flash; but it should be noted that both of these technologies have their pros and cons. Beside this, Non-Volatile memories retain their information state even with power turned off. The scaling limitations of charge storage memories such as (NAND Flash and NOR Flash) are challenged by the emerging non-charge storage memories (FeRAM, MRAM, PCRAM, ReRAM) which are reported to scale further. Among the emerging memories, Ferroelectric Random Access Memories (FeRAM) have attracted much attention due to their fast access time, low power consumption, radiation tolerance, excellent retention, and endurance time. Thus, they are suitable for portable low voltage, long lifetime embedded (RFID's, smart cards) and space applications. In the present work, Ferroelectric memories are fabricated using thin lead zirconate titanate (PZT) ferroelectric film and ultrathin high-K titanium oxynitride ( $\text{TiO}_x\text{N}_y$ ) insulator layer on p-Si substrate. The electrical characteristics of fabricated devices were analyzed under constant voltage stress (CVS) to test their reliability. Furthermore, the devices exhibited excellent retention characteristics measured till 1.5 hr at room temperature and  $100^\circ\text{C}$ , capacitance difference remains distinguishable even if extrapolated to 15 years. It attributes that aforesaid fabricated FeRAM structure capable to store the data without battery for 15 years and beyond. Thus, It is believe that to take a further step to increase business opportunities by changing the paradigm of FeRAM engineering strategy, the proposed MFIS FeRAM gate stacks with  $\text{TiO}_x\text{N}_y$  as buffer layer and PZT as ferroelectric layer is a potential candidate for changing the landscape of the embedded memory with the long retention ferroelectric field effect transistors (FeFET) for next generation technology node and also a potential candidate for long retention FeFET for storage class memory of the current memory hierarchy.

**Keywords:** FeRAM, Universal memory, Next generation technology node

**Biotechnology: Introduction, Advances and Career Options**

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Biotechnology is defined as the exploitation of living organisms and biological processes to develop new products and technologies to serve mankind. It finds applications in virtually all fields of science and technology for e.g. engineering, medicine, agriculture and waste-management. As the natural resources continue to deplete, biotechnology ensures a solution to every frightening problem. Biotechnology has opened endless career opportunities as we have started to comprehend its infinite applications. The lecture will cover some of the recent advances in the emerging discipline of biotechnology.

**Revitalizing Indian Agriculture: Role of Science and Technology**

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India faces multiple challenges for sustainable food security including, population growth, threats to agricultural production, inefficient production practices and supply chains. In order to meet the challenge of climate change and ensure food security, major interventions are required to transform current patterns and practices of food production, distribution and consumption. Science and technology and the scientific community in particular has an essential role to play in developing concurrent, strategic investments to establish climate-resilient agricultural production systems, make efficient use of resources and develop a robust knowledge system for sustainability. Climate change will further exacerbate the fragility of food production systems and the natural resource base, hence, farmers would need to produce more food on less land, with less water and energy resources. To compete in terms of cost and quality globally, conservation and judicious utilization of prime natural resources in particular water, soil and genetic resources will be crucial. The promising options to tackle these issues effectively include improved breeding and input for crops, livestock and aquatic organisms, diversification of agricultural systems, better soil management and resource-efficient practices for crop production. The search, characterization, isolation and utilization of new genes through application of biotechnology are essential for the revitalization of Indian agriculture, which can prove to be the engine of growth in this millennium. Natural and farm biodiversity needs to be explored as an essential prerequisite in search for new genes. With the projected population of 1.5 billion of India by 2050, the importance of enhanced productivity per unit area, input, time and energy needs to be stressed. The advantages offered by biotechnology over classical breeding in terms of precision are technology gestation period and gene transfer for specific traits even from the unrelated organisms, which is vitally important for ensuring food security resulting in designer crops and animal breeds that are more resistant to biotic and abiotic stresses. Genetically modified crops with dramatic adoption over the last decade in developed and developing countries have already demonstrated that some of these challenges can be

tackled with greater efficiency. To harness the benefits of these new advances in science, scientific community needs to play a proactive role for developing the public trust and informed debate, in a very rationale manner in open and transparent way.

**IT-07**

### **Life Cycle Strategies in Aphids**

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Aphids are insect pests of great economic importance as they cause considerable damage to agricultural and horticultural crops by sucking the plant sap and also by transmitting a number of plant virus diseases. Many aphid species exhibit host alternation which involves exploitation of two very different host plants; one of which is primary host and other is secondary host. Many species of aphids that have worldwide distribution, adopt different life cycle strategies depending upon geographical regions with different environmental conditions as well as availability of primary and secondary host plants. So a species may be heteroecious or monoecious, holocyclic or anholocyclic and in certain situations, it may have populations showing either of the given life cycles. Aphid life cycle is characterized by the occurrence of several morphs which are produced to perform different functions such as multiplication, dispersal and production of new genotypes for survival under different situations. Cyclic parthenogenesis is the most common mode of reproduction in aphid life cycle. In cyclic parthenogenesis, several apomictic parthenogenetic generations are produced in most part of the year when the food resource is available in quality and abundance especially in spring and summer seasons. These parthenogenetic generations are followed by a single sexual generation consisting of males and oviparous females in autumn that lays overwintering eggs. During spring and summer, the parthenogenetic generations exploit the herbaceous secondary host plants fully and build up large populations generally on secondary host plants. Aphid parthenogenesis is associated with viviparity and telescoping of generations where granddaughters of a female aphid are already developing within the daughters inside her. Before the onset of harsh conditions of winter, the sexual generation is produced to lay overwintering eggs on the primary host. In many species, there is shift from holocyclic to anholocyclic life cycles and from heteroecious to monocious conditions with shift from cyclic parthenogenesis to complete parthenogenetic mode of reproduction. These strategies in aphid life cycle are controlled by photoperiod and temperature regimes. Elucidation of occurrence of these different features in aphid life cycle forms the basis of the present lecture to discuss different life cycle strategies in aphids.

## **Phytoplasma- an Emerging Plant Pathogen as the Potential Tool to Unravel the Genetic Regulation of Plant Development**

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Global environment has been changing at an alarming rate due to unprecedented anthropogenic activities such as urbanization, industrialization and excessive usage of harmful chemicals in agriculture related activities. New diseases are emerging or disease under control are getting more widespread and increasing in severity in plants as well as animals particularly those that are transmitted by insect vectors. Accordingly, Phytoplasma, a plant pathogenic mollicute transmitted by phloem sap sucking insects is gaining worldwide attention due to ever increasing reports of diseases in an array of crop taxa and the associated plants. Sesame (*Sesamum indicum* L.) an important oil yielding plant is adversely affected due to various Phytoplasma associated diseases such as phyllody, virescence, little leaf, fasciation etc. The peculiar symptoms exhibited by the Phytoplasma affected sesame plants cause severe yield losses but also offer unique opportunity to unravel the mechanism underlying genetic regulation of developmental processes in the leaves, stem and flowers etc. Investigations on the expression of selected genes during disease progression vis-à-vis healthy plants using RT-PCR revealed significant differential expression of vegetative as well as floral development genes. Comparative microRNA profiling of asymptomatic and symptomatic plants carried out showed differential abundance of conserved as well as unique miRNAs. Interestingly, unique miRNAs seem to have a more significant role in phyllody onset than the differentially expressed conserved miRNAs. Modulators of organ development genes as the potential targets of Phytoplasma in the host plants are suggested. Further investigations on the pathogen secreted effector molecules causing these alterations and the processes involved are desirable to understand the disease onset and normal vegetative and floral development in plants.

## **Radon Migration and Implications**

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Radon is a chemical element with symbol Rn and atomic number 86. It is a radioactive, colorless, odorless, tasteless noble gas, occurring naturally. Its most stable isotope,  $^{222}\text{Rn}$ , has a half-life of 3.8 days. Radon is a colorless, odorless gas, a radioactive byproduct of radium. It is part of the natural radioactive decay series starting from U238 and ending with Polonium, bismuth, and lead in successive steps. Radon is one of the densest substances that remains a gas under normal conditions. Radon gas is radioactive gas which is released from the uranium contents of the soil. The greatest importance among radon isotopes is attributed to  $\text{Rn}^{222}$  because it is the longest lived of the three naturally produced isotopes. Radon is both a hazard and a help. The possibilities of transport of  $\text{Rn}^{222}$  within the earth, its waters, and atmosphere make it a useful tracer for a remarkable variety of geophysical, geochemical, hydrological, and atmospheric purpose. These applications range from

exploration for resources such as uranium and hydrocarbon deposits, to recognizing fluid transport within the earth, to attempting to predict seismic and volcanic events through premonitory changes in radon concentration in the earth. Epidemiological studies have shown a clear link between breathing high concentrations of radon and incidence of lung cancer. Thus radon is considered a significant contaminant that affects indoor air quality worldwide. According to the United States Environmental Protection Agency, radon is the second most frequent cause of lung cancer, after cigarette smoking, causing 21,000 lung cancer deaths per year in the United States. Radon comes from the minute amounts of uranium that occur naturally in all rocks and soils. Due to mechanical stresses radiating outward from the future hypocenter of an earthquake, rocks below the soil will undergo micro fracturing and thereby release radon. It is suggested that radon, constantly released from crystalline rocks below become bound in the soil allowing the radon to escape. Monitoring radon release with many inexpensive (but reliable) sensors is certainly promising to arrive at a practical early warning system for earthquakes.

IT-10

### **Nanobiotechnology: Future Prospects & Challenges**

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Nanotechnology represents the designing, production and application of nano sized materials. It is emerging as a rapidly growing field which deals with manufacturing new materials at the nano scale level and its advanced application in Science and Technology. The special feature of the nanoparticle largely depends on their particle shape and size, which leads to higher surface to volume ratio and increased percentage of the atoms at the grain boundaries. Nanoparticles when compare to conventional bulk particles, exhibits some unique physical & chemical properties including electrical, catalytic, magnetic, mechanical, thermal, or imaging features that make the nanomaterials more applicable in medical, pharmaceutical and different engineering fields. One major issue with nanotechnology is that it is difficult to keep track of nanomaterials once they are released into the environment. Therefore, the impact of nanoparticles on ecosystems cannot be determined easily. Long-term exposure to low, highly dispersed doses of nanoparticles may cause a considerable impact on environment and health. So researchers are searching for the ways to make it beneficial to the environment and health. This has been branded as 'Nanobiotechnology' since it focuses on challenges within the nanoscale that need to be overcome to ensure eco-friendly processes and products. Nanobiotechnology could be considered as the development of technologies to minimize potential environmental and human health risks associated with the manufacturing and use of nanotechnology based products, and to encourage replacement of existing products with new nano products that are more environment friendly throughout their lifecycle. It has many applications including Chemical & Pharmaceuticals, Food Processing, Paper, Electronics & Domestic Appliances, Auto, Ceramics, Color and Optics, Energy, Oil & Gas, Glass, textiles etc. Nanobiotechnology majorly involves the following:

- Use of safe, environmentally benign substances, solvents etc (whenever possible)
- Use of less energy during manufacture processing.

- Ability to recycle after use.
- Easy disposal.

Nanobiotechnologies will not just initiate the next industrial revolution, it will also offer technological solutions as it provides a strong foundation for products and processes that are safe and have a low net environmental impact, being energy efficient, reducing waste, lessening greenhouse gas emissions and using renewable materials.

**Keywords:** Nanobiotechnology, Nanomaterials, Green Nanotechnology

**IT-11**

### **Mathematical Modeling: Importance and Application in various Fields**

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The Above lecture deals with the art of translating problems from an application area into tractable mathematics formulation, whose theoretical and numerical analysis provides insight, answers and guidance useful for the originating applications. The importance of this lecture is to aware the research scholars/students/others about Mathematical Modeling as an indispensable discipline to be studied and cultivated. This gives precision and direction for problem solution and enables a thorough understanding of the system modeled. It prepares the way for better design or control of a system and allows the efficient use of modern computing capabilities. Mathematical Modeling consists of simplifying Real world Problems and representing them as Mathematical Models, solving the mathematical problems and interpreting these solutions in language of real world. In other word, conversion of real world phenomenon under certain condition into mathematical formulation is known as Mathematical Modeling. To understand the performing experiments and solve real world problems may be risky and expensive. Therefore, the use of Mathematical Modeling is the only recourse in such situation and it is widely accepted especially due to the increasing computation power of digital computer and computing methods both of which have facilitated the handing of length and complicated problems. Mathematical Models is basically of two kinds: First are empirical models and second are theoretical models. Empirical models deal with the experiments and observation whereas Theoretical models deal with Mathematics, statistics and Computer based. It has wide application such as computer animation in arts, labour data analysis in Economics, risk analysis and value estimation in Finance, chemical equilibrium and planning of production units in chemical engineering, image processing and realistic computer graphics in computer science, finger print recognition and face recognition in Criminalistics Science etc.

**Status of Orthoptera Fauna in Bageri and its Catchment Areas of Himachal Pradesh**

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The Orthopteran are found in a variety of habitats, with more familiar species found in grasslands and forests, the scaly crickets found on sea-shores, the large marsh grasshopper, and bog bush-cricket, found in bogs and marshes, camel crickets are naturally cave dwellers, the desert locust, live in deserts and semi-deserts, while the mole-cricket lives under ground. Bageri primarily symbolizes one of the most fragile ecosystems (sub-tropical zone) of the Shiwalik hills and supports rich and diversified faunal and floral diversity. The present studies revealed the presence of 55 species of orthopterans belonging to 48 genera and 11 families under 4 super-families. The family Acrididae was the largest family of orthopterans under 8 subfamilies forming 26 (47 %) species of the total grasshopper fauna, followed by Gryllidae 10 (18%) species and Tetrigidae 5 (9%) species, followed by Phaneropteridae 4 (7%) species, followed by Pyrgomorphidae 3 (5%) species, followed by Trigonidiidae 2 (4%) species and Tridactylidae, Eneopteridae, Gryllotalpidae, Conocephalidae & Pseudophyllidae were represented by one (2%) species each. Moreover, it was observed that among the Acrididae subfamilies, Oedipodinae was the largest with 7 species followed by Acridinae and Hemiacridinae 4 species each; Gomphocerinae, Eyprepocnemidinae and Catantopinae 3 species each and Oxynae and Truxalinae 1 species each. *Acrida exaltata*, *Gastrimargus africanus africanus*, *Spathosternum pr. prasiniferum*, *Oxya hyla hyla*, *Atractomorpha cr. crenulata* and *Chrotogonus* (Chr.) tr. *Trachypterus* were the most abundant acridoids whereas, *Gelasterrhinus laticornis*, *Scintharista blanchardiana*, *Choroedocus illustris*, *Hieroglyphus oryzivorus* and *Xenocatantops karnyi* were the least represented acridoids species in this watershed. Present biodiversity studies on orthopteran fauna shall be of great use in taxonomical practices, formulation of a reliable data base of insects, monitoring changes in an ecosystem, especially in relation to crops and climate change.

**Keywords:** Orthoptera, Acrididae, Gryllidae, Bageri, Ecosystem

**Chalcopyrite Based Organic Inorganic Hybrid Photovoltaics**Dinesh Pathak<sup>1</sup>, Tomas Wagner<sup>2</sup>, J. M. Nunzi<sup>3</sup><sup>1</sup>Department of Physics, Sri Sai University, Palampur, India.<sup>2</sup>Faculty of Chemical Technology, University of Pardubice, Czech Republic<sup>3</sup>Department of Physics, Queens University, Kingston, ON, Canada.*Dineshpathak80@gmail.com*

Solar energy is the best renewable energy source because of its longevity, availability, cost effectiveness and clean properties. Solar radiation (energy) received within one hour on the earth is sufficient to meet the total energy demand of the world for more than one year. Till 2010 world total photovoltaic energy capacity was 40 GW, Solar must supply 25% of global energy by 2030, and at least 50% by 2050. Harnessing of solar energy for significant

technological applications is another cause of great concern as it require materials that have a high ability of solar energy collection and conversion. Although silicon with 22% efficiency has been and remains the traditional solar cell material of choice, its high cost and fragility reduces its residential applications. Cadmium-based solar cells are also considered in commercial modules because of their high efficiency of up to 19%, but the highly toxic nature of Cd limits its applications because of the adverse effects that it can have on the environment and human health. Dye sensitized solar cells have also approached an efficiency of 12%, however, there are still some issues with this technology that need to be addressed. Therefore, developing alternatives to severely toxic cadmium containing materials have been a prime issue in the research field of solar cells. In this direction, organic materials are getting pretty attention because of their fantastic properties as they are flexible, ecofriendly light weight, considered as disposable etc. Future technology is believed to be of such easy processable materials and devices. Recently Heliatek have reported the 12% certified efficiency of organic photovoltaic (OPVs). This rapid progress suggests that the commercialization of OPVs will be realized soon. Bulk heterojunction photovoltaic cells are another class of devices, known for fourth generation electronic which is believed to be dominating in energy sector in future. In this type of cell, the donor and the acceptor materials are mixed together to form the blend. In this type of cell, if the length scales of the polymer blend and the exciton diffusion length are comparable, then most of the excitons generated in either material may reach the interface, where they break efficiently. After the exciton break-up, the charge carriers (electrons and holes) are efficiently collected at their respective electrodes while traveling through the blend. Inorganic/organic hybrid solar cells have attracted a lot of interest due to their potential in combining the advantages of both components. Chalcopyrite type  $\text{AgInSe}_2$  is believed as a potential absorber material due to additional absorption edges due to crystal field and split orbit splitting. Blending such systems in organic matrix can be promising for future inorganic organic bulk heterojunction hybrid photovoltaics. In this lecture the efforts in the direction “Chalcopyrite based organic inorganic hybrid solar cells” will be presented.

### OP-03

#### **A Study on Heat Sources in a Generalized Magneto Viscothermoelastic Half Space**

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The disturbance due to periodical strip thermal sources is acting on the surface of homogenous isotropic magneto viscothermoelastic solid half space. The results obtained to associated system of coupled ordinary differential equations have been solved to find the eigen values. A combination of Laplace and Fourier transform technique has been applied to solve the given partial differential equations and boundary conditions in the transformed domain. The inverse transform integrals are evaluated by using numerical integration technique. The displacements, temperature change, stresses and perturbation of magnetic

fields have been presented in physical domain. The analytical results such as displacements, temperature change, stresses, perturbation of magnetic fields and behaviour of resonant frequencies obtained have been computed numerically with MATLAB software tools and presented graphically for carbon steel material.

**Keywords:** Heat sources, Wave characteristics, Relaxation time, Inverse transform technique, Perturbation of magnetic fields, Carbon steel material

**OP-04**

**Biological applications of Glucosamine based Bio-conjugate of Benzothiazole Derivatives**

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Thiazole heterocycle is an important synthon which plays a vital role as medicinal active agents with diversity of biological potencies. But, bioavailability of benzothiazole is exceptionally low due to its poor absorption and rapid metabolism in the liver and intestinal wall. Bioconjugation is a promising tool to enhance the pharmaceutical performance of molecules with poor physicochemical properties and a low therapeutic index. In view of above facts, the present study reports an efficient and green synthesis of a new bioconjugate of benzothiazole derivatives with glucosamine. Glucosamine is selected for bioconjugation because it is structural components of bacterial cell wall. Additionally, to achieve these results, this study involves the exploration of environment-friendly methodology using microwave synthesis. The synthesized derivatives were tested for their in vitro antimicrobial activity against standard strains of Gram-positive, Gram-negative bacteria and pathogenic fungi by colorimetric and well diffusion method. Furthermore, the synthesized compounds were also screened for their antiparasitic activity using SEM study.

**Keywords:** Benzothiazole, Bio-conjugate, Glucosamine, Microwave synthesis

**OP-05**

**Herbal Potential of Some Endangered Plants of Himachal Pradesh and their Conservation Strategies**

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Himachal Pradesh is a beautiful state due their floristic plant vegetation and their scenic beauty. This region act as good hot spot for the diverse flora with diverse medicinal wealth. This region is full of herbal, horticulture and agricultural plant varieties of economic interests. Rural people of this region is still using the plants parts/products for fulfilling their daily requirements i.e. food, fodder, fiber, shelter, primary health care and for religious

purposes. The local peoples have still good faith on herbal potential of these local plants. So, they use these plants and their parts/products for the treatment of various health problems and disorders due to their herbal potential and medicinal importance. Among the plant wealth of this region, some plant got the status of endangered plant species due to their over exploitation for human benefits, their loss as a result of technological advancement and other developmental activities. These endangered plants species forms the basis of modern pharmaceutical drugs. So, their conservation is the necessary step for the protection of these endangered plant species and their herbal potential. For conservation purposes, various strategies is used but mostly in-situ conservation is followed by the local people.

**Keywords:** Conservation, Herbal potential, Endangered, Primary health.

**OP-06**

**Preparation of Guar gum/Copper oxide Nanocomposite for Photocatalytic Remediation of Malachite Green dye**

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Guar gum/Copper oxide (GG/CuO) nanocomposite was synthesized using sol-gel method. GG/CuO nanocomposite was characterized by techniques such as ultraviolet-visible (UV-visible) spectroscopy, Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), thermo gravimetric analysis (TGA/DTA), scanning electron microscopy (SEM), energy-dispersive spectroscopy (EDS) and transmission electron microscopy (TEM). TEM analysis revealed the size of the GG/CuO nanocomposite particles in the range of 20-50 nm. GG/CuO nanocomposite was used for degradation of Malachite green dye was studied under different conditions. The degradation of MG dye was recorded 89% under irradiation time of 180 min. The antimicrobial activity of GG/CuO was also ascertained against *S. aureus*.

**Keywords:** Guar gum, CuO nanoparticles, Nanocomposite, Malachite green, Antimicrobial activity

**OP-07**

**Evaluation of Insecticidal Activity of Bacterial Strain, *Staphylococcus Sciuri* (SL9) Against Oriental Leafworm Moth**

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To identify novel bioinsecticidal agents, a bacterial strain, *Staphylococcus sciuri* (SL9) was isolated from the gut of oriental leafworm moth, *Spodoptera litura*. In this study, the insecticidal activity of liquid cultures in Luria-Bertani broth (LBB) of a bacterial strain, *Staphylococcus sciuri* (SL6) against second instar larvae of the *S. litura* was investigated on

castor leaves. The results of this study provided valuable information on the insecticidal activity of the liquid culture of *S. sciuri* against *S. litura* which showed 73.33% larval mortality during screening. Further, we assessed the effect of bacterial infection on growth and development of *S. litura*. A significant effect of *S. sciuri* was observed on various biological parameters viz. larval and pupal period, total development period and reproductive potential of *S. litura*. Inhibitory effects of *S. sciuri* was also recorded on nutritional physiology of *S. litura* larvae. This indicates that *S. sciuri* can have the potential to be used as a promising biological control agent.

**OP-08**

**Structural and Optical Property Study of Chemically Synthesized Copper Ferrite (CuFe<sub>2</sub>O<sub>4</sub>) Nanoparticles**

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Among the ferrites, copper ferrite (CuFe<sub>2</sub>O<sub>4</sub>) has received significant attention in recent years due to its interesting magnetic, magneto resistive and magneto optical properties and they are widely used in high density magneto optic recording devices, magnetic resonance imaging, magnetic refrigeration, magnetic bulk cores, ferrofluids, microwave absorbers, medical diagnostics, catalytic uses etc. Depending on the synthesis conditions and precipitating agents, CuFe<sub>2</sub>O<sub>4</sub> can crystallize either in tetragonal or cubical form. CuFe<sub>2</sub>O<sub>4</sub> nanoparticles were successfully prepared by co-precipitation method using Fe(III) and Cu(II) in the presence of NaOH, CTAB surfactant at 90°C. The structure, morphology and Copper Ferrite nanoparticles were characterized via X-ray diffraction (XRD), High resolution Scanning electron microscope (HRSEM), Energy dispersive X-ray spectroscopy (EDX), Brunauer Emmett Teller analysis (BET), Fourier transform infra-red spectroscopy (FTIR) and UV-visible spectroscopy and Photoluminance spectra (PL). XRD revealed the crystallographic structure of the synthesized sample. HRSEM images have shown the nearly spherical shape and mean particle size and morphology of copper ferrite nanoparticles. The EDS spectra have shown strong peaks of Fe, Cu and O. Surface area of the sample was measured using BET technique. FTIR indicates the characteristic groups of the coating on the Copper Ferrite and metal oxide bond. Optical properties are measured by using PL spectra and UV-visible spectra.

**Keywords:** CuFe<sub>2</sub>O<sub>4</sub>, BET, FT-IR, CTAB, HRSEM, PL

### **Structural, Optical and Photoluminescence Study of Petal Like Zinc Oxide Nanocomposites Synthesized by Chemical Method**

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Zinc oxide (ZnO) nanoparticles (NPs) and ZnO-ZnO nanocomposite materials were successfully prepared by simple co-precipitation method. The formation of ZnO-ZnS composite materials was defined by X-ray diffraction (XRD) and energy dispersive X-ray (EDS) spectrum. From the XRD investigation the average particles size of the synthesized ZnO NPs was calculated to be 48.95 and 79.47 nm for the ZnO-ZnS composite materials respectively. The EDS spectrum have displayed strong peaks of Zn, S and O. From Field Emission Scanning electron microscope (FESEM) images, ZnO-ZnS nanocomposite materials disappear to be petal-like structure morphology. Fourier transform infra-red spectroscopy (FTIR) spectrum has confirmed the presence of Zn-O symmetric stretching vibration at  $442\text{ cm}^{-1}$ , at  $809\text{ cm}^{-1}$  because of weak vibration of ZnO and other peaks at  $687\text{ cm}^{-1}$  due to Zn-S symmetric bending vibration. Optical absorption spectrum exposed the assessed band gap energy increased for ZnO-ZnS composite as a comparison to the pure ZnO NPs observed by UV-visible Spectrophotometer (UV-vis). The photoluminescence spectrum (PL) was investigated and shown the broad emissions spectrum were composed of several different bands owing to the presence of zinc vacancies, oxygen vacancies, and surface defects.

**Keyword:** Nanocomposites, XRD, FESEM, FTIR, Photoluminescence

### **Ground-Water Protection: Future Challenges and Strategies**

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The use of groundwater in India dates back to pre-historic times. Wells and other ground-water structures have been important source of water supply. But with the passage of the phenomenal growth of groundwater structures and increased groundwater exploitation have led to groundwater deterioration and degradation. Although the present stage of groundwater development is of the order of about 58%, there are areas where pumping out exceeds the annually replenishable resource causing decline of water level. In addition, various socio-economic problems also arise. But, the necessary discipline and awareness for its development in order to ensure equity and social justice are yet to emerge. Also cases of groundwater pollution induced by human activities are on the rise. Uncontrolled disposal of industrial wastes, sewage effluents and excessive use of chemical fertilizers in agriculture have affected the quality of ground-water with consequent adverse effects on population and environment. Hence, there is need to regulate the development of this vital resource for the safe and bright future of mankind.

**Optimization of Carboxymethylcellulase Production via Submerged Fermentation from a Newly Isolated Strain of *Bacillus Subtilis* Subsp. *inaquosorum***

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Fossil fuels reserves are depleting at an alarming rate which has developed a grim situation globally drawing the attention of scientific world. The rising costs of fuels have shifted the concerns to exploit renewable sources for production of value added chemicals. Worldwide research is going on to utilize the natural cellulosic biomass efficiently as it is considered as a virtually inexhaustible source of raw material to develop novel processes and products. But main obstacle in the path of success is high cost of enzymes necessitating the need to develop economically profitable processes. Cellulases are drawing the attention of the scientific world by virtue of their immense potential in lignocellulosic biomass utilization. The need for isolation of novel microorganisms from diverse habitats is imperative as they provide a platform for genetic modifications. In the present study, a novel strain of cellulose degrading bacteria was isolated from soil and identified as *B. subtilis* subsp. *inaquosorum*. Optimization studies were performed to enhance carboxymethylcellulase production. Maximum CMCase (1.4 IU/ml) activity was observed at 30°C, 150 rpm after 72 hrs using wheat bran as carbon source.

**Chemical Synthesis and Characterization Studies of Doped Polyaniline**

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Polyaniline doped with p-toluene sulphonic acid (p-TSA) was synthesized using in-situ chemical oxidation method in the presence of ammoniumperoxydisulphate (APS). The optimization parameters used for synthesis sustained the whole experimental work with single empirical value. The dopant to monomer molar ratio of 5 was found to show best electrical conductivity. The polymer was characterized by using different techniques. FT-IR spectroscopy confirmed the formation of polyaniline. The crystallinity of the sample was examined by X-ray diffraction (XRD) technique. The various electronic transitions present in the polyaniline were determined by UV-VIS absorption spectroscopy. The electrical conductivity of the synthesized and optimized sample in pellet form was found to be in the semiconducting range.

**Keywords:** Polyaniline, Chemical oxidation method, Characterization, Conductivity

**Radiation Induced Color Centers in Eu-Doped LiF Nanophosphors**Satinder Kumar<sup>1</sup>, Ravi Kumar<sup>2</sup><sup>1</sup> Govt. College Sujampur Tihra (H.P)-India,<sup>2</sup>Centre of Material Science & Engineering, N.I.T Hamirpur (H.P)-India*sksharma1564@gmail.com, ranade@nitham.ac.in*

Eu- doped LiF nanophosphors are synthesized at constant pH value of 8.0 by modified co-precipitation technique. X-ray diffraction measurements confirm the single phase system up to 0.04 mol % content of Eu in LiF. The crystallite size of the nanophosphors is calculated by using Scherrer's formula and these are found in the range 35 nm to 57 nm. The lattice parameter increased in Eu doped LiF nanophosphors which reveal that lattice expands on doping. Field emission scanning electron microscope (FESEM) micrographs clearly reveal cubic surface morphologies. The electron dispersive x-rays spectroscopy (EDX) confirms the elemental composition of the nanophosphors. The results show that Eu ions are well incorporated in the LiF host lattice. The absorption spectra of  $\gamma$ -irradiated Eu-doped LiF nanophosphors exhibit absorption peaks positioned at 250 nm and 445 nm which are due to F-CCs and F<sub>2</sub>.CCs respectively. These absorption peaks reveal the formation of radiation induced color centers (CCs). The concentrations of F and F<sub>2</sub> color centers are quantitatively estimated using Smakula's formula and are found to be in the order of 10<sup>18</sup>. The acquired photoluminescence (PL) emission spectra at fixed excitation wavelength 325 nm exhibit characteristic emission lines positioned at 577, 592, 612, 648 and 690-698 nm corresponding to <sup>5</sup>D<sub>0</sub> to <sup>7</sup>F<sub>J</sub> (J=0,1,2,3,4) transitions.

**Keywords:** Irradiation, Color Centers, Excitation, Photoluminescence

**Use of Technology in Conversational English: A Study of Communication Skills**

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Using technology in conversational English has become a stipulation, its now element of our lives. People communicate through mobile phones, emails, faxes, texting programmers, video conferences, digital chart-rooms and social media methods. As time goes on, more emerging technologies will change the system we communicate and it will be up to us to embrace them or not. Impact of technology in conversational English finds in individual and business level. Today, every organisation uses expertise in its own way to reach the media and targeted consumers. Also professionals have embraced skill by easing communication within companies and among investors and suppliers. A study will be examined input and output of languages to make conversational English effective. Input deals with observation of language through reading skills and listening skills. A study explores the benefits of technology like E- learning process through reading online books, articles, research papers etc. Another side, listening skills helps to improve conversational English through online lectures, trainings, spoken tutorials, inspiring speeches, interviews etc. The study will be

examined the barriers of languages on local dialects' conversational English, use of technology to make business conversation effective and using internet facility to overcome from the barrier of language. The online services, programmers, software, messengers, voice messages and video messages helps to remove the language barrier through social media, websites and apps.

**OP-15**

### **Green Synthesis of Metal Nanostructures**

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In the present study, metal (Ag and Cu) nanostructures were prepared in presence of ethylene glycol using PVP with the aid of conventional household microwave. The microwave assisted methods enjoy the obvious advantages of symmetric and volumetric heating, ease of synthesis and decreased time of reaction. The choice of Ag and Cu is attributed to their large catalytic activity, high antibacterial capability, prominent Surface Enhanced Raman Scattering (SERS) etc. The characteristic Surface Plasmon Resonance (SPR) peak for these nanostructures confirms their formation. Further, shape and morphological studies were done through Transmission Electron Microscopy. The as prepared fast, rapid and green synthesis of Ag and Cu nanostructures may found applications in SERS, electrochemical and biological sensors etc.

**Keywords:** Green synthesis, Microwave Irradiation, Metal (Ag and Cu) nanostructures, UV-Visible absorption, Transmission electron microscopy

**OP-16**

### **Controlled Variation of Zinc Interstitials as a Result of Multi Step Sintering on Undoped ZnO**

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The consequences of sintering time and sintering temperature has been studied concurrently on undoped ZnO powder by a technique called Multi step sintering. The powder was given heat treatment using a muffle furnace at a high heating rate of 100 °C/min. The structural investigations performed by X- Ray diffraction suggest the formation of oscillatory stress along [100] plane, which implies the rigorous formation of oxygen vacancies during sintering. The blue shift in bandgap was found and variation of intrinsic defects like oxygen vacancies, Zinc interstitial, Zinc vacancies and oxygen interstitials were studied using photoluminescence spectroscopy. The controlled nature of Zinc interstitial and their complexes with oxygen vacancies are exceptional results in the history of ZnO.

### Effects of Kr<sup>+</sup>, Ar<sup>+</sup> and N<sup>+</sup> Implantation on CR-39

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The samples of CR-39 have been implanted with 100 keV Kr<sup>+</sup>, Ar<sup>+</sup> and N<sup>+</sup> ions at the fluence of  $1 \times 10^{16}$  ions/cm<sup>2</sup>. The optical behaviour of the polymer after implantation has been studied through UV visible absorption, transmission and reflection spectroscopy. Due to implantation, reduction in transmittance, optical band gap and increase in refractive index for Kr<sup>+</sup>, Ar<sup>+</sup> and N<sup>+</sup> ion implanted CR-39 samples has been observed. The optical changes are maximum for N<sup>+</sup> ions and minimum for Kr<sup>+</sup> ions, at the same implantation dose. The observed trends in various optical parameters can be described on the basis of the formation of cross-linked carbonaceous structure in the implanted region as also confirmed through Raman and FTIR techniques. The formation of such a structure may be explained on the basis of the spurs formed during the penetration of the implanted ions within the polymeric material.

**Keywords:** Ion implantation, Absorption, Reflection, Refractive index, Spurs

### Energy Loss of Swift Heavy Ions in Solids

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Energy loss of swift heavy ions is important not only to understand the basic ion-matter interaction process but also required in many scientific applications, where swift heavy ions are used. In recent days, swift heavy ions beam are used for material modifications and characterization techniques which depends on the energy loss of impinging ion while traversing through the medium. In the experiments based on swift heavy ions (SHI) like in atomic physics, nuclear physics, material science and engineering etc., the accurate knowledge of energy loss is highly essential for correct data interpretation. In the present work, energy loss rate has been calculated for SHI from  $Z_1=3-20$  in elemental solids covering  $Z_2=3-79$  on the basis of Bohr's approach which is applicable in both classical and quantum mechanical regime, without almost any empirical/semi empirical parameterization of effective charge. It is found that the calculated energy loss values are in good agreement with the available experimental data.

**Keywords:** Energy loss, Swift heavy ions, Effective charge, Elemental solids

**How to Improve Communication in English: Need of the Present World**

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Can you imagine your life without communication? Is progress in life possible without communication? Can you get a good job or promotion without good communication skills? And the answer to all these questions is – No. Human beings have only been able to progress because of the progress of communication. In the early times, people had to communicate for food, shelter, and water. Now, communication is needed in every aspect of our lives. English is an international language and a common medium for communication for many people across the world. Having good communication skills is really important in every walk of life. The ability to communicate effectively is essential to the success of any endeavour in the present world scenario. Proficiency in English is an important factor in both hiring and promotion decisions. Therefore it is very important that one should have effective communication skills. This present paper mainly focuses on how to improve communication skills in English by following easy and simple tips.

**Keywords:** Communication, Technology, Effective Communication, Proficiency in English

**Biochemical Characterization and in-Silico Analysis of a Thermotolerant Lipase from *Bacillus Thermoamylovorans* BHK67**

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A bacterium isolated from a hot-water spring identified as *Bacillus thermoamylovorans* BHK67 successfully produced a thermotolerant extracellular alkaliphilic lipase. The lipase was purified to homogeneity by anion exchange chromatography with 15-fold purification and 12.1 % yield. The lipase appeared to be a hexameric protein as it possessed a single band of  $M_r$  25 kDa in SDS PAGE and 150 kDa in Native PAGE. Lipase showed maximum activity at pH 7.5 and with a half life of 10.5 h at 55°C. Kinetic study of purified lipase by Lineweaver-Burk plot provided  $K_m$  (7.7mM),  $V_{max}$  (90.9 U/mL/min),  $K_{cat}$  (227.3 sec<sup>-1</sup>) and  $K_{spec}$  (29.4mM sec<sup>-1</sup>) for substrate *p*-nitrophenylpalmitate. The purified lipase also showed remarkable stability following exposure to ethanol, *n*-propanol, *iso*-propanol, *n*-butanol and DMSO. Purified lipase revealed high score with query coverage of 80% and 62% identity with lysophospholipase L1 related esterase of *Lactobacillus ozensis* DSM 23829.

**Keywords:** *Bacillus thermoamylovorans*, Extracellular thermotolerant lipase, Characterization, Multimeric nature.

## A Community Analysis of Protected Forests in the Himalaya: A Case of Manali Wildlife Sanctuary

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Although the temperate forests are explored for flora and ecology but their classification and relationship with environmental variables remains somewhat unclear. The aim of this study was to delineate communities, analyze structure and composition and relationship with environmental variables. A stratified random sampling design was employed and quadrats were used to sampling of vegetation and collection of information on species. The Hierarchical Agglomerative Cluster Analysis distinguished four major associations viz. *Acer caesium–Abiespindrow*, *Cedrusdeodara–Piceasmithiana*, *Quercussemecarpifolia* and *Betulautilis*. The Kruskal–Wallis test showed a significant difference in saplings, seedlings, shrubs and herbs density among associations ( $p < 0.05$ ). More than 40 % of trees represented lower cbh classes and increase in class showed decrease in density and species representation. Dominant species had maximum number of saplings and seedlings in all associations. DCA showed significant positive correlation with altitude and moisture content and negative with pH. Vegetation composition varies significantly among associations in sapling and seedling layers. Environmental factors cause variation in vegetation composition among associations evident by influence of altitude, moisture content and pH in the present study. Associations were different in structure and composition, thereby representing unique entities. The protection and maintenance of each communities/associations through forest management will be important for biodiversity conservation.

## Diversity and Bioecological Assets of Orthopteran in Shimla Hills of Himachal Pradesh

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Shimla hills primarily symbolize one of most fragile ecosystem of the Western Himalayas of Himachal Pradesh and supports rich and diversified faunal and floral diversity. The intensive and extensive bioecological studies were conducted on orthopteran fauna in order to study their diversity and status in different bioecological habitat was explored for the presence of orthopteran fauna in various ecosystems/habitats types like agriculture fields, forests, grasslands, streams, human habitations, industrial area etc. of Shimla hills. Present studies revealed the presence of 36 species of orthopteran insects belonging to 34 genera, 6 families and 4 superfamilies. During the course of present studies it was observed that Acrididae, represented by 22 species, spread over 21 genera and 9 subfamilies was the largest family of the orthopterans. Further, it was revealed that family Acrididae (61%) was followed by Tetrigidae 5(14%) species, Pyrgomorphidae and Gryllidae 3(8%) species in each, Phaneropteridae 2(6%) species and Gomphocerinae, Oxyinae and Coptacrydinae were

represented by a single (4.33%) species each. Present investigations revealed that, there were 15 such species of orthopterans namely *Acrida exaltata*, *Phlaeoba infumata*, *Oedaleus abruptus*, *Spathosternum pr. prasiniferum*, *Atractomorpha cr. Crenulata*, *Chrotogonus (Chr.) tr. trachypterus*, *Hedotettix costatus*, *Ducetia japonica* etc., whose distribution ranged widely in present watershed. It was further noticed that there were significant increase in the orthopteran diversity from December to September-October (peak diversity of species) and then a decrease to December/January. Present studies intend to provide platform for entomologists and all other interested in biodiversity conservation and its impacts on biodiversity and environment for sustainable ecosystem.

**Keywords:** Diversity, Orthoptera, Acrididae, Ecosystem, Shimla hills

**OP-23**

**N-Seleno Substituted 3-Alkoxy- $\beta$ -Lactams: Introduction to a Novel Class of  $\beta$ -Lactams**

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$\beta$ -lactams are the most exploited family of antibiotics used for the treatment of bacterial and fungal infections. The use of  $\beta$ -lactams as prodrug has also met with success by aiding delivery of the chemotherapeutic directly to the tumor sites. It has been reported in literature that a novel class of *N*-thiolated-3-methoxy- $\beta$ -lactams has shown apoptotic activity against human leukaemia, breast, prostate and head-neck cancer cells. Selenium also known to be a part of few amino acids and hence many biological functions are incomplete without its incorporation. Selenium possesses size and electronic properties similar to sulphur. So keeping this in mind we present here a simple strategy for the synthesis of *N*-seleno substituted 3-alkoxy- $\beta$ -lactams. Synthetic procedure began with the treatment of phenylthioacetic acid with an appropriate Schiff's base in the presence of phosphorous oxychloride and triethylamine using toluene as a solvent. Reaction yielded 3-phenylthio- $\beta$ -lactam which was further chlorinated at C-3 to generate a cationic centre in order to introduce an alkoxy group by treating 3-chloro- $\beta$ -lactam with an appropriate alcohol in the presence of  $ZnCl_2-SiO_2$  using chloroform as a solvent. These 3-alkoxy- $\beta$ -lactams were made to react with ceric ammonium nitrate (CAN) using acetonitrile and water as solvents at 0 °C to afford *N*-unsubstituted 3-alkoxy- $\beta$ -lactams. These will be further transformed to *N*-seleno substituted-3-alkoxy- $\beta$ -lactams using *N*-seleno substituted phthalimide and triethylamine in dichloromethane at 0 °C.

### Some Interesting Hypomycete from Himachal Pradesh

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Himachal Pradesh is a hilly state situated between 30° 22' - 33° 02' N latitude and 75° 47' - 79° 04' E longitudes, covers an area of 55,673 km<sup>2</sup> spread over 12 districts. with its varied climate, forest types, altitude and topography supports much diversified mycoflora. The forests of H. P. which were not explored, earlier, were surveyed for hypomycetes colonizing fallen leaves, litter, twigs and bark of the trees. It is interesting to note that the survey has resulted in the documentation of 10 hypomycetous fungi, viz. *Ceratocladium microspermum*, *Brachysporiella pulchra*, *Ceratosporium fuschen*, *Conoplea fusca*, *Cryptocoryneum rilstonei*, *Dendryphiella vinosa*, *Dendryphion comosum*, *Dendryphiopsis atra*, *Dwayabeeja sundara* and *Ellisemia brachypus*.

### Study on Interactions Prevailing in Binary Mixture of Propylene/Diethylene Glycol Mono Butyl Ether with Alcohols at Different Temperatures: A Thermophysical and Spectroscopic Approach

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Molecular interactions have been studied between the binary mixtures of propylene glycol mono butyl ether  $\text{CH}_3(\text{CH}_2)_3\text{OCH}_2\text{CH}(\text{OH})\text{CH}_3$ , diethylene glycol mono butyl ether 2-(2-butoxyethoxy) ethanol  $\text{CH}_3(\text{CH}_2)_3\text{OC}_2\text{H}_4\text{O}(\text{CH}_2)_2\text{OH}$ , with alcohols, viz., 1-hexanol  $\text{CH}_3(\text{CH}_2)_5\text{OH}$ , 1-octanol  $\text{CH}_3(\text{CH}_2)_7\text{OH}$  and 1-decanol  $\text{CH}_3(\text{CH}_2)_9\text{OH}$  over the entire composition range at 293.15, 298.15, 303.15, 308.15 and 313.15 K through the behavior of measured densities,  $\rho$  and speeds of sound,  $u$  at 293.15, 298.15, 303.15, 308.15 and 313.15 K. These binary mixtures can serve as materials with enhanced properties than that of individual components and can be used in various biotechnical and biomedical applications. Therefore, we are eager to investigate the intermolecular interactions in such binary mixtures. So, for this the experimental data were used to calculate the excess molar volumes,  $V_m^E$ , excess molar isentropic compressibilities,  $K_{s,m}^E$  and deviations in speed of sound,  $u^D$ . A Redlich-Kister type equation was applied to fit the excess molar volumes and deviations in isentropic compressibility and speeds of sound. Spectroscopic techniques have also been used for analyzing molecular level interactions prevailing between the binary mixtures. The thermodynamic properties and spectroscopic data have been analyzed in terms of the effect of temperature, composition, increase in alkyl chain and the change of position of -OH group in alcohols.

**Keywords:** Excess molar volume, Deviation in isentropic compressibility, Deviation in speed of sound, FT-IR

## Fluent Based Analysis of Flow Behavior in Triangular Duct under Laminar Conditions

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The fluid flow behavior through the triangular cross-sectional duct is analyzed for laminar flow, in the present study. The numerical simulations are performed on three-dimensional model of the duct. The flow is assumed to be fully hydro-dynamically developed and it is numerically simulated by solving basic flow governing equations using finite volume method (FVM). The computational fluid dynamics (CFD) code is developed on the commercial Fluent software in order to analyze the flow characteristics. The simulated results are compared with the available results on the open literature and close agreement is observed between them with the percentage deviation of only 66.5. Because of the sharp corners, flow characteristics of the fluid get affected and main stream velocity even drop to zero close to the corner region. In fully developed flow, the location of maximum velocity gets shifted from the centre and it is observed at the distance 0.3 times the height from the base of the duct. It is concluded that the flow dynamics through the duct is strongly affected by the sharp corners and main stream surpass the flow at the corners.

## Synthesis, Characterization and Antimicrobial Activity of Oxovanadium (IV) Complexes Derived from Hydroxamate Ligands using $[\text{VO}(\text{Q})_2]$ as Precursor

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The oxovanadium(IV) complexes of composition  $[\text{VO}(\text{Q})_{2-n}(\text{HL}^1,^2)_n]$  and  $[\text{VO}(\text{HL}^1,^2)_2]$  (where Q =  $\text{C}_9\text{H}_6\text{ON}^-$  8-hydroxyquinolate ion;  $\text{HL}^1$  = indole-2-carboxyhydroxamate ion;  $[\text{C}_8\text{H}_6\text{NC}(\text{O})\text{NHO}]^-$ ;  $\text{HL}^2$  = indole-3-butyrohydroxamate ion;  $[\text{C}_{11}\text{H}_{12}\text{NC}(\text{O})\text{NHO}]^-$  n = 1 and 2) have been synthesized by the reaction of  $\text{VO}(\text{Q})_2$  with equi- and bi-molar amounts of potassium- indole-2-carboxyhydroxamate and potassium-indole-3-butyrohydroxamate in THF + MeOH solvent medium. The complexes have been characterized by elemental analyses, molar conductivity, molecular weight determinations, magnetic moment measurements, electrochemical and IR, electronic and ESR spectral studies. Based upon spectroscopic studies, bidentate nature of hydroxamate ligands involving O,O coordination has been depicted and a square-pyramidal environment around vanadium has been proposed. The antimicrobial activities of the newly synthesized complexes, ligands and precursor  $\text{VO}(\text{Q})_2$  have been assayed against some pathogenic bacteria such as Gram -Ve bacteria *Escherichia coli*, *Salmonella typhi*, *Salmonella paratyphi*, *Klebsiella pneumoniae* and Gram

+Ve bacteria *Staphylococcus aureus*, *Staphylococcus epidermidis* and fungi viz. *Aspergillus niger*, *B. fulva* and *M. circinelloides* by minimum inhibitory concentration method. The complexes exhibited promising antimicrobial activity.

**OP-28**

### **In Plane Switching (IPS): A New Milestone in Display Technology**

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Liquid crystal display is well known technology and is widely involved in various fields of science & Technology. Day by day increasing demand of new technologically advanced displays, a series of research works is going on all over the world. In-plane switching (IPS) mode is the leading LCD technologies currently available in the market. This technology was one of the first refinements to produce significant gains in the wide viewing and fast response characteristics. IPS technology increases the viewing angle and changes the LCD transmittance, which is being used in producing the iPhones and iPads. In plane switching is different from conventional liquid crystal display (LCD) in configuration and pattern of liquid crystal cell. In conventional LCD both plates of cell are acted upon by electric field and liquid crystal material sandwich between plates works according to applied field and properties of that material. Where as in IPS display technique, field is applied in plane of only one glass plate and other glass plate not acted upon by field. All this decides properties of display such as contrast ratio, display brightness, response time, wide viewing angle, switching time etc. In conventional LCD wide viewing angle is main limitation. This limitation overcomes by IPS technology and wide viewing angel characteristics are achieved to maximum extent. In IPS display mode, one of the two glass plates has electrodes and electric field is applied to the liquid crystals along the direction parallel to the plane of the substrates. The liquid crystals, aligned homogeneously between the substrates, in the state without the electric field, are twisted by an in-plane electric field. The initially untwisted homogeneous configuration of the liquid crystals provides excellent light blocking. This behaviour contributes to a high contrast ratio without gray scale reversal even for obliquely incident light at wide angles.

**OP-29**

### **Diversity in Insect Pollinators on Apple Crop in Experimental Orchards in Shimla District of Himachal Pradesh**

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Diversity in various insect visitors of apple crop was investigated and carried out by collecting flower visitors in different orchards located at Padola (2200 m), Kalzar (2514 m) and Jarol (2648m) in Shimla hills of Western Himalaya. Insect diversity studies showed that apple flowers were visited by 41 species of insects belonging to 5 orders and 16 families of

class Insecta. Of these, 13 species belonged to Hymenoptera, 17 to Diptera, 8 to Lepidoptera, 2 to Coleoptera and 1 to order Thysanoptera. Analyses of data on relative abundance of different insect visitors revealed that Indian hivebee, *A. cerana* was the most abundant insect visitor to apple flowers in all the three experimental orchards i.e. Padola (29.23%), Kalzar (29.43%) and Jarol (28.82%). European honey bee, *A. mellifera* (18.59%, 17.23% and 16.74%) and *Bombus tunicatus* (2.02%, 2.04% and 1.98%) were other important hymenopterans at Padola, Kalzar and Jarol orchards. Besides, hymenopterans, dipterans also constituted an important group of insect pollinators.

**Keywords:** Diversity, Insect pollinator, Apple, Honeybee, Shimla hills

**OP-30**

### **Studies on Controlled Release Transdermal Polymeric Matrix Films for Treating Hypertension**

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To present study to develop a matrix type Transdermal therapeutic system containing Carvedilol, Ramipril and Metoprolol succinate as a model antihypertensive drugs, with different ratio of polymers like PVPK-30, HPMCK 4M, HPMCK15M, HPMCE15M, HPMC5CPS, EC, HPC, Eudragit RL100, Eudragit L100. Preformulation studies are necessary to understand the physicochemical Properties of the drug and the compatibility of the other excipients used in the formulation. The Differential Scanning calorimetry (DSC) Fourier transform infrared (FTIR) spectroscopy were used to confirm compatibility and to rule out any possible interactions between drug and polymers. In order to improve patient compliance by sustaining its action and by avoiding its gastrointestinal side effects. The prepared patches were evaluated for their physicochemical characteristics such as physical appearance, weight variation, thickness, folding endurance, percentage moisture absorption, percentage moisture loss, water vapour transmission, tensile strength and drug content and *in vitro* drug release studies. Data of *in vitro* release from patches were fit in to different equations and kinetic models to explain release kinetics. All Transdermal Patches formulated by solvent evaporation technique. The drug used is the best studied for therapy in treating Hypertension. Carvedilol, Ramipril, Metoprolol Succinate were successfully formulated as controlled release Transdermal patches, which prevents the frequency of administration and gives good patient compliance. From the experimental results obtained, Carvedilol F8 (93.1%), Ramipril R10 (93.29%), Metoprolol succinate K10 (97.36%) formulation has been selected as the best formulation among all the other formulations among the three drugs. The *in-vitro* drug diffusion studies from the formulation was found to be controlled release. A primary skin irritation test studies was conducted on Albino rabbit skin and there was no signs of Erythema or Edema. It indicates that the

Transdermal films are safe for use. The surface morphology of this film was observed using Scanning Electron microscopy and which indicates that the formulated film has smooth surface with elegant appearance and good physical appearance. It shows that the drug is uniformly distributed throughout the film. All the evaluation parameters obtained from the best formulation were found to be satisfactory.

**OP-31**

### **A Secure Cryptosystem based on Normal bases over Finite Fields**

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Cryptography provides the security to the messages which travel over the insecure channels. Normal bases are widely used in various cryptographic functions and ciphers to provide the confidentiality, integrity and security to the messages. We propose a secure cryptosystem using Hill cipher and normal bases over finite fields.

**OP-32**

### **Synthesis and Characterisation of $\text{La}_{0.40}\text{Ca}_{0.6}\text{Ti}_{0.40}\text{Mn}_{0.6}\text{O}_3$ Interconnect Material for Solid Oxide Fuel Cell**

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SOFCs (solid oxide fuel cells) have been the subject of intensive research and development among various type of fuel cell around the world. The most abundant interconnect material of SOFCs is LCTM. Nanostructured LCTM has been synthesised by following solid oxide reaction method. Material is ball milled by Zirconium oxide balls of size 1.6-1.8 mm for 6 hr. Material is calcined at 950°C for 10 hours. Then sintered at 1400°C for 10 hours. The crystalline size of the material is 50 nm. Morphology of the sample is studied by SEM. Density of the sample is 6.80 g/cm<sup>3</sup>.

**La<sub>0.8</sub>Sr<sub>0.2</sub>Co<sub>0.2</sub>Fe<sub>0.8</sub>O<sub>3</sub> Cathode Material for Solid Oxide Fuel Cell**  
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La<sub>0.8</sub>Sr<sub>0.2</sub>Co<sub>0.5</sub>Fe<sub>0.5</sub>O<sub>3</sub> is synthesized by conventional solid state reaction method. Zirconium oxide balls of size (2.0-2.5) mm are used for ball milling. Conventional furnace and microwave is used for sintering processes. As-prepared samples are characterized by X-ray powder diffraction (XRD) by use of D8-Advance Bruker-axe X-ray diffractometer at room temperature. La<sub>0.8</sub>Sr<sub>0.2</sub>Co<sub>0.5</sub>Fe<sub>0.5</sub>O<sub>3</sub> powder exhibit single phase Cubic perovskite structure with Pm-3m space group above 8000 C. W-H plot for LSCF powder calcined at 700oC, 800oC, sintered in microwave and conventionally at 1150oC showing tensile strain. crystalline size and density of conventionally sintered La<sub>0.8</sub>Sr<sub>0.2</sub>Co<sub>0.5</sub>Fe<sub>0.5</sub>O<sub>3</sub> pellets is 45 nm and 6.11 g/cm<sup>3</sup> respectively at 1150oC for 5 hrs, whereas for microwave sintered La<sub>0.8</sub>Sr<sub>0.2</sub>Co<sub>0.5</sub>Fe<sub>0.5</sub>O<sub>3</sub> pellets crystalline size is 40 nm and density 6.23 g/cm<sup>3</sup> at 1150°C for 45 mins.

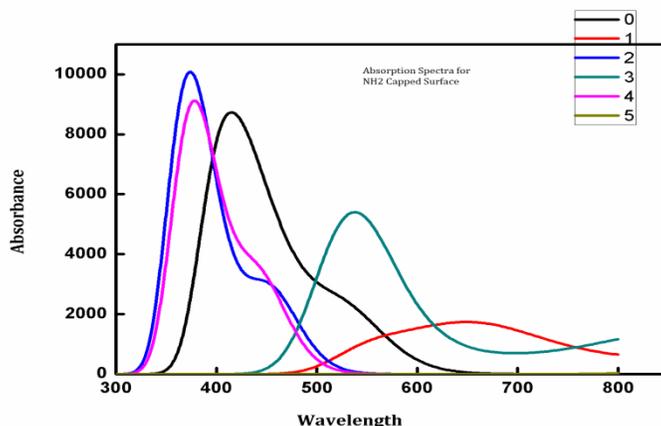
**Tuning of Electronic Energy Levels of Ligands Passivated ZnO Nanocluster: A  
 DFT/TDDFT Study**

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The surface passivation is one of the most effective way to enhance the performance of QD based optoelectronic devices. It is observed that by attaching the number of ligands on the surface of the nanocluster leads to significant change in electronic and optical properties of the system. The current work reports the computational modeling of the multiple ligand capped (ZnO)<sub>21</sub> nanocluster using density functional theory (DFT), B3LYP functional with LANL2DZ basis set which are implemented in the Gaussian09 package. Surface of nanoclusters capped upto five different ligands and then structural, electronic and optical properties have been explored. The computed spectrum of the lowest-lying capped nanoclusters shows a notable blueshift in the absorption spectrum.



The surface passivation enhances the HOMO–LUMO gap values of ZnO QDs but the important point to note is that the extent of enhancement depends on the nature of the passivating ligands. The passivation of ZnO QDs with ligands facilitates the UV emission while suppressing the visible emission of bare QDs.

**Keywords:** B3LYP, Band gap tuning, Surface passivation

**OP-35**

**La<sub>0.40</sub>Ca<sub>0.60</sub>Ti<sub>0.60</sub>Mn<sub>0.4</sub>O<sub>3</sub> Interconnect Material for Solid Oxide Fuel Cell**

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Energy is backbone of our society and method of production of energy play an important role in development and growth of that society. Fuel cells are devices which convert chemical energy into electrical energy and heat without the need for direct combustion and emission of carbon oxides, nitrous oxide and sulphur oxide as an intermediate step. Its conversion efficiencies are much higher than conventional energy systems and at the same time it is more environmental friendly. For the practical use of SOFCs, large number of SOFC cells is connected in series. For their connection material used are called as interconnect. Interconnect is either a metallic or ceramic layer that sits between each individual cell. Nanostructured LCTM has been synthesised by solid oxide reaction method. Material is ball milled by Zirconium oxide balls of size 1.6-1.8 mm for 6 hr. Material is calcined at 9500c for 10 hours. Then sintered at 1400<sup>0</sup>C for 10 hours. The crystalline size of the material is 55 nm. Morphology of the sample is studied by SEM. Density of the sample is 6.85 g/cm<sup>3</sup>.

**Effect of Physical Factors, Carbon and Nitrogen Sources on Growth and Sclerotial Production in *Morchella hybrida* (Sow.) Pers.**

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The physical and nutritional requirements for the growth and sclerotial production of *Morchella hybrida* were studied. The morel grows and reproduces best on Czapek's medium at an optimum temperature 24°C pH 7.0 and after ten days of incubation. The growth and sclerotia production on nine different carbon compounds has been investigated and D(+) xylose found to be best for both. Twenty six different nitrogen compounds have been used in the nitrogen nutrition studies. The fungus produces maximum mycelial growth with L-glutamic acid and best production of sclerotia with L-glutamic acid and L-ornithine HCl

**Keywords:** Sclerotial, *Morchella hybrida*, Czapek's medium,

**Soil-Gas Radon Monitoring in Hamirpur District of Himachal Pradesh, NW-Himalaya, India**

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The Tectonic features of Himalaya have been studied by various researchers by different transport mechanisms techniques, which includes active and passive soil gas radon monitoring. Keeping in view the ease of execution of passive technique, soil-gas measurement of radon- thoron concentration was performed by this method at Hamirpur district of North-West Himalayas, India. For this purpose LR-115 type-II detector films (SSNTD's) were used in radon-thoron discriminator at twenty different locations of the study area with an aim to set eventual correlation between radon-thoron anomalies and faults / fractured zone in lithology of area.

**Keywords:** Solid state nuclear track detector (SSNTD)

**Synthesis and Characterization of Mixed-Metal Acetato-Isopropylphenoxides  
[Mnb<sub>2</sub>(Oac)<sub>2</sub>(Oc<sub>6</sub>h<sub>4</sub>pri-2/4)<sub>10</sub>] (M = Cd, Pb) as Precursors to Oxides**

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The pentakis(2- and 4-isopropylphenoxo)niobium(V) complexes of composition Nb(OC<sub>6</sub>H<sub>4</sub>Pri-2)<sub>5</sub>(**1**) and Nb(OC<sub>6</sub>H<sub>4</sub>Pri-4)<sub>5</sub>(**2**) have been synthesized by the reactions of niobium pentachloride with five equivalents of 2- and 4-isopropylphenol in carbon tetrachloride and characterized by elemental analysis, molar conductance, molecular weight determination and IR, <sup>1</sup>H and <sup>13</sup>C NMR spectral techniques. The reactions of [Nb(OC<sub>6</sub>H<sub>4</sub>Pri-2/4)<sub>5</sub>] with divalent metal acetates M(OAc)<sub>2</sub> [ M = Cd, Pb] in 2:1 molar ratios in hexane yielded heterometallic complexes [MNb<sub>2</sub>(OAc)<sub>2</sub>(OC<sub>6</sub>H<sub>4</sub>Pri-2/4)<sub>10</sub>]. The characterization of heterometallic complexes has been accomplished by physicochemical and FTIR and <sup>1</sup>H NMR spectral studies. The acetate group seemed to act as assembling ligand. The X-ray diffraction data of [CdNb<sub>2</sub>(OAc)<sub>2</sub>(OC<sub>6</sub>H<sub>4</sub>Pri-4)<sub>10</sub>] has indicated to be polycrystalline over amorphous nature of parent complex [Nb(OC<sub>6</sub>H<sub>4</sub>Pri-4)<sub>5</sub>] suggesting thereby the transformation of non-crystalline material to crystalline. Thermal behaviour of mixed-metal acetatoaryloxides studied by TGA-DTA techniques have yielded mixed-metal oxides.

**Significant Potential of Biopolymer Based Hydrogels in Water Purification Technology**

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A series of the gelatin-based hydrogels using *N,N*-MBAAm as crosslinker was synthesized by a clean and simple method using biocompatible components. Further the prepared gelatin-based hydrogels were characterized by FTIR and SEM. These hydrogels are effective sorbents for Cr (VI) ions. The hydrogel (Gelatin/AAm/HPMA-*cl*-*N,N*-MBAAm) showed the maximum uptake of 67.8 % and exhibited the maximum retention capacity (MRC) of 75.7 mg g<sup>-1</sup> after four feeds. All the experimental data showed better match with Freundlich than Langmuir isotherm and followed pseudo-second-order kinetics. The choice of monomers or crosslinker leads to the tailoring of the hydrogels as the hydrogels exhibited structure-property relationship in the removal of excess Cr (VI) ions from industrial waste water and hence showed significant potential for use in water purification technologies.

**Key words:** Hydrogel, Maximum retention capacity, Freundlich isotherm

**Micellar Behaviour Bile Salts in aqueous medium of Metformin Hydrochloride:  
Concentration and Temperature Effect**

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The micellization behaviour of two sodium salts of cholic acids (bio-surfactants) viz. sodium cholate (NaC) and sodium deoxycholate (NaDC) in aqueous solutions of antidiabetic drug, metformin hydrochloride (Mfm-HCl) has been analyzed by applying electrical conductivity and spectral techniques over a wide range of temperature (288.15 to 318.15) K. The conductivity,  $\kappa$  data have been employed to determine critical micelle concentration, *CMC* i.e. point of aggregation and the results have been discussed in terms of Mfm-HCl–NaC/NaDC hydrophobic and electrostatic interactions in aqueous medium. The enhancement in the micellization tendency of the studied bio-surfactant has been revealed from obtained *CMC* values. The *CMC* values have also been determined by applying spectroscopic techniques i.e. UV-Visible (absorption spectra) and fluorescence (emission spectra) studies which corroborates the conductivity studies (good agreement). Moreover, the temperature dependence of *CMC* (typical U-shaped profile) has been explained in terms of various interactions present around the hydrophobic part of bile salts. Furthermore, charged pseudo-phase separation model of micellization has been applied to discuss the thermodynamics of the ternary system.

**Keywords:** Micellization, Critical micelle concentration, Aggregation, Charged pseudo-phase separation model

**Interactions of Cationic Surfactant with Tetrabutylammonium based Ionic Liquids  
(ILs): Volumetric Analysis**

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The effect of three ionic liquids, tetrabutylammonium bromide ( $\text{Bu}_4\text{NBr}$ ), tetrabutylammonium nitrate ( $\text{Bu}_4\text{NNO}_3$ ) and tetrabutylammonium acetate ( $\text{Bu}_4\text{NOAc}$ ) on the volumetric properties of a cationic surfactant, DTAB (dodecyltrimethylammonium bromide) has been explored by measuring density ( $\rho$ ) and speed of sound ( $u$ ) of aqueous solutions over a wide range of temperature (293.15 to 318.15) K at an interval of 5 K. Density of aqueous solution of surfactant increases in the order :  $\text{Bu}_4\text{NBr} > \text{Bu}_4\text{NNO}_3 > \text{Bu}_4\text{NOAc}$  which is in accordance with the molecular mass of the additive, whereas speed of sound shows opposite trend. Various volumetric and compressibility parameters viz. apparent molar volume ( $V_\phi$ ), isentropic compressibility ( $\kappa_s$ ) and apparent molar adiabatic compression ( $\kappa_{s,\phi}$ ) have been derived using experimental data. The variation of  $V_\phi$  and  $\kappa_{s,\phi}$  with concentration of surfactant may be ascribed as the modification of water–water

interactions due to the loss of hydrophobic hydration of the surfactant molecules on the addition of salts. The trends of all these parameters have been examined in terms of competing pattern of various intermolecular interactions existing in ternary (IL + water + DTAB) system.

**Keywords:** Ionic Liquid, Apparent molar volume, Isentropic compressibility, Apparent molar adiabatic compression, Intermolecular interactions.

OP-42

**Medicinal plant diversity of Mohalkhad Watershed in Kullu district of Himachal Pradesh, North Western Himalaya: An area specific conservation approach**

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In the mountains, the people mostly depend on various plant resources for their livelihood options including medicine. The worth of medicinal plants in indigenous/traditional healthcare practices provides an innovative approach to the latest areas of research in biodiversity conservation. However, information on the uses of plants for medicine is deficient from remote areas of the Himalaya. Therefore, the present study has been conducted to study the diversity, indigenous uses, threat categorization and conservation prioritization of medicinal plants in the study area. Overall 278 species of medicinal plants belonging to 92 families and 210 genera were recorded and used by the inhabitants. These medicinal plants include 33 trees, 192 herbs, 47 shrubs, climber and ferns 3 species each. From the total, 124 medicinal plants were native, 3 endemic and 27 were near endemic. The species have been also analysed for their nativity, endemism, rarity and are prioritized for cultivation. Area specific approach for threat categorization of species is most important for long term management planning. In the present study such an effort has been made in the study area, using information on different parameters was initiated. The unsustainable harnessing, habitat degradation, high anthropogenic pressure and changing environmental conditions may lead to the extinction within a few years. Therefore, regular monitoring of population and habitats, development of propagation protocol, establishment of species insitu conditions and replication of this approach in other parts of Indian Himalayan Region have been recommended. In addition to this formation of Biodiversity Management Committees (BMCs) at Panchayat, Block and District level has also been suggested.

**Keywords:** Biodiversity Management Committees (BMCs), conservation prioritization, diversity, Endemism, Indigenous uses, Nativity, Mohalkhad Watershed, Threat categorization

### Synthesis and Characterization of ZnO NPs: A Green Synthesis Approach

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In the last decade, number of studies has been reported on the green or biological synthesis of metal nanoparticles (NPs) due to its potential application for the ecofriendly development and uses of renewable resources for the synthesis of NPs. The present paper is, therefore, aimed to synthesize ZnO NPs from precursors, zinc acetate and zinc nitrate by employing bio-reducing agents, leaves extracts of Aloe vera and Tulsi plants. Both the reducing agents are herbal plants and were easily collected from the surrounding areas. As synthesized ZnO NPs were stable and possess irregularity in shape. NPs synthesized from zinc acetate form distorted spherical, rod and cuboidal like structures, whereas cuboidal like shapes NPs have been obtained in case of zinc nitrate. The characterization of NPs has been done by using UV-Visible Spectrophotometer. The crystallinity and morphology structural determination of ZnO NPs have been confirmed by X-Ray Diffraction (XRD) and Transmission Electron microscope (TEM) studies, respectively.

**Keywords:** Aloe vera, Transmission Electron microscope, Tulsi, X-Ray Diffraction, Zinc oxide

### Synthesis and Characterization of Gemini Surfactants of SDS and CTAB

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Gemini surfactants are newer class of surface active compounds which consist of two hydrophobic chains connected by a spacer. In this paper, we report the synthesis and characterization of sodium dodecyl sulphate (SDS) and cetyl trimethyl ammonium bromide (CTAB) by using spacers, glucose and bisodium salt of ethylene diamine tetraacetic acid (EDTA) at temperature 50° C. The synthesized compounds were characterized by NMR and FTIR techniques. Surface tension measurements were also used to determine the critical micellar concentration (CMC) of synthesized Gemini surfactants. It was observed that CMC values of Gemini surfactants are approximately half then that of respective conventional surfactants.

**Keywords:** Cetyl trimethyl ammonium bromide, Gemini surfactant, Sodium dodecyl sulphate.

### Analysis of Surface Wave Propagation with Liquid

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The analysis of the surface waves in a homogeneous isotropic, thermally conducting elastic solid half-space underlying a half-space of viscous liquid at varying temperature by employing Green-Naghdi theory is investigated in the present paper. After formation of basic equation and using mechanical, thermal boundary conditions and formal solution in governing equations, secular equations for surface waves in compact form are derived with the help of separation of variable method. The expressions for coupled and uncoupled theories of thermoelasticity have been obtained from the derived secular equations. The results for surface particle motion have also been discussed as particular case. In order to illustrate the analytical results, the numerical calculations have been carried out with MATLAB software tools for aluminum-epoxy composite material solid (half-space) underlying a viscous liquid half-space.

### Diversity of Bee Flora and their Role in the Sustenance of Pollinators in the Upper Beas Valley of Himachal Pradesh

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Farming practices are largely dependent on various ecosystem services provided by the forests interspersed in the agricultural landscape. However, changing environmental conditions are causing decline in such ecosystem services. For instance, decline in pollinator services has been now identified as an important issue worldwide. Recent surveys document that more than 30 genera of animals consisting of hundreds of species of floral visitors are required to pollinate the 100 or so crops that feed the world. We must recognize that pollination is not a free service, and that investment and stewardship are required to protect and sustain it. The present study carried in the apple orchards and the surrounding areas of Upper Beas Valley in District Kullu, Himachal Pradesh to investigate the foraging preference of apple pollinators and their dependency on wild flora for sustenance and to develop the floral calendar of the foraging plant species. The flowering plants were visited and observed for the presence of honey bees and other insect pollinators and their foraging activities. The blossom period of the foraging species was also recorded for the preparation of floral calendar. Data on foraging resources in bloom were recorded for each observation by scan/visual sampling method. Total 250 species

(19 Trees; 29 shrubs and 202 herbs) of flowering plants were recorded from the Upper Beas Valley, of which 72 species were found to be the foraging resources of the insect pollinators. *Prinsepia utilis*, *Tagetes minuta*, *Callistemon citrinus*, *Rubus biflorus*; *Rubus ellipticus*, *Robinia pseudoacacia*, *Berberis lycium*, *B. aristata*, *Deutzia staminea*, *Buddleija crispa*, *Trifolium pratense*, *T. repense*, *Rabdosia rugosa*, *Zanthoxylum armatum*, *Origanum vulgare*, *Prunus cerasoides*, *Ajuga bracteosa*, *Zephyranthes carinata*, *Aesculus indica*, etc. were the preferred foraging plants of the insect pollinators. The floral calendar of the area revealed that the maximum foraging species were in bloom from March to September and there is decrease in the number of flowering species which blooms after that in the year. Minimum foraging species in bloom were observed in the months of December and January. The status of most of these foraging plants is a matter of concern due to habitat loss and monoculturing of apple in the valley. Interactions between plants and their pollinators are essential to healthy functioning of wild and agricultural communities.

**Key words:** Pollinators, Ecosystem Services, Diversity, Habitats, Foraging

**OP-47**

### **A symmetric Cryptosystem Based on Irreducible Polynomials over Finite Fields**

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Irreducible polynomials over finite fields play an important role in cryptography. Various cryptosystems are based on the irreducible polynomials. In the present paper, we discuss a symmetric key cryptosystem using irreducible polynomial of degree four over finite field GF (2).

**OP-48**

### **Status and Regeneration of Himalayan Yew in the Kais Wildlife Sanctuary**

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The Himalayan Yew (*Taxus baccata* L. subsp. *wallichiana* (Zucc.) Pilger) is an endangered, native and high value medicinal plant of the Indian Himalayan Region. The anti-cancerous property of the bark and leaves of this species has increased pressure on it to a great extent. Further, poor regeneration of seeds has enhanced the degree of threats on this species. This has necessitated studies on its population dynamics and also the formulation of management plan for its *in situ* and *ex situ* conservation. During the present study, its population status

and regeneration were examined in Kais Wildlife Sanctuary of Himachal Pradesh through standard ecological methods. The species was found in 25 sites, 3 habitats and 6 aspects, distributed between 2,500 -3,300m amsl. Maximum sites were dominated by *Abies pindrow* and *Quercus semecarpifolia* communities. The *Taxus baccata* subsp. *wallichiana* was best represented in shady moist habitats and West and Northwest aspects. Among the sites, density of *Taxus baccata* subsp. *wallichiana* ranged from 10.00-422.00 Ind ha<sup>-1</sup>; total basal area, 0.23-42.3m<sup>2</sup> ha<sup>-1</sup>; IVI, 5.51-106.7; sapling density, 40.00-60.00 Ind ha<sup>-1</sup> and seedling density, 15-110 Ind ha<sup>-1</sup>. Among the sites, richness of trees ranged from 2-11, shrubs, 1-21 and herbs, 16-56. Species diversity (H') for trees ranged from 0.27-2.17, seedlings, 0.10-1.68, saplings, 0.31-1.65, shrubs 0.70-2.87 and herbs, 2.82-3.86. It showed contagious distribution pattern across the sites. The density of saplings and seedlings is relatively poor indicating change in population dynamics in future. The continuous extraction of bark and leaves of this species from the wild may cause the extinction of species and loss of moisture and humus content of soil from the sites which may lead to soil erosion and finally habitat degradation. It has been observed that due to unplanned collection of the resources, ecology of the forests has been seriously affected. In addition, it can influence vegetation by altering its composition and structure. Based on the study, it can be concluded that the species is under severe threat in the study area due to over exploitation and poor regeneration. Frequent monitoring of the species is recommended to identify the underlying factors responsible for population depletion and development of future management plan.

**Key Words:** Population dynamics, Himalayan yew, Endangered, Kais wildlife sanctuary

**OP-49**

### **Proton Exchange Membrane for Fuel Cell Applications**

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Sulphonated poly (arylene ether ketone)-1 (SPEK-1) and sulphonated poly (arylene ether ketone)-2 (SPEK-2) membranes were synthesized by direct copolymerization method for fuel cell applications. The former copolymer was prepared by direct copolymerisation of 4, 4'-bis (4-hydroxyphenyl) valeric acid, dichlorobenzophenone and sulphonated naphthalene monomers. Whereas 4, 4'-bis (4-hydroxyphenyl) valeric acid, dichlorobenzophenone and sulphonated bisphenol-A were used as monomers for the synthesis of the later. The prepared copolymers were subsequently crosslinked with polyvinylalcohol to synthesize crosslinked membrane. These membranes were characterized by IR and NMR Techniques. The various PEM related properties such as water uptake, ion exchange capacity, proton conductivity and oxidative stability of the crosslinked membranes are also discussed in this article.

### Synthesis and Characterization of $\text{La}_{0.80}\text{Sr}_{0.20}\text{MnO}_3$ Cathode Material for Solid Oxide Fuel Cell

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SOFCs (solid oxide fuel cells) have been the subject of intensive research and development among various type of fuel cell around the world. The most abundant cathode material of SOFCs is  $\text{LaSrMnO}_3$ . Nanostructured LSM has been synthesised by following solid oxide reaction method. Material is ball milled by Zirconium oxide balls of size 0.8-1.0 mm for 6 hr. Material is calcined at 950<sup>o</sup>c for 10 hours. Then sintered at 1400<sup>o</sup>C for 10 hours. Rhombohedral structure with space group R-3c is observed with XRD. The crystalline size of the material is 53 nm. Morphology of the sample is studied by SEM. Density of the sample is 5.80 g/cm<sup>3</sup>.

### $\text{La}_{0.80}\text{Sr}_{0.20}\text{MnO}_3$ Cathode Material for Solid Oxide Fuel Cell

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Solid oxide fuel cells represent the most efficient way to generate electricity from a variety of fuels. LSM is one of the most essential cathode materials of SOFCs. In this study,  $\text{LaSrMnO}_3$  is synthesised by conventional solid state reaction method. For ball milling, zirconium oxide balls of size 0.8-1.0mm are used. Material is calcined at 950<sup>o</sup>c for 10 hours and sintered at 1150<sup>o</sup>c for 10 hours. As prepared sample were characterised by X-Ray powder diffraction (XRD) at room temperature. Rhombohedral structure with space group R-3c. The crystalline size of the material is 35 nm. The microstructure was characterised by SEM. Density of the sample is 5.80 g/cm<sup>3</sup>.

### Synthesis of $\text{La}_{0.7}\text{Sr}_{0.3}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_3$ Cathode Material for Solid Oxide Fuel Cell

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$\text{La}_{0.8}\text{Sr}_{0.2}\text{Co}_{0.5}\text{Fe}_{0.5}\text{O}_3$  is synthesized by conventional solid state reaction method. Zirconium oxide balls of size (2.0-2.5) mm are used for ball milling. Conventional furnace sintering processes. As-prepared samples are characterized by X-ray powder diffraction (XRD).  $\text{La}_{0.8}\text{Sr}_{0.2}\text{Co}_{0.5}\text{Fe}_{0.5}\text{O}_3$  powder exhibit single phase Cubic perovskite structure with Pm-3m

space group above 800<sup>0</sup> C. Crystalline size and density of conventionally sintered La<sub>0.8</sub>Sr<sub>0.2</sub>Co<sub>0.5</sub>Fe<sub>0.5</sub>O<sub>3</sub> pellets is 25 nm and 5.40 g/cm<sup>3</sup> respectively at 1150°C for 5 hrs. The microstructure was characterised by SEM.

**OP-53**

**Production of antimicrobial compounds by *Bacillus tequilensis***

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Antibiotics are secondary metabolites produced by various microorganisms. Till date various soil isolates have been identified for producing antibiotics but only few of them have been commercially exploited to treat human, plant and animal diseases. As the microorganisms become resistant after some time to a particular antibiotic, it is becoming necessary to find newer antibiotics to which the microorganism is sensitive. In the present study, a soil isolate was found to show antimicrobial activity against various pathogens. The isolate was identified as *Bacillus tequilensis* (*B. tequilensis*) by molecular techniques. The culture medium of isolate *B. tequilensis* was extracted. Agar well diffusion method was used for antimicrobial assay against *Escherichia coli* (MTCC-2961), *Enterococcus faecalis* (MTCC-439), *Staphylococcus aureus* (MTCC-3160), *Vibrio cholera* (MTCC-3906) and *Listeria monocytogenes* (MTCC-839). Further ethyl-acetate and chloroform were used to extract the compounds at different time intervals using different growth medium. The extracted compounds were found to be active against *Listeria monocytogenes*(MTCC-839) and *Staphylococcus aureus* (MTCC-3160) and zone of inhibition was measured. These compounds will be further purified by HPLC. Therefore, the present approach will provide us with a strain *B.tequilensis* that can be exploited for various newer antibiotic productions.

**OP-54**

**Comparative Molecular Modeling of Various Non Terpenoids Jhas Against Insect Pests**

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There is a need to develop a method for the control of economically destructive agricultural pests, such as lepidopteran insects. By tradition, pest management has involved the use of non-specific chemical pesticides and this practice has enabled insects to build up a resistance to low level concentrations. The introduction of a highly selective pest management system may allow for a decrease in the negative effects on non-specific targets, and also reduce environmental contamination. A more complete understanding of JHs basic physiological

function in insects may provide a means of insect control that is more specific for target organisms. JH is a hydrophobic molecule, its transport in the hemolymph to target cells or in the cell to nucleus needs specific binding proteins. JH regulation by JHBP is one area to understand the mechanism of action of this hormone. JH is a hydrophobic molecule and we are in a process to design JH Mimics with varied functionality using molecular modeling techniques.

**Keywords:** Insect pest, Juvenile Hormone, Juvenile Hormone Mimics, Juvenile Hormone Binding Proteins, Molecular Modeling

**OP-55**

**Effects of Bare root dip Treatments of Neem-based Formulations and *Trichoderma* spp. Against *Meloidogyne Incognita* infesting Tomato (*Solanum lycopersicum*)**

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An experiment was conducted to test the effect of bare root dip treatments in five neem-based formulations viz., econeem, nimbecidine, neem azal, neem gold and NSKE at 1.0 per cent concentration and two nematode parasitizing fungus, *Trichoderma viride* and *T. harzianum* on the growth of tomato, root galling and multiplication of *Meloidogyne incognita* (Kofoid & White) Chitw. Both, neem-based formulations and nematophagus fungi were applied as bare root treatments for two, four, six and eight hrs. Test nematophagus fungi improved plant status than neem-based formulations. However, reduction in root galling of tomato by dipping in *T. viride*, *T. harzianum*, NSKE, neem gold and econeem was equally significant. In general, dipping exposure of two hrs was as effective as compared to longer exposure periods.

**Keywords:** Bare root dip, Neem, Trichoderma, Meloidogyne incognita, Tomato

**OP-56**

**Population Ecology of *Podophyllum hexandrum* Royle, an Endangered Medicinal Plant**

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*Podophyllum hexandrum*, potent source of podophyllin is an endangered species of the Himalayan region. Roots of the species are medicinally valuable for which reason they are dug out in large quantities. Harvesting of roots in large quantities and poor sexual

reproduction has brought the species to the brink of extinction. Various strategies are being pursued to conserve the species and replenish impoverished habitats. These include *in-vivo* as well as *in-vitro* strategies. Although methodologies for both types of strategies have been perfected, actual gains made hitherto are in no way satisfactory. The paper reports observations made on the population ecology of the species in the high altitude Suru Valley. Performance of the species has been studied at 50 different sites that vary in various biotic and abiotic characteristics. The interaction between plants of *P. hexandrum* and the surrounding habitat has been studied in details. The results obtained have provided useful clues for use in strategizing *in-situ* conservation and rehabilitating the species in its natural habitats which have been greatly impoverished.

**Keywords:** *Podophyllum hexandrum*, Suru Valley, Population Ecology, High Altitude

**OP-57**

**Traditional Health Cure Practices Used by the People of Rural Areas of Hamirpur District of Himachal Pradesh in the Treatment of Asthma and Other Respiratory Disorders or Lungs Complaints**

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Respiration is the necessary process for all living organisms. Lung is the main essential organ in air-breathing animals including man. So, respiratory problems mainly related to lungs. Asthma is the main respiratory problem among peoples of the study region. The local peoples in the study area have great knowledge about the medicinal plants. The local people of this region have good faith on use of local plant based medicinal therapies for the treatment of various health problems. So, they still depend upon the local plants for the primary health care rather than other medical resources. The present work reveals the use of 36 plants belonging to 26 families, which are especially used to cure Asthma and other respiratory disorders or lung complaints.

**Keywords:** Asthma, Traditional knowledge, Respiratory disorders

**OP-58**

**Structural, Magnetic and Mössbauer study of Cu<sup>2+</sup> Substituted Mg-Mn Nanoferrites**

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Cu<sup>2+</sup> substituted Mg-Mn nanoferrites were processed via solution combustion technique. X-ray diffraction study confirmed the formation of single phase spinel structure. The crystallite size was calculated by using the Scherrer's formula. M-H study was carried out to obtain the information about the saturation magnetization ( $M_s$ ), coercivity ( $H_c$ ) and retentivity ( $M_r$ ).

The measurements of magnetization as a function of applied field, temperature and temperature in the zero field cool (ZFC) as well as field cool (FC) modes were carried out. Since, the Mössbauer spectroscopy is one of the important techniques which can measure the comparatively weak interactions between the nucleus and the surrounding electrons; therefore, in the present work we have carried out the Mössbauer spectroscopy.

**OP-59**

**Auxiliary Examination of Zinc Oxide Nanoparticles Coordinated by Solution Consuming Technique**

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Zinc oxide (ZnO) nanoparticles had been effectively combined by means of arrangement combustion technique. Zinc nitrate hexahydrate  $Zn(NO_3)_2 \cdot 6H_2O$  and glycine ( $NH_2CH_2COOH$ ) was utilized as an oxidant and fuel individually. These reactants were blended in stoichiometric proportion at calcination temperature  $400^\circ C$  for 4 hours keeping in mind the end goal to get fancy nanoparticles. The blended ZnO powder described by XRD. The crystalline size of ZnO nanoparticles were of the span of 17nm and precious stone structure has hexagonal wurtzite structure. Cross section parameter  $a=b=3.2386 \text{ \AA}$  and  $c=5.210 \text{ \AA}$  and  $c/a=1.6087$  with space group P63mc of the gem structure.

**OP-60**

**On the Principle of Exchange of Stabilities of Thermohaline Problem in Porous Medium with Variable Gravity Using Positive Operator**

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In the present paper, Thermohaline Problem with variable gravity in porous medium is analyzed and it is established by the method of positive operator of Weinberger and uses the positivity properties of Green's function that principle of exchange of stabilities is valid for this general problem, when  $g(z)$  is non-negative throughout the fluid layer and  $\Re \geq \Re_s$

**Keywords:** Thermohaline problem, Variable gravity, Principle of Exchange of Stabilities

## Study of Waves in Spherical Thermoelastic Curved Plates in Circumferential Direction of Transradially Isotropic

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The aim of this paper is to study the propagation of waves along circumferential direction in homogeneous, transversely isotropic thermoelastic rigidly fixed spherical curved plates. Different use of spherically curved plate like structures is like as pressure vessels, spherical domes of power plants etc. in addition to many other industrial applications. With the help of mathematical modeling the dispersion curves for transversely isotropic thermally conducting spherically elastic plates leads to coupled differential equations. The differential equations of motion and rigidly fixed boundary conditions on the inner and outer surfaces of a spherical curved plate are solved with the help of Matrix Frobenius method. For illustration of theoretical development, the problem solves numerically and presented graphically for a zinc plate.

## Characterization of Methylcellulose Extracted from Wheat Straw

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Methylcellulose was obtained from the straw of Wheat. Methylcellulose samples are manufactured by methylation, using iodomethane. The Methylcellulose samples produced were illustrated for their thermal properties, crystallinity and functional group in the chemical way. Modifications in functional groups, thermal properties and crystallinity of the Methylcellulose samples through different phases of characterization were clarify by FTIR, DSC & TGA, XRD and SEM examination respectively. FTIR spectrums specify continuous subtraction of non cellulosic materials. XRD spectrum be evidence for that the inaccessible Methylcellulose is crystalline in character. DSC & TGA spectra showed that the decrease the humidity of sample and lose and gain weight as a utility of temperature. Morphological analysis was conceded out via SEM. In this study to show that Methylcellulose harnessed economical potential from Wheat Straw.

**Keywords:** Wheat Straw, Methylcellulose, Characterization, FTIR, DSC, TGA, XRD, SEM, Crystallinity

**Water Quality Analysis of Satluj river at Bayal, Rampur Himachal Pradesh**Navendu Sharma<sup>1</sup>, Yogesh Kumar Walia<sup>2</sup><sup>1</sup>Department of Chemistry, Career Point University, Kota (Raj)<sup>2</sup>Department of Chemistry, Career Point University, Hamirpur (H.P.)*navendu928@gmail.com*

In present investigation analysis of water was done on river Satlujin Himachal Pradesh for the important physical and chemical water quality parameters during rainy season (during July, 2015 to October, 2015). Parameters such as turbidity, total alkalinity, pH, conductivity, magnesium hardness, biological oxygen demand (BOD), chemical oxygen demand (COD), dissolved carbon dioxide, total hardness, chloride, phosphate, nitrate and calcium were analyzed. All procedures for analysis were followed by standard methods for the examination of water & wastewater published in 22<sup>nd</sup> Edition, 2012 prepared and published by APHA. The analysis of data reveals that the values of pH, EC, total alkalinity, chloride, phosphate, total hardness, calcium, magnesium, sodium, COD, dissolved carbon dioxide values are within the permissible limits proposed by BIS, 2012 and WHO, 2011. The turbidity and BOD values are beyond the maximum permissible limits and can be attributed to addition of domestic sewages and agricultural wastes in the river etc.

**Keywords:** River Satluj, Water analysis, Turbidity, Rampur

**Toxicity Evaluation of Biosynthesized Nanoparticles with Special Reference to Impaired Diabetic Wounds**Pallavi Singh Chauhan<sup>1</sup>, Vikas Shrivastava<sup>1</sup>, GBKS Prasad<sup>2</sup>, Rajesh SinghTomar<sup>1</sup><sup>1</sup>Amity Institute of Biotechnology, Amity University Madhya Pradesh, India-474005<sup>2</sup>S.O.S. Biochemistry, Jiwaji University, India-474011

The present study is on synthesizing Silver nanoparticles by chemical as well bio-associated route and evaluation of their wound healing potential with special reference to toxicity. In this study, silver nanoparticles were synthesized by utilizing different reducing and capping agents. The synthesized nanoparticles were characterized by UV-Visible spectroscopy, FTIR, SEM and TEM, which substantiates the availability of nano silver with marginally spherical morphology. Further antibacterial activity of these synthesized silver nanoparticles was exploited in the treatment of impaired diabetic wounds in *wistar* rat models. In addition, the comparative evaluation of liver and kidney toxicity was carried out. The study showed efficient wound rejuvenating activity of silver nanoparticles as compared to pre-existing drug povidone-iodine which was carried out by comparing wound area and histology of skin tissue sections. Moreover the result of toxicity evaluation showed less toxicity in phyto-fabricated silver nanoparticles treated animals as compared to chemically synthesized silver nanoparticles, which may be due to the utilization of different capping and reducing agent during the synthesis process.

**Keywords:** Nanoparticles synthesis, Characterization, Antibacterial activity, Wound healing activity, Liver function test, Kidney function test, Histology

**Stem Cell Biology: Its Application in Clinical Medicine and Stem Cell Banking**Kanika Sharma<sup>1</sup>, Kusum Sharma<sup>2</sup><sup>1</sup>Indira Gandhi Medical College (IGMC) Shimla (H.P.)<sup>2</sup>GDC Sujampur, Tihra, Hamirpur (H.P.)*knksharma16@gmail.com, ksmsharma17@gmail.com*

Stem cell biology is a rapidly expanding field that explores the characteristics and possible clinical applications of a variety of stem cells that serve as the progenitors of more differentiated cell types. There are different types of stem cells including embryonic, fetal, umbilical, adult and induced pluripotent stem cells (iPSCs). Recent groundbreaking research has now demonstrated that differentiated cells of rodents and humans can be reprogrammed into pluripotent stem cells, similar to embryonic stem cells by transduction of genes encoding ESC transcription factors. These programmed cells are the future of therapeutic cloning. Many somatic cells have also been identified, which possess properties of self-renewal and differentiation. These are known as somatic or adult stem cells. These include bone marrow – hematopoietic stem cells and marrow stromal cells, liver – progenitor cells in canal of Hering, brain- neural stem cells, skin – hair follicle bulge and sebaceous glands and Limbal stem cells of Cornea to name a few. These have varied disease specific applications in humans. Apart from these above-mentioned which are still under study, we have come a long way where cord blood and dental stem cells are concerned. We now have specialized banks or storage units for cord blood and dental stem cells which can be stored under optimal conditions for prolonged periods of time and used in times of need by the individual himself or may even be donated. The method of stem cell collection in cord blood banking is a non-invasive one in which blood is collected immediately after delivery of the new born from the umbilical cord using a needle and saved frozen in specialized centers. Since, it is a new concept that has become popular in the last decade only, especially in developing countries another method has come up for stem cell isolation and storage. This includes collecting stem cells from milk teeth of children aged 6-12 years and the pulp of healthy wisdom teeth of adults more than 30 years of age. These are subjected to cryopreservation at temperature  $-156^{\circ}\text{C}$ . Stem cell therapies raise ethical and socially contentious issues pertaining to the belief that the embryonic stem cells are derived from blastocysts which is considered by some members of society as alive and using it for research and therapy as violation of right to life. The society has great diversity with respect to religious beliefs, concepts of individual rights, tolerance for uncertainty and risk and boundaries for how scientific interventions should be used to alter the outcome of disease.

**Strained Induced Properties on CaTiO<sub>3</sub>, a LDA+U Study**Rajendra Adhikari<sup>1</sup>, Upendra Adhikari<sup>2</sup><sup>1</sup>Kathmandu University, Department of Applied Physics, Dhulikhel Kavre, Nepal<sup>2</sup>Goldengate College, Tribhuvan University, Kathmandu, Nepal

In many of the experimental growth or fabrication process there is a chance of slight lattice mismatch, which introduces strain on the grown layers. Therefore, we study the effects of in plane strains on a prototype perovskite crystal CaTiO<sub>3</sub> using density functional theory.

Theory further modified by Hubbard Hamiltonian. Its structural properties, polarizations and phonons will be analyzed in reference to experimental and other theoretical data.

**OP-67**

### **Study of Thermal Decomposition of Ammonium Paratungstate**

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Thermal decomposition of ammonium paratungstate  $5[(\text{NH}_4)_2\text{O}]_{12}\text{WO}_3 \cdot 4\text{H}_2\text{O}$  has been studied by differential scanning calorimetry and thermogravimetry. The results suggest that the water is lost in two steps at the temperature region 318.7 to 441.3K, while anhydrous ammonium paratungstate is converted into  $\text{WO}_3$  in the next three steps in the temperature region 441.3 to 767K. The phases have been characterized by IR spectroscopy elemental analysis and X-ray diffractometry various kinetic equations have been applied to the isothermal DSC data to understand mechanism of the various decomposition steps. The isothermal data show that the dehydration process follows the Mampel's unimolecular law of random nucleation, the transition third follows the Avrami - Erofeev equation, fourth transition follows the diffusion controlled Ginstling – Brounshtein mechanism and the fifth transition obeys the linear law which is the rate determining step in this process.

**Keywords:** Ammonium paratungstate, DSC, kinetic parameters, TG

**OP-68**

### **Impact of Different types of Pollutions on Biodiversity**

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Any undesirable change which degrades the quality of various components of environment such as air, water and soil etc. due to addition of harmful substances is termed as pollution. This paper emphasizes the various effects of the release of different kinds of pollutant which is a source of various kinds of pollution on the biodiversity including flora and fauna. The release of any kind of pollutants into any type of environment kills the organism, changes the biogeochemical conditions and processes which results in the systematic changes that degrade the habitat and makes the ecological processes dysfunction. The most risk may be on the biodiversity related to human through downstream water pollution and air pollution. The major potential effects of pollutants on ecosystem are the distribution of species, interruption to energy and nutrient flows, modification of habitat, reduction in the soil, water and air quality and changes to the stability and resilience of eco system, All the types of pollution have an impact on living environment. This effect on living organism may range from mild discomfort to serious diseases such as cancer. The effect of air, water and soil pollution mainly seen on crops and other plants and mainly affects the animals by causing of various types of diseases and by delaying their reproductive activity. So usually pollution

effect is quite underestimated that more researches are needed to understand the condition between the pollution and its effect on all life forms.

**Keywords:** Biodiversity, Ecosystem, Pollution

**OP-69**

**Subaltern Study of Marginalized Experience in Amitav Ghosh's *Sea of Poppies***

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This paper entitled, "Subaltern Study of Marginalized Experience in Amitav Ghosh's *Sea of Poppies*" focuses on expressing the plights of the marginalized Indian society comprising different castes and religions which were exploited under British rule. Indian society was a dark world which contained marginalized victims coming from all sorts. The novel is set in one important segment of history and covers the timeframe of 1830s. The paper, as a whole, analyses the fretful norm of caste and gender oriented Indian society which compels Kalua and Deeti, representing the marginalized and exploited Indian society, to turn into girmitiyas (sold labourers) as one, for their common survival. In addition, the paper also highlights the drastic effects of compelled opium cultivation by the colonial rule and how it served to ruin Indian society in the name of "Free Trade" (115). The effects of this forced opium cultivation were so severe that Indian peasants fall easy victims to poverty. Not only the poor class but the nobility also was not able to save itself from the exceeding avarice of colonial rule. The paper provides ample evidences to prove how a wealthy zemindar Neel Rattan Halder failed to defend him from the horrible clutches of colonialism ultimately plummeting himself into a voiceless convict. The powerful portrayal of the subaltern world, made alive by Amitav Ghosh, in this novel is given an attempt to uncover the pains and pangs of the people caused by inhumane exploitation exercised by colonial rule.

**Keywords:** Marginalised, Caste System, Inhumanity, Superstition, Girmitiyas, Colonialism

**OP-70**

**An Assessment of a Unique Rainwater Harvesting System of District Hamirpur (HP)**

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Hamirpur is a hilly area in western shivaliks in Himachal Pradesh. Water is very scarce resource in Shivalik hills of Himachal Pradesh. It is very important for the survival of every human being but little attention is being paid for its conservation. Due to indiscriminate use of groundwater the water table is going down abnormally. Rainwater is the main source of water and if rainwater is harvested properly the water shortage problem can be eliminated to a large extent. Rainwater is free from organic matter and soft in nature. It is also bacteriologically pure. This is an ideal solution for a water problem, especially related to hilly areas where the ground water table is low and the surface sources are few and that too are found at a very low elevation in the valleys. The water has to be pumped to a high

elevation where the habitations are situated. The rainwater harvested from rooftops can be stored in a tank and can be used directly. Bhoranj area in Hamirpur district has adopted a unique system of rainwater harvesting from roof tops in a rock-cut underground reservoirs called 'Khatries.' The paper is based on the analysis of survey conducted for 30 rainwater harvesting structures in Bhoranj area of Hamirpur district in Shiwalik hilly region of Himachal Pradesh in India. The paper examines the population of household, size of structure, uses of rainwater, protection provided to the structure and other aspects.

**OP-71**

**Synthesis, Characterization and Biological Studies of Oxotitanium (IV) porphyrins with 2-Substituted Benzimidazole as Axial Ligand**

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A series of six co-ordinated oxotitanium(IV)porphyrins benzimidazole complexes were prepared by 'benzotrile' method followed by stirring with 2-methyl, 2-ethyl and 2-porphylbenzimidazole ligands at lowest possible temperature. The free base porphyrins and their axially ligated oxotitanium(IV)complexes containing benzimidazole ligands have been characterized and investigated by various spectroscopic techniques. The synthesised axially ligated porphyrin complexes have been subjected to thermogravimetric (TGA, magnetic moment and conductivity measurements. SEM, TEM, and EDAX was applied to unravel their external and internal morphology. The IR Spectra indicates the vibrational frequency band for Ti=O in oxotitanium(IV) in the range of 1040-950  $\text{cm}^{-1}$ . The metal-axial ligand vibrational peaks were observed in the range of 865-470  $\text{cm}^{-1}$ . The magnetic moment measurements agrees well with  $3d^0$  configuration for oxotitanium(IV). The complexes were tested for antibacterial, antifungal, anticancer and for acute oral toxicity in female swiss mice according to fixed dose procedure guide line 420. The studies shows that complexes possess good antibacterial, antifungal, anticancer and have low toxicity potential and high safety margins. SEM and TEM analysis shows that complexes under investigation have spherical hollow ice granular like shape of particles of size 200-500 nm. The axially ligated oxotitanium(IV) complexes are of 1:1 strichiometry and diamagnetic have octahedral stereochemistry around titanium(IV)ion.

**Keywords:** Oxotitanium (IV) benzimidazole, Low toxicity potential, High safety margin good biological activity

**OP-72**

**Ethnobotanical Survey for Wild Medicinal Plants of District Hamirpur, Himachal Pradesh, India**

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A survey was carried in district Hamirpur of Himachal Pradesh for documentation of important flora and information from local communities about their uses. Indigenous

knowledge of local and traditional uses was collected by personal interviews and questioner during field visits. People of both the genders and of different age groups were interviewed. Plants with their correct nomenclature were arranged by family name, vernacular name, part used, ethnomedicinal remedies and ethnomedicinal uses. Screening of data was done based on the book entitled 'Dictionary of Indian Folk Medicine and Ethnobotany' by Jain (1991) and available ethnobotanical literature. 17 wild plant species belonging to 16 genera and 16 families were used by local people for edible purposes. Plant having uses as medicine, ornamental, fodder etc, were studied. Aim of present work was to accumulate knowledge regarding ethnic uses of plants so that they can be used for modern formulation of drugs in Ayurveda and for food purposes.

**Keywords:** Ethnobotanical survey, Indigenous knowledge, Hamirpur, Himachal Pradesh

**OP-73**

### **Study of Antimicrobial Fatty Acids Isolated and Purified from Skin and Muscles**

#### **Homogenate of *Labeo Rohita***

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The omega-6 fatty acids (PUFA) were isolated from skin and muscles homogenate of fresh water fish commonly known as Rohu (*Labeo rohita*) in order to evaluate the antimicrobial properties if any. Crude extracts were obtained with ethyl acetate of the homogenized mixture after separation of protein. The chloroform-methanol layer (2:1) was placed into a glass tube. The total lipid fraction was obtained by evaporating the lower phase. The total lipids from the feed samples were extracted by soxhlet for 4 hours at condensation rate of 5-6 drops/ second, dry extract for 30 minutes at 100 °C cool. Total lipid contents were determined gravimetrically and stored at 4<sup>0</sup>C until analysis. The lipid fraction was separated and purified by thin layer chromatography (TLC) after changing the solvents. The silica gel was scrapped off having the pure isolates of the fatty acid molecules separated. There were 2 spots visualized from the lipid homogenate run on TLC plate. These molecules were scrapped off from TLC plate, centrifuged and at 100 µg/ml, these were screened against gram-positive bacteria, *Staphylococcus aureus*, *Micrococcus luteus* and *Bacillus subtilis*, and for the gram-negative bacteria, *Vibrio alginolyticus*, *Vibrio parahaemolyticus*, *Vibrio fluvialis*, *Pasteurella multocida*, *Aeromonas hydrophila*, *Escherichia coli*, and *Pseudomonas aeruginosa*. These molecules were found to have dominant activity against gram negative microbes in comparison to gram positive microbes. This study is a significant contribution to the knowledge of compounds unique from such edible fishes as potential sources of new drugs in the pharmacological industry.

**Keywords:** *Labeo rohita*, Fatty acids, Skin, Muscles, Homogenate, Antimicrobial property

### Temperature Dependent Acoustical Properties of 12-2-12 Gemini Surfactant in Aqueous Solutions of Carbohydrates (Fructose, Maltose and Raffinose)

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Surfactant-carbohydrate interactions of 12-2-12 Gemini Surfactant cationic surfactant, Ethanediy-1,2-bis(dimethyldodecylammonium bromide in aqueous solution of (0.00 and 0.10 mol.kg<sup>-1</sup>) carbohydrates (Fructose, Maltose And Raffinose) have been studied using density and speed of sound in the temperature range of 293.15–318.15 K at an interval of 5K. Density and speed of sound data have been used to derive various acoustical parameters such as intermolecular free length ( $L_f$ ), specific acoustic impedance ( $Z$ ) and sound velocity number ( $[U]$ ). These parameters have been found to yield reliable information regarding the structural consequences of Surfactant-carbohydrates interactions in aqueous solutions. The observed trends in these parameters may be accounted for strong solute–solvent and dipole–dipole interactions and suggests that structural readjustment in the solutions proceeds in the direction of less compressible phase or closer packing of molecules. This concludes that intermolecular interactions between components of the mixtures increase with carbohydrates concentrations. The internal pressure values as expected shows reverse trends of variations as compared to molar volume values. These results are due to different degree of various solute–solvent interactions in the ternary system.

**Keywords:** 12-2-12 Gemini Surfactant, Carbohydrates, Intermolecular free length( $L_f$ ), Specific acoustic impedance ( $Z$ ), Sound velocity number ( $[U]$ )

### Ultrasonic Studies on Alkyd Resins in Benzene

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Ultrasonic velocity and related parameters of solutions of synthesized alkyd resins (linseed oil modified and styrenated) in benzene at different temperatures have been evaluated in the concentration range 0.25-24% by weight, at 3MHz in order to understand the molecular interactions and to get information on structural aspects. Both the samples of alkyd resins showed polymer-solvent interactions at lower concentrations, while polymer-polymer type interactions dominated at higher concentrations. The process of network formation was found to be difficult and was possible at higher concentrations or temperatures due to hindered internal rotation of macromolecules.

**Keywords:** Benzene, Resin, Ultrasonic, Polymer-solvent Interaction

**A Review on Green Synthesis of Silver Nanoparticles using Various Medicinal Plants**

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Plants have been used from ancient times to cure for many diseases, as there is no or minimal side effects. Treatment with medicinal plants is considered very safe. In modern material science, nanotechnology is one of the most active areas of research. Green synthesis of nano-materials gets more attention towards the researchers day by day, because it does not involve any harmful effects and also it is cost effective and ecofriendly. In this research paper focus is on the green synthesis of Silver nanoparticles using various medicinal plants and characterization of the synthesized nanoparticles performed through X-ray diffraction analysis, Scanning Electron Microscopy, Transmission Electron Microscopy, Fourier Transform Infra Red Spectroscopy analysis.

**Keywords:** Silver nanoparticles, Medicinal Plants, XRD, SEM, TEM, FTIR

**A Review on the Doped and Co-doped CuO Nanoparticles Synthesis**Anu<sup>1</sup>, Jitender kumar<sup>2</sup>, Naveen Thakur<sup>1</sup>, Kuldeep Kumar<sup>3</sup><sup>1</sup>Department of Physics, Career Point University, Hamirpur (HP) INDIA<sup>2</sup>Government degree college, Shillai, Sirmour, Himachal Pradesh<sup>3</sup>Department of Chemistry, Career Point University, Hamirpur (HP) INDIA

In the recent few years, nanotechnology comes to the front with huge research on the metal oxide nanoparticles for broadening its multifunctionality. Researchers work on the synthesis of uniform shape and size NPs, modifying the nanoparticle structure to get the good results. Either by synthesizing pure metal, metal oxide, doped and co-doped metal oxide nanoparticles to study their applications. Copper oxide is an important p-type semiconductor and increasing attention because of its low cost, excellent reactivity, high stability and non-toxicity which help in industrial and commercial use of CuO nanoparticles, in cosmetic, sensing, medicine etc. In this research paper we have given a review on the doped and co-doped CuO nanoparticles synthesis and modification on structure and properties. Doped and Co-doped CuO NPs have been prepared by various chemical methods and characterized by UV (Ultraviolet-Visible spectroscopy), FTIR (Fourier Transform Infrared spectroscopy), SEM (Scanning electron microscopy), TEM (Transmission electron microscopy) and XRD (X-ray Diffraction).

**Deterministic Fractals**

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In this paper, it is shown that a collection  $\text{Comp}(X)$  of non – empty compact subsets of a metric space  $X$  itself becomes a metric space with respect to a metric defined suitably for the

purpose. If  $X$  is taken to be complete, then interestingly this space too turns out to be a complete metric space. In the process of proving this space to be complete, there comes a very strong and useful result which enables us to extend a Cauchy's subsequence of points of  $X$  to a Cauchy sequence in  $X$ . Definition of a contraction mapping on the space  $\text{Comp}(X)$  is also given. Since Banach's Contraction Mapping Principle ensures that a contraction map has a unique fixed point, a deterministic fractal is obtained.

**OP-79**

**Augmenting Crop Adaptability for Environmental Stress towards Sustainable  
Agriculture**

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Environmental stress including both biotic and abiotic stress are recognized as most challenging threats to the agriculture system which has a huge negative impact on crop productivity and crop yield globally. In the current scenario, such adverse incidences are recurring frequently due to both natural as well as anthropogenic activities globally. Therefore, to minimize the adverse effect of abiotic as well as biotic stress on crop production, yield and development of tolerance in potential crops there a strong need to evaluate and adopt the best combination of ecofriendly approaches toward sustainable agriculture. The principle component the success towards achieving the goal exists in adopting the scientific advancement along with integrated management practices such as development of varieties with more durable resistance towards biotic as well as abiotic stress through traits modification following biotechnological approaches. In the recent years nanobiotechnology is an emerging as a new approach which exploits the unique properties of material at nanoscale, which makes the suitable candidate for design and development of novel tools in support of sustainable agriculture which offers controlled release of nutrients, pesticides, herbicides i.e. Nanofertilizers, Nanopesticides, Nanoherbicides, Nanozeolites etc. Parallel to crop improvement strategies emphasis should be given on the development integrated management practices like efficient nutrient management, integrative pest management and efficient utilization of water and soil resources, soil management strategies to enhance diversity in soil. Applications of PGPR have also shown potential benefits in this direction. Therefore, continuous research and identification of new area is required to address technological challenges and yield barrier by adopting resource use efficiency and design and development of environmentally accepted technology.

**Keywords:** Sustainable agriculture, Abiotic stress, Crop improvement, Biotic stress, Nano technologies

## Copper Oxide Thin Films for Optoelectronic Applications

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Copper oxide is a semiconductor that has been studied for several reasons such as the natural abundance of starting material copper (Cu); the easiness of production by Cu oxidation; their non-toxic nature and the reasonably good electrical and optical properties. Copper oxide is well-known as cuprite oxide. The cuprite is p-type semiconductors having band gap energy of 1.21 to 1.51 eV. As a p-type semiconductor, conduction arises from the presence of holes in the valence band (VB) due to doping/annealing. CuO is attractive as a selective solar absorber since it has high solar absorbency and a low thermal emittance. CuO is very promising candidate for solar cell applications as it is a suitable material for photovoltaic energy conversion. The current potential application areas of copper oxide thin films include solar cells and electro chromic devices. Copper oxide films have been reported to have band gap energy values, which make them suitable for application as windows for solar energy conversion. Literature review suggests potential applications of CuO thin films in optoelectronic applications. In this paper the review based on CuO thin films will be presented.

## Derivation of Equation of Phase Dynamics in a Stack Long Josephson Junctions with Multi-gap Superconductors

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In the present work, we study the phase dynamics of long Josephson junction (LJJ) with stack of multi-gap superconductors like iron pnictides, MgB<sub>2</sub>, etc. This is an extension of the Ambegaoker-Baratoff relation for a Josephson junction of single gap superconductor to the stack of multi-gap junctions. The starting point of our derivation is to develop the quantum mechanical Hamiltonian of the system and then to write the corresponding partition function. The partition function is further simplified through the phenomenological procedure followed by Hubbard-Stratonovich transformation, Grassmann integration, saddle-point approximation. We then obtain the action functional which is further simplified using Goldstone mode. Finally the equation for phase dynamics can be derived using Euler-Lagrange equation of motion. Our generalized theoretical result compared to other's for one- and two-gap junctions and is found to be close agreement to each other.

**Surface Tension, Viscosity and Refractive Index of Sodium Dodecyl Sulfate (SDS) in Aqueous Solution Containing Polyethylene Glycol (PEG), Polyvinyl Pyrrolidone (PVP) and their Blends**

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Taken into consideration the importance of polymer-surfactant system, in present manuscript we have discussed the intermolecular interactions present in solution containing sodium dodecyl sulfate (SDS) in six different solvent concentrations of polymer and their mixtures in their mass ratio (1g PEG ( $m_1$ ), 0.8:0.2 PEG/PVP ( $m_2$ ), 0.6:0.4 PEG/PVP ( $m_3$ ), 0.4:0.6 PEG/PVP ( $m_4$ ), 0.2:0.8 PEG/PVP ( $m_5$ ) and 1g PVP ( $m_6$ ) in 100 ml of distilled water) having molal concentration correspond to  $1.66 \text{ mmol}\cdot\text{kg}^{-1}$ ,  $1.38 \text{ mmol}\cdot\text{kg}^{-1}$ ,  $1.10 \text{ mmol}\cdot\text{kg}^{-1}$ ,  $0.81 \text{ mmol}\cdot\text{kg}^{-1}$ ,  $0.53 \text{ mmol}\cdot\text{kg}^{-1}$  and  $0.25 \text{ mmol}\cdot\text{kg}^{-1}$ , respectively. It suffices to mention here that the concentration (molality) corresponds to the total polymer content in the solution. All the measurements were carried out at three different temperatures, i.e. 293.15, 303.15 and 313.15 K. The whole experiment was carried out with techniques like surface tension, viscosity and refractive index measurements. Different parameters of relevance like surface excess ( $\Gamma_{\text{max}}$ ), minimum area per molecule at air-water interface ( $A_{\text{min}}$ ), relative viscosity ( $\eta_r$ ), viscous relaxation time ( $\tau$ ) and limiting dielectric constant ( $\epsilon_{\infty}$ ) etc. have been evaluated from surface tension, viscosity and refractive index measurements. This persistence of the surface tension ( $\gamma$ ) beyond the critical micelle concentration (CMC) appears to suggest that the aggregate formation in the presence of the PEG or PVP or their blends is sufficiently large. The close approximated value of relative viscosity to the unity implies that the conformational changes in the polymer are minimal. The refractive index measurements further reveal that overall polarizability of the studied systems increases with an increase in the amount of polymer in the solution.

**Keywords:** Polymers, Refractive index, SDS, Surface tension, Viscosity

**Experimental Study of Polymers Surface Modification by Atmospheric Pressure Argon/Oxygen Plasma Jet**

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Atmospheric pressure plasma jets have been established as suitable sources of low-temperature and non-equilibrium plasmas. In this paper, an atmospheric pressure plasma jet sustained in oxygen/argon mixture has been used to modify the surface properties of Polyethyleneterephthalate (PET) and Polypropylene (PP). The surface properties of the

untreated and plasma treated PET and PP samples were characterized by using a ramhart contact angle goniometer. Two different test liquids distilled water and glycerol was used and the surface energy of the PET and PP samples were determined by Owen wendt kadble method. The effect of frequency of applied voltage, the distance between sample and nozzle, and treatment time was investigated. Result showed that the water contact angle on PET and PP reduces from 77.0 and 85.2° of control sample to 25.0 and 40.0 after 120s of plasma exposure. Moreover, it was found that, the best plasma treatment can be obtained with applying 27 kHz frequency of the source and a distance of 3.5 cm between PET/PP samples and nozzle of the jet. Chemical modifications of the PET and PP surfaces were investigated with Attenuated Total Reflectance Fourier Transform Infrared (ATR/FTIR) spectroscopy. FTIR analysis of the plasma-treated PET/ PP films showed that plasma treatment introduces hydrophilic functional groups on polymer surface. Thus APPJ in oxygen/argon can effectively modify the surface property of the polymers leading to enhance hydrophilicity.

**Keywords:** Plasma jet, Contact angle, Surface energy, ATR/FTIR

**PP-05**

### **A Study on Circumferential Vibrations of Thermoelastic Curved Plates**

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In this paper the spherical curved plate is assumed to be stress free in equilibrium state. The ordinary differential equations have been obtained by reducing partial differential equations using time harmonics vibrations. The coupled system of equations which depend upon temperature is taken for spheroidal vibrations. Matrix Fröbenius method of series solution has been applied in the coupled system of ordinary differential equations to obtain displacements, stresses and temperature. The uncoupled equation which is independent of temperature is taken for toroidal vibrations. The convergence analysis has been applied which shows that the series can be differentiated term by term and being analytic in nature. The secular equations have been obtained by applying assumed boundary conditions. To represent numerical results the fixed point iteration numerical technique has been implemented to obtain eigen field quantities with the help of MATLAB software tools. Numerical results have been presented graphically for lowest frequency, dissipation factor.

**Keywords:** Matrix Fröbenius Method, Time harmonics, Toroidal, Spheroidal, Lowest frequency, Dissipation factor

**Plant Growth Regulators Mediated Consequences in Morphology and Biomass of  
Fagopyrum esculentum Moench of Himalayan Region**

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Fagopyrum esculentum Moench (Buckwheat) is the most important and nutritious staple food crop of mountain regions having high nutritive and pharmaceutical value. It is major dietary source of rutin as well as a minor source of other flavonoids such as quercetin, myricetin, hyperoside (quercetin 3-O- $\beta$ -D-galactoside), quercitrin (quercetin 3-O- $\alpha$ -L-rhamnoside), epicatechin and flavones C-glucosides. It is known for its medicinal uses like antioedema effect, reduces the risk of arteriosclerosis, antioxidant activity, gluten-free diets for people suffering from coeliac disease etc. A pot experiment was conducted in the natural conditions of net house of the Department of Botany, Shoolini University, Solan (HP), India, to evaluate the effect of exogenous application of plant growth regulators on morphological parameters of plant. Four major hormones IAA, BAP, ABA and GA was used solely as well as in combination in concentration of 25, 50 and 100 ppm through foliar spray. The study revealed that that IAA+BAP combination was effective in generation of multiple branches, leaf number, inflorescence number, root length, leaf surface area and shoot dry weight. IAA+GA was effective in root fresh weight, root dry weight, shoot fresh weight, shoot dry weight, inflorescence no, stem diameter, leaf surface area, shoot length, root length, no of branches and internodal length. BAP alone significantly increased leaf no and no of branches. BAP+GA combination resulted highest value of internodal length, root fresh weight, shoot fresh weight and shoot length of plant. Combination of ABA+BAP and BAP+GA showed maximum no of nodes. Maximum leaf relative water content was found in plants treated with ABA+GA and IAA+BAP.

**Keywords:** Buckwheat, Staple food, Rutin, Growth regulators

**Design and Thermal Analysis of Pine Needle Charcoal Briquette**

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The work represented in this paper focuses on the design aspect of the pine needle charcoal briquette. Different types of briquette samples are manufactured based upon their composition, ratio of the constituents and the physical structure. The samples are compared upon various parameters by performing various tests. The briquette, having clay as the binder and the ratio six to four of pine char with the clay, is taking the least ignition time. The briquette, having cow dung as the binder with ratio four to six with the pine char and having nineteen holes, is having the longest life among all the considered types of the briquettes. The specific fuel consumption is the best for the briquette with cow dung as binder with the ratio three to seven of the pine char and having thirty three holes. The

briquette, with nineteen holes and having clay as the binder in the ratio three to seven with the pine char, takes the least time to boil the water and the briquette, with nineteen holes and having clay as the binder in the ratio four to six, takes the longest time to boil the water.

**Keywords:** Pine needle, Briquette, Binder, Ignition, Specific fuel consumption

**PP-08**

**Study of Antioxidant Activities of Stem and Leaves of *Lantana Camara***

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Medicinal plants are gaining global attention owing to the fact that the herbal drugs are cost effective, easily available and with negligible side effects. The beneficial effects of the medicinal plants in health care can be well judged from the WHO estimate that around 80% of the world population uses them in some form or the other. It is important to note that homeopathy and modern medicine have their roots in medicinal plants. The compounds derived from medicinal plants form the ingredients of analgesics, antibiotics, heart drugs, laxatives, anti-cancer agents, ulcer treatments, contraceptives, diuretics etc. Compounds from plants are referred as plant secondary metabolites, phytochemicals, anti-nutritional factors, plant xenobiotics etc. *Lantana camara* is considered a problem weed in many parts of India in which it has been introduced (Iyengar, 1933). Due to its prolific nature of flowering and dispersal, the species tends to alter the structure of the terrestrial ecosystem by gregarious presence. *Lantana camara* become the understorey species in disturbed native forest thus dominating the flora, causing disruption in succession and loss in biodiversity. The allelopathic activities of plant tend to reduce the vigor of other species in its proximity. In addition to its impact on grazing lands, *Lantana camara* often causes a reduction in yield or impedes harvesting in plantations. In the present study, the antioxidant activities of leaves and stems of *Lantana camara* were studied by in vitro conventional methods. It was found that, leaves were having potent antioxidant activity in comparison to stems when determined by TPC, superoxide anion radical scavenging activity, DPPH free radical scavenging activity etc.

**Keywords:** Antioxidant activity, *Lantana camara*, Leaves, Stems, Conventional methods

**Ethno-Medicinal Uses of Some Plants of Suratgarh Tehsil, Sri Ganganagar  
(Rajasthan)**

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Rajasthan is large state act as a good hot spot for the growth ethno- medicinal plants. This region having variation in geology, physiographic, climatic, edaphic and basic conditions and shows the diversity of ethno- medicinal plants which grows in the wide range of habitat. Rajasthan includes 12.44% of tribal population of tribal population the major tribes of Rajasthan are: Kaibelia, Nats, Raika, Bhil, Garasia, and Saharia. Meena, Damor, Kathodi, Patelia, Kanjar, Gardalia lauhar etc. In this study, an ethno-botanical survey of the plant diversity is carried out in the different remote areas of Suratgarh tehsil i.e. Manaksar, Piplan, Rampura and Bhagwansar in Sri Ganganagar district, Rajasthan. The study mainly emphasizes traditional uses of some herbal plants of study area which are used for the treatment of various diseases and health problems. The information is carried out about the uses of herbal plants for primary health care and the treatment of various health disorders through the personal contact and personal interview of rural old people of study area. This study mainly focuses on keeping the record of the herbal potential possessed by the cultivated plants in this area and their sustainability for the welfare of human race.

**Keywords:** Ethno-medicinal, Primary healthcare, Sustainability, Suratgarh

**Role of Information and Communication Technology in Teaching of Biological Science**

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Information and communication technology has changed the global scenario of education and teaching learning process. There is no any type of human activity which is not influenced by ICT. The process of education got revolutionized because of the incorporation of ICT into its sphere. ICT becomes indispensable and inseparable part of education and teaching-learning activities. The teaching of biology can be integrated with ICT for giving the demonstration about various practical aspects of biological sciences, illustration about various phenomenons of biological sciences, providing various demonstrations about experiments of biology and about the utility of various types of biological resources. There are various kinds of ICT tool such as different kinds of software and CD-ROM which provides knowledge about various topic and concepts of biological science by using computer technology computer technology plays importantrole in screening the potential drugs for growth and development of life.Computer technology is now days very helpful to create three dimensional computer images of molecule of animals and plant cell testing. The digital desktops which is part of ICT and which is helpful for teaching various concepts of biological science because these desktops can handle large quintiles of data and digital

information. This paper mainly emphasizes to explain the basic concepts of ICT which are important for teaching of biological science. This paper also laid stress on the use of different type of ICT resources and data bases for teaching biological science and to create scientific attitude and personality development among the students.

**Keywords:** Biological science, ICT, Personality development

**PP-11**

### **Role of Biotechnology in the Conservation of Plant Genetic Resources**

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Biotechnology has brought a revolution in the way of utilization of plant genetic resource. No longer, the breeder has to seek the genetic resources to provide information about the target genotypes among the closet relatives. Due to advancement in biotechnology, new opportunities have been generated for utilization and conservation of genetic resources.

Biotechnology has application in utilization of plant genetic resources through mass propagation, invitro conservation, genetic manipulation and safe distribution of germplasm. *Invitro* conservation is particularly valuable for crop that produces recalcitrant seeds and those that are clonally propagated. And other techniques for conservation of plant genetic resources include seedbank, pollen bank, DNA banks, test tube gene banks and inside conservation. Inside conservation means conservation of plant genetic resources with in natural habitat. Inside conservation technique include – National bank, wild life sanctuaries, Biosphere reserve, reserve, sacred grooves etc. Thus, Biotechnology plays very much important role in conservation of plant genetic resources for longer time for future generation.

**Keywords:** Germplasm, Invitro- conservation, Plant genetic resource

**PP-12**

### **Documentation of Traditional Knowledge of Medicinal Plants of Fabaceae Family of Hamirpur District (H.P.)**

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Himachal Pradesh is beautiful state due to their scenic beauty and their mountains and hills. These hills are full of forest with floristic plant diversity. Due to the favorable climatic conditions, this region act as a good reservoir for the growth of herbal plants and other plants of ethnobotanical importance which are belonging to different families. Among all families of angiosperms. The most dominant family which is found in this region is Fabaceae family. This family is considered as the largest family of the angiosperms. This family is characterized by the presence of polypetalous condition, monocarpellary condition and

marginal placentation. The rural people this state yet has good faith on plants based folk remedies for the treatment of various health problems. So, they use different parts of plants and their products in the form of herbal folk remedies for the primary health care. This paper mainly emphasizes the uses of some plants of Fabaceae family of angiosperms for alleviating different kind of health-related problems or diseases due to their herbal potential

**Keywords:** Angiosperms, Ethnobotanical, Folk remedies, Herbal potential

**PP-13**

**To Analyze the Physio-Chemical Properties of Soil Sample of Hanumangarhof  
Rajasthan**

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The soil is uppermost layer of earth crust and soil is an important ecological factor in the biosphere. This affects the productivity of whole ecosystem by providing the supply of water and nutrients to the living resources of our planet. Soil is rich in organic matter and minerals. The decay of organic matter releases the Nitrogen, Phosphorus and other nutrients which are available from soil to plant for their growth. The physiochemical properties of soil related to fertility and uptake of radioactivity. The chemical properties of soil show the nature of soil. The important parameter is pH which measures the acidity and basicity of the soil. Sodium content determines the salinity of the soil and potassium is essential nutrient for the plant growth. Calcium and Magnesium significantly increase the plant nutrients and give more leaf biomass. This paper emphasizes the evaluation of soil quality in this region in terms of pH, electronic conductivity, water holding capacity and availability of organic Carbon, Zinc, Copper, Manganese, Potassium and Phosphorus. This study helps to aware the people and farmer of this region towards the quality of soil which will be helpful for them.

**Keywords:** Organic matter, Physico-chemical, Soil productivity

**PP-14**

**Radon Gas in Soil and Underground Water and its Geological Co-Relation: A Case  
Study of Transverse Dehar Lineament**

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Satellite data has been used to generate the lineament map of Jawali and its adjoining area of Kangra district, Himachal Pradesh. LR-115 solid state nuclear track detectors have been used for the measurement of soil gas radon at different locations of the study area. Radon monitoring in underground water at different locations of the study area has been carried by scintillometry. The results indicate zones of lineament density and tectonically induced

radon in soil and underground water .The results are co-relatable with regional geology of the area. Lineament trends observed in the study area conforms to the Main Boundary Thrust passing through the adjoining Dharamsala region and comprises an important tectonic plane of the region namely Jawalamukhi Thrust. The region along Dehar lineament and Jawalamukhi Thrust including the Masatgarh region is tectonically more active. The results support the presence of north-south transverse Dehar lineament which cut across varied lithounits including sandstone, conglomerates, sand rocks, alluvium and other recent deposits.

**PP-15**

### **Impacts of Plastics Pollution on Human Health and Environment**

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Due to the use of chemical additives during plastic production, plastics have potentially harmful effects that could prove to be carcinogenic or promote endocrine disruption. Through bio-monitoring, chemicals in plastics such as BPA and phthalates have been identified in the human population. Humans can be exposed to various levels of these harmful chemicals. Also the level of exposure varies depending on age and geography. Exposure to chemicals such as BPA has been correlated with disruptions in fertility, reproduction, sexual maturation at early stage and other health effects. This paper is concerned with the impacts of plastics on environment and human health and what all may be done to reduce our dependence on the plastics and how changes at various levels can reduce plastic exposure and usagewhich in turn would be beneficial to the mankind in long run.

**PP-16**

### **Isothermal Analysis of the Cylindrical Textured Hydrodynamic Parallel Plates**

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The performance of finite parallel plates having cylindrical textures is investigated numerically. Deriving a Reynolds equation for textured parallel plate is necessary for the assessment of static characteristics in terms of load of a lubricating system by using finite difference method (FDM) with central differencing scheme. It has been observed that the textured stationary plate (bottom) carry the load carrying capacity of the smooth moving plate (upper) due to the generation of lubricating pressures. It has been also found that the load carrying capacity of textured parallel plate increases with the increment of the number of textures in z direction. However, the fruitfulness of texturing deteriorated in the x-direction after certain point.

**Keywords:** Cylindrical surface textures, Finite Difference Method, Isothermal analysis, lubricant pressure, Load, Reynolds equation

## The Effect of Spherical Surface Textures on the Performance of Inclined Slider Bearings

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The present study investigates the effect of spherical textures at different positions (full textures & Partial textures) on the performance characteristic of finite slider bearings. The Reynolds equation is numerically solved using finite difference method. The performance of inclined slider bearings in terms of percentage change in friction coefficient calculated for two different cases (Constant Convergence ratio & Load carrying capacity). It is concluded that the partial surface texturing (PT-I) gives the fruitful results as compared with different textures position (FT & PT-II) and smooth surface for first case. However, in the case of constant load, the full and partial texturing II shows fruitful results compare with other cases.

**Keywords:** Central differencing scheme, Friction coefficient, Hydrodynamic slider bearing, Isothermal analysis, Spherical surface textures

## Ionospheric Scintillation Variation with Geomagnetic Conditions Using GPS

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A rapid fluctuation of radio-frequency signal in phase and amplitude, generated by passing the signal through the ionosphere is Ionospheric scintillation. Scintillation occurs when a radio frequency signal in the form of a plane wave traverses a region of small scale irregularities in electron density. In the present paper Scintillation has been monitored by analysing the data obtained during 1<sup>st</sup> January, 2015 to 31<sup>st</sup> December, 2015 by employing GPS receiver at Department of Physics Sri Sai University Palampur Himachal Pradesh at Geographic location with latitude and longitude (32.11degrees N, 76.53 degrees E. Since Palampur is least explored area in ionospheric research, so in this paper we had tried to show the variation of ionospheric scintillation. According to analysis it is found that at mid latitude on 7<sup>th</sup> January maximum variation in scintillation ~0.6 at 9:57 UTC. In recovery phase there is no variation in Dst and Kp similarly no variation in scintillation. On 17<sup>th</sup> March maximum variation in scintillation was ~0.42 at 6:11 UTC. On 23<sup>rd</sup> June maximum variation in scintillation was ~0.27 at 6:41 UTC. In recovery phase there is no variation in Dst and Kp similarly no variation in scintillation. On 27<sup>th</sup> August the maximum variation in scintillation was ~0.21 at 20:00 UTC. In recovery phase there is no variation in Dst and Kp similarly no variation in scintillation. On 7<sup>th</sup> October maximum variation was in scintillation ~0.20 at 11:53 UTC. On 7<sup>th</sup> November maximum variation in scintillation was ~0.23 at 15:02 UTC and on 20<sup>th</sup> December maximum variation was in scintillation ~0.28 at

18:25 UTC. These results show the scintillation behavior is varies according to the global geomagnetic parameters Kp and Dst indices.

**Keywords:** Ionospheric scintillation, Dst, Kp, Radio signals

**PP-19**

### **Drought Stress Responses in Clitoria Ternatea**

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Drought stress is a one of the most important environmental stresses that effect the development and production of the plants. The objective of present study was to evaluate the impact of drought stress on seed germination of *Clitoria ternatea*, (Butterfly Pea) which is a medicinal plant. Drought stress was induced by PEG-6000 (Polyethylene glycol). Different concentrations of PEG-6000 (1%, 5%, 10%, 15%, 20%, 25% and 30%) were used. It was observed that germination percentage increased at lower concentration of PEG-6000 i.e. at 1% and decreased with increase in the concentration of PEG-6000 (5%, 10%, 20%, 25% and 30%) as compared to control.

**Keywords:** Clitoria ternatea, PEG-6000, Seed germination

**PP-20**

### **Environmental Pollution and its Impact on Biodiversity**

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Pollution involves introduction of undesirable and harmful material or radiations in an eco system. Most of these pollutants adversely affect the biotic community and eliminate the weak and susceptible species. More damage is done by the substances which persist in toxic state for long duration. These include a variety of pesticides, crude petroleum, toxic trace elements and number of other chemicals. Even very small concentration of these persistent pollutants may cause irreparable damage to eco system Enormous quantities of gaseous pollutants are finally brought down to earth with rain to cause slow but extensive damage to plants and animal life. For example only few plants survive around nickel smelters in Sudbery, USA. With in a period 40 years, smelters at Trail, British Columbia, killed nearly all conifers within area of 20 kms Such dead zones are still being created all around the world, taking a heavy toll of plant and animal life. Hence to control pollution is the need of hour so that biodiversity in eco system could be maintained.

**Role of Osmolytes in Improving Water-Deficit Stress Tolerance in Echinacea  
Purpurea: An Important Himalayan Medicinal Plant**

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Water-deficit stress is one of the prime abiotic stresses in the world including salinity, drought, heat/cold, light and other hostile conditions leads to the production of reactive oxygen species (ROS). ROS stimulate active signaling compounds capable of triggering production of bioactive compounds (secondary metabolites) that enhances the medicinal value of the plant. *Echinacea purpurea* L., a medicinal plant, was selected in the present study. The plant was subjected to abiotic stress, namely, water-deficit (1%, 2.5%, 5%, 7.5% and 10% PEG) and osmolytes proline and glycinebetaine (50ppm and 100ppm) in order to see their impact on morphological, physiological, biochemical parameters on *E. purpurea*. The study revealed that water-deficit stress causes a significant decrease in seed germination, shoot length, root length, plant height and fresh weight under all the concentration of PEG treatments. Osmolytes play a significant role to increases relative water content at lower concentrations but showed a decrease at higher concentration. Constitutive activities of CAT, POD, MDA, and total phenol showed an enhancement due to stress and osmolytes. Overall results showed that the osmolytes play a significant role on physiological and biochemical consequences of *E. purpurea* under water-deficit stress.

**Keywords:** Abiotic Stress, Medicinal Plants, Antioxidant, Osmolytes, *Echinacea purpurea*

**Surface Modification of Polymer by 50 Hz DBD at Atmospheric and Near Atmospheric  
Pressure**

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The industrial application of the dielectric barrier discharge (DBD) has a long tradition. However, the lack of understanding of some of its fundamental issues, such as the stochastic behaviors, is still a challenge for DBD researchers. In this project, considerable efforts to understand the fundamental aspects of DBD have been made. The work was carried out at line frequency and reduced atmospheric pressure. The main aim of this work is to study the electrical characteristics of DBD at nearly atmospheric pressure to determine a suitable condition for utilization of the device for several applications. Different diagnostic tools such as high-voltage probe, resistive current, charge measurement, and high-speed camera imaging will be employed for the investigation. However, the contact angle and surface free energy measurement was done for determination of hydrophilicity/hydrophobicity of

polypropylene polymer and it was found that the contact angle decreases with the increase in treatment time.

**PP-23**

### **Experimental Study of Hydrophilicity of Polypropylene Film by Atmospheric Pressure Argon/Oxygen Plasma Jet Treatment**

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An atmospheric pressure argon/oxygen mixture plasma jet was generated by using high voltage in the range of (0-20)kV and frequency in the range (0-30)kHz power supply. The plasma obtained was characterized by Electrical and optical methods. Surface modification of polypropylene film by atmospheric pressure Argon/oxygen plasma jet was studied for technical applications. The effects of argon/oxygen plasma treatments on the surface properties of polypropylene films were investigated in terms of Fourier-transform infrared (FTIR) spectroscopy, scanning electron microscope (SEM), atomic force microscopy (AFM), and contact angle measurements. Contact angles with water and glycerol were used to determine the surface free energy of the sample. The surface free energy value of untreated Polypropylene film was 27.8mJ/m<sup>2</sup> and increased to 52.5 mJ/m<sup>2</sup> after 1 minutes of argon/oxygen plasma treatment. The results show a considerable improvement in surface wettability by exposure times as observed by a remarkable decrease in contact angle values. SEM and AFM images indicated that the surface roughness significantly increases after the treatment. This experiment further shows that C=O bond is the key factor to the improvement of the hydrophilicity of polypropylene surface.

**Keywords:** Polypropylene, Wettability, SEM, AFM, FTIR and Contact Angle

**PP-24**

### **RGO-Ag Nanocomposite as Active SERS Substrate**

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Graphene, the wonder 2-D allotrope of carbon has good potential as substrate for Surface Enhanced Raman Spectroscopy (SERS). Though, the metal nanoparticles had already proved their potential as an SERS substrate but the fluorescence observed while using dye molecules as SERS probe is a major obstacle in their way. But the fluorescence quenching property of graphene comes as natural solution for this problem. In the present study, reduced graphene oxide (rGO)-Ag nanocomposites were synthesized and characterized by Transmission Electron Microscopy (TEM) and UV-Visible spectroscopy. The samples for SERS substrate were prepared using simple drop cast method on clean glass substrate. Such

a simple preparation of rGO as active SERS substrate is the strength of our technique. This technique is fast, cost effective and suitable for large scale synthesis.

**Keywords:** Reduced Graphene Oxide (RGO), RGO-Ag nanocomposite, Transmission Electron Microscopy (TEM), UV-Visible spectroscopy, SERS substrate

**PP-25**

### **Photoluminescence of P3HT-Graphene Composites**

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P3HT (Poly3-hexyl thiophene) is one of the most attractive conjugate polymer used in organic photovoltaic because of high electrical conductivity and good solubility in various solvents. Unlike CNTs based composites, graphene based composites have been proven as promising material for efficient device performance. But still practical use of the composite material for photovoltaic has been hampered due to drawbacks related to the exciton dissociation at the interfaces. Using interface engineering performance of device can be improved. Here we focus on photoluminescence (PL) properties of P3HT and P3HT-Graphene composite. P3HT and P3HT-Graphene composite were excited at 420 and 480 nm wavelengths and it was found that PL of P3HT-Graphene composite is effectively reduced from that of pure P3HT. Thus quenching of PL emission of P3HT shows that graphene can be considered as an efficient electron acceptor for organic photovoltaic applications.

**Keyword:** P3HT, P3HT-Graphene composite, Photoluminescence, Exciton, Quenching

**PP-26**

### **Effect of Aqueous Amino Acids on Micellization of Anionic and Cationic Surfactants at Different Temperatures: Conductometric and Tensiometric Approach**

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Two different surfactants have been investigated to find the effect of presence of different amino acids on their CMCs in aqueous solutions. Conductivities of anionic surfactant, sodium dodecyl sulfate (SDS) and cationic surfactant, cetyltrimethylammonium bromide (CTAB) have been determined in pure water and in presence of 0.05 M aqueous amino acids, L-glycine, L-alanine, L-valine and L-leucine at 298.15, 303.15, 308.15, and 313.15 K. From the specific conductivity data, the critical micellar concentration (CMC), degree of counterion dissociation ( $\alpha$ ), standard free energy of micellization ( $\Delta G_m^\circ$ ), standard enthalpy of micellization ( $\Delta H_m^\circ$ ), and standard entropy of micellization ( $\Delta S_m^\circ$ ) of SDS and CTAB have been computed. The CMC values have been increasing with rise in temperature. The CMC values of SDS and CTAB in presence of all above mentioned amino

acids have also been calculated from surface tension measurements were found to be in good agreement with the results obtained from conductance measurements. The excess surface concentration ( $\Gamma_{\max}$ ) and minimum area per surfactant molecule ( $A_{\min}$ ) have been calculated from tensiometric measurements. The thermodynamic parameters of micellization, surface parameters and the effect of additives on these parameters have been used to study the interactions present in the micellar systems.

**PP-27**

**Thermophysical and Spectroscopic Study of some Strongly Interacting Binary Mixtures Containing Amine with Ketones**

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Binary liquid mixtures containing ethylenediamine with 2-pentanone, 3-pentanone, and 4-methyl-2-pentanone have been studied for the estimation of intermolecular interactions. Experimental values of densities, speeds of sound, and viscosities of binary liquid mixtures containing ethylenediamine with 2-pentanone, 3-pentanone, and 4-methyl-2-pentanone have been measured. Densities and speeds of sound are recorded at a temperature range (293.15, 298.15, 303.15, 308.15, and 313.15) K and at atmospheric pressure. Various thermophysical properties calculated using density and speed of sound are excess molar volume ( $V_m^E$ ), excess isentropic compressibility ( $K_{s,m}^E$ ), and deviation in speed of sound ( $u^D$ ) at the same temperature range and pressure. Viscosities are used to calculate deviation in viscosity ( $\Delta\eta$ ) and excess Gibb's free energy of activation for viscous flow ( $\Delta G^{*,E}$ ) at 298.15 K, 303.15 K, and 308.15 K at atmospheric pressure. All these properties are analysed in terms of effect of position of functional group and structure of component molecules on intermolecular interactions. FTIR spectroscopy is also used to investigate the unlike interactions in the binaries. Excess and deviation properties calculated are fitted to Redlich-Kister type polynomial for the estimation of binary coefficients and standard errors. Jouyben-Acree modal is also used to correlate the density, speed of sound, and viscosity to the composition. Method of least squares is used for the estimation of binary coefficients and standard errors for the Jouyben-Acree model and Redlich-Kister polynomial.

**PP-28**

**Comparative Study of Various Error Diffusion Algorithms Used in Visual Cryptography with Raster Scan**

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Visual Cryptography encrypt secret image into  $n$  halftoned shares. The secret image can be recovered by stacking these shares together without any complex computation involved.

These shares are very safe because individually they show nothing about the secret image. A particular halftoning method named as error diffusion method is used for the better generation of halftoned shares. In this paper three error diffusion algorithms are used for generation of halftoned shares of secret image and these algorithms are compared on the basis of four parameters such as PSNR, WSNR, LDM, and UQI.

**Keywords:** Error diffusion, Half toning, Raster scan, PSNR, WSNR, LDM, UQI

**PP-29**

### **Effect of Stabilizing Agent and Encapsulation on Optical Properties of CdSe Quantum Dots**

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In this work we studied effect of stabilizing agent i.e. 2-Mercaptoethanol (2-ME) and polymer encapsulation on optical properties of CdSe Quantum dots. Different concentrations of 2-ME were used to tune the emission spectra. Addition of 2-ME to CdSe QDs enhances the trap emission by quenching Band edge emission. Trap emission is much intense in small sized Quantum dots because of their high surface to volume ratio. Optical properties of QDs were recorded by Photoluminescence spectroscopy. Blue shift in emission peak of PL spectra on increasing concentration of 2-ME occurs. This behavior is related to quantum confinement effect. These as prepared CdSe QDs possess poor optical properties, to improve their optical properties we encapsulated these QDs with different polymers. The average diameter of QDs was directly measured from TEM image and has a value approximately 1nm-2nm. Therefore, this study demonstrates the effect of 2-ME and encapsulation approach on the optical properties of QDs desired for various applications.

**PP-30**

### **Catch Composition of *Ctenopharyngodon Idella* (Grass Carp) from Gobind Sagar Reservoir during Years 2006 to 2012**

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Gobind Sagar Reservoir (31° 25' N and 76 ° 25' E) is one of largest reservoirs in Himachal Pradesh, India created by constructing 226 meter high, straight gravity dam across the river Sutlej in 1963 at village Bhakra. Average water spread area of this reservoir is 10,000

hectare. *Ctenopharyngodon idella* (Grass carp) is one of exotic carps of Chinese origin. It got introduced accidentally in this reservoir from Deoli Fish farm along with silver carp in 1971 due to flash floods. Grass carp is being exploited as one of commercial fish species from this reservoir. Gill nets were used for catching fishes from this reservoir. Fishermen have organized themselves in the form of co-operative societies. Gill nets were applied during the afternoon hours and collected next morning. Twenty six fisheries co-operative societies were working in Gobind Sagar Reservoir till year 2012. Total number of individuals of Grass carp caught was 8966 weighing 64320.2 kg during years 2006 to 2012. Total number of individuals of all species caught was 3141236 weighing 5637108.9 kg. Weight wise contribution of Grass carp in total catch was 1.14 percent during this period from this reservoir. This fish has not got well established in this reservoir due to lack of water weeds. Annual catch of *C. idella* was maximum (12270.4 kg) in year 2009 and minimum (6078.6 kg) during 2012. Fisheries co-operative society wise, catch of this species was varying between 8 kg caught by Fisheries co-operative Society Nakrana (during year 2011) and 4176.5 kg by Bhakra (during the year 2006).

**Keywords:** Grass Carp, Catch, Gobind Sagar reservoir

**PP-31**

### **Flux Induced Fano Effect in Transmission Peaks of Asymmetric Coupled Quantum Dot System**

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Electronic transport through an asymmetric parallel coupled quantum dot system connected to normal leads has been studied theoretically in Coulomb blockade regime in the presence of magnetic flux, using non equilibrium Green's function formalism. A new type of decoupling approximation has been adopted to close the chain of higher order Green function, while deriving their equation of motion. The detailed calculations of transmission probability have been presented in the transition of system of coupled quantum dots from series geometry to symmetric parallel configuration. The results show that normally the electron transmission probability peaks are Lorentzian type both in the presence and absence of flux. But, for a particular value of flux the shape of transmission peaks becomes Fano type, signifying the appearance of Fano effect. Therefore, the present theoretical investigation, using new decoupling scheme, concludes that the presence of magnetic flux induces the Fano effect which appears in the form of Fano line shapes of transmission peaks for electron transport through the system under investigation.

**Keywords:** Non equilibrium, Green's function, Magnetic flux, Fano peaks

### Effect of Salt Concentration on the Stability Properties of Free Standing Polymeric Films for Energy Storage/Conversion Devices

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Free standing polymeric films (electrolytes) have been prepared by PAN as a polymer host and Li salt (LiPF<sub>6</sub>) using the standard solution cast process. Thermo Gravimetric (TGA) analyses the effect of salt concentration on thermal stability property of the free standing polymeric films. Cyclic voltammetry shows voltage stability (Electrochemical potential window). Solid electrolytes provide advantages in terms of simplicity of design and operational safety, but typically SPE's have the conductivities that are lower than those of organic liquid electrolytes. Though these prepared free standing polymeric films have wide range of applications in energy storage and conversion devices.

**Keywords:** FT-IR, SPE, Thermo gravimetric analysis (TGA), Cyclic voltammetry

### Micellization Behavior of Streptomycin in Aqueous Solution of Electrolytes: A Conductometric Study

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In the present study, the micellization of a surface active drug, streptomycin, an antibiotic, in aqueous solution of electrolytes present in body fluid has been studied in terms of drug-electrolyte intermolecular interactions. The activities of streptomycin are largely affected by the presence of electrolytes, therefore, the interactions of streptomycin and electrolytes like NaCl, KCl, CsCl, MgCl<sub>2</sub>, CaCl<sub>2</sub> and SrCl<sub>2</sub> in aqueous medium, has been investigated in the temperature range 298.15 to 313.15K by using conductometric studies. The critical micelle concentration (*CMC*) values have been calculated and reviewed in terms of effect of electrolytes on the electrostatic repulsions of drug molecules in aqueous solutions. The temperature dependence of *CMC* values has also been explained by means of hydrophilic and hydrophobic dehydrations. Further, the temperature dependence of  $X_{CMC}$  is employed to compute the thermodynamic parameters of micellization like standard enthalpy of micellization,  $\Delta H_m^o$ , standard free energy of micellization,  $\Delta G_m^o$ , and entropy of micellization,  $\Delta S_m^o$  and their variation with temperature has been investigated in terms of nature of micellization of streptomycin in presence and absence of electrolytes. The results are also attributed to the action of electrolytes to improve the drug adsorption and

bioavailability. The mechanisms of drug solubilization by electrolytes are reviewed from the physicochemical point of view.

**Keywords:** Conductometric study, Critical micelle concentration, Electrolyte, Streptomycin

**PP-34**

### **Comparison of Microbiological Quality of Drinking Water between Chandigarh and Mohali**

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Water is essential to sustain life and a satisfactory supply must be available to all. Water free from contaminants is fit for drinking but due to increase in urbanization, industries and interference of human activities water pollution has increased many folds which causes water unfit for dinking and causes harmful diseases. Study was undertaken to identify bacterial and fungal contaminant in drinking water samples collected from public areas of Mohali and Chandigarh. Total 20 samples were collected from both cities. The presence of *E. coli*, *Klebsiella*, *Shigella* and *Enterobacter* was identified in water samples on the basis of morphological and biochemical tests. Out of 10 samples from Mohali three were found to be positive for bacterial contamination and four were found positive for fungal contamination whereas out of 10 samples from Chandigarh four were found to be positive for bacterial contamination and five for fungal contamination. Water samples collected from Mohali were found to be more suitable for drinking than Chandigarh.

**PP-35**

### **Value Addition in Dairy Waste Water by Producing Algal Biomass in it**

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The dairy industry in India has become one of the largest producers of value added milk products in the world and hence generates large quantity of waste water from milk processing. The dairy effluent is treated in effluent treatment plant (ETP) and disposed off onto land or used in irrigation purposes. The present study was undertaken to assess the utility of dairy effluent as a growth medium for algal biomass generation. Three algal cultures namely *Chlorella vulgaris*, *Nostoc muscorum* and *Anabaena variabilis* were used in the present study. Dairy effluent was collected from a locally operational plant. It was filtered prior to use and subjected to analysis of major pollution parameter as BOD, TSS, oil and grease, TOC, TKN. Algal biomass in terms of wet weight was determined at the end of incubation time period of 15 days. Every 5 days the inoculated samples were tested for pollution parameter as BOD, oil and grease, TSS, TOC, TKN. Dairy waste water proved to be a good growth medium for all the three algae at 100X concentration. In 100X dairy

effluent, all algal cultures reduced BOD, oil and grease, TSS to 150-300 mg/l (91-95% reduction), 40-50 mg/l (85-89% reduction), 400-800 mg/l (80-90% reduction) respectively. It is inferred that undiluted dairy effluent is more suitable for algal biomass generation as compared to diluted effluent. The algal biomass yield can be increased by increasing inoculum rate, incubation period and use of algal consortia (mixed culture).

**PP-36**

### **Spatio-Temporal Dynamics of Large Mammals and Birds in Eco-Tourism Zone of Nanda Devi National Park**

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Investigations on spatio-temporal dynamics of large mammals and birds in eco-tourism zone of Nanda Devi National Park have revealed the presence of eleven mammals viz. Snow Leopard (*Uncia uncia*), Himalayan Musk deer (*Moschus leucogaster*), Himalayan Black Bear (*Ursus thibetanus*), Himalayan Tahr (*Hemitragus jemlahicus*), Red Fox (*Vulpes vulpes*), Leopard Cat (*Prionailurus bengalensis*), Himalayan Weasel (*Mustela sibirica*), Beech Marten (*Martes foina*), Blue Sheep (*Pseudois nayaur*), Wild boar (*Sus scrofa*), Pika (*Ochotona himalayana*) and five birds viz. Himalayan Monal (*Lophophorus impejanus*), Himalayan Snow Cock (*Tetraogallus himalayensis*), House Sparrow (*Passer domesticus*), Chukor Partridge (*Alectoris chukar*) and Himalayan Scaly Breasted Thrush. These investigations have been carried out during October-November months using capture-recapture techniques and sign surveys. Maximum numbers of photo-captures were obtained during the month of November (72.53%). During the entire exercise, the highest photographic percentage was recorded in Red fox 38.73% followed by snow leopard 6.33%. The Himalayan black bear had low photo-capture percentage (2.11%). Among the prey species, blue sheep had maximum photo-captures (20.42%) followed by Himalayan Musk deer (3.52%).

**Keywords:** Sign Survey, Capture-Recapture, Large Mammals, Spatio-Temporal Dynamics

**PP-37**

### **Structural and Optical Properties of nickel and silver Doped ZnO nanoparticles**

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Nanoparticles of undoped, nickel and copper co-doped ZnO are synthesized. The crystallite size, morphology and optical properties of as prepared nanoparticles are determined by XRD and UV- visible spectra. XRD analysis shows that the prepared samples are single phase and

have hexagonal wurtzite structure. The crystallite size of the doped and undoped nanoparticles is determined using Scherrer method. From the optical studies, the band gap is found to be increased with co-doping of nickel and silver. The different behaviour of different dopant can be explained on the basis of their different chemical nature and different ionic radii as compared to the host cation.

**Keywords:** XRD, Crystallite size, Optical band gap

**PP-38**

### **Antimicrobial Activity of Tin (IV) Complexes**

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Tin(IV) phenoxides of composition  $\text{SnCl}_{4-n}(\text{OC}_6\text{H}_4\text{-OMe-4})_n$  (where  $n=1,2$ ) have been synthesized by the reaction of  $\text{SnCl}_4$  and 4-methoxy phenol in benzene under reflux. The complexes have been characterized by elemental analysis, molar conductance measurement, molecular weight determination, IR,  $^1\text{H}$  NMR and mass spectral studies. The antibacterial and antifungal activity of these complexes and ligand have been assayed by screening them against bacteria *B. subtilis*, *E. coli* and *S. aureus* and fungi *C. albicans* and *A. niger*. In the present work, activities of the synthesized complexes were evaluated by minimum inhibitory concentration (MIC) method using sabouraud agar as nutrient medium. It has been observed that complexes have greater antimicrobial activity than ligand.

**PP-39**

### **Quantum Mechanical Studies of Newly Synthesized Diorganotin (IV) 2-Chlorophenylacetohydroxamate Complexes**

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The determination of structural and spectroscopic properties of compounds using both experimental techniques and theoretical methods has been a subject of much interest. Of the computational methods DFT has been the favorite one due to its great accuracy in reproducing the experimental values of molecule geometry, vibrational frequencies, atomic charges, dipole moment etc. for computing the electronic structure of molecular systems. Among all organometallic compounds, organotin compounds are the best studied and their diversified applications have fascinated many inorganic and organic chemists. Of numerous organotin complexes derived from a variety of ligands, organotin hydroxamate due to their biological relevance has drawn tremendous research interest as hydroxamic acids constitute an important class of organic bioligands and possess a broad spectrum of biological activities in medicine and as potent and selective inhibitors of a range of metalloenzymes. In this context, diorganotin (IV) 2-chlorophenylacetohydroxamate complexes of composition  $[\text{Me}_{2/n}\text{-Bu}_2\text{Sn}(2\text{-ClC}_6\text{H}_4\text{CH}_2\text{CONHO})_2$  synthesized by the

reactions of  $\text{Me}_2\text{SnCl}_2$  and  $n\text{-Bu}_2\text{SnCl}_2$  with bimolar amounts of  $2\text{-ClC}_6\text{H}_4\text{CH}_2\text{CONHOK}$  have been studied by DFT in SIESTA code. The optimized energetically lowered but most stable geometry has been found to be distorted octahedral. The HOMO-LUMO analysis has been made to gather information regarding ionization potential (IP), electron affinity (EA), electronegativity ( $\chi$ ), electrophilicity index ( $\omega$ ), hardness ( $\eta$ ), softness ( $s$ ) and chemical potential ( $\mu$ ) from which the relations among energy, structure and characteristics of complexes has been inferred.

PP-40

### **Formulation, Optimization and *in-vitro* Evaluation of Nifedipine Sustained Release Tablet**

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The present work was carried out to formulate sustained release tablet of Nifedipine by employing different polymers. Nifedipine was an antihypertensive drug for the treatment of stable and unstable angina pectoris, acute myocardial infarction and heart failure. In the present study an attempt was made to formulate 30mg sustained release tablet to provide effective drug release for 24hrs. Sustained release tablets of Nifedipine were prepared by wet granulation technique. Under pre- formulation study, the organoleptic properties were complied with the BP specification. Physical properties such as bulk density and tapped density were more in case of granules ready for compression than that of Nifedipine raw powder. *In vitro* studies showed formulation F3 followed the sustained drug release. The coating solution prepared by using polymethacrylate polymer was the ideal to formulate a sustained release drug delivery system. The compatibility evaluation was carried out by FT-IR spectroscopy analysis. The study revealed that there were no interactions between the drug and the polymers. Hence the drug and polymers were compatible. The optimized formulation F3 was evaluated on the basis of Pharmacopoeial specifications. The physical parameters like thickness, diameter, hardness, friability, weight variations were carried out. The assay was carried out for optimized formulation and the result was found to be 99.55%. The optimum release was shown with HPMC K 100 in ratio 1.5:1 with Nifedipine. The optimized formulation showed a satisfactory release profile on comparison with the marketed formulation. The drug release was found to decrease with the increase in the weight of PVP. The drug release was found to be more with HPMC than with PVP. The similarity factor  $f_2$  was applied between the dissolution profile of optimized batch and the theoretical dissolution profile, which also indicate a decent similarity between both dissolution profiles. The optimized batch was kept for stability studies at room temperature ( $25^\circ\text{C} \pm 2^\circ\text{C}/ 60\% \pm 5\% \text{RH}$ ) and at accelerated temperature ( $40^\circ\text{C} \pm 2^\circ\text{C}/ 75\% \pm 5\% \text{RH}$ ) in stability chamber for 60 days. The result of stability studies revealed no change in physical appearance, drug content and *in vitro* dissolution profile, hence F3 formulation was found to be stable. The drug release from the selected formulation (F3) was plotted for the zero order kinetics. From the results obtained, it can be concluded that formulation F3 has achieved the objectives of sustained drug release, patient compliance and cost effectiveness as a single daily dose of the drug.

### **Formulation and Evaluation of Mouth Dissolving Tablet Containing Naproxen by Direct Compression Method**

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The conventional dosage forms (tablet and capsule) have wide acceptance upto 50-60 % of the total dosage forms. Tablet is still most popular dosage form existing because of ease of self administration, compact in nature, easy to manufacture and it can be delivered in accurate dose. One drawback of solid dosage form is difficulty in swallowing (dysphasia) and chewing in some patients particularly in geriatric and paediatric patients. The problem of choking is common phenomenon in geriatric patients due to fear of choking, hand tremors. The concept of mouth dissolving drug delivery system (MDDDS) emerged with an objective to improve patient's compliance. These dosage forms rapidly disintegrate and/or dissolve to release the drug as soon as they come in contact with saliva, thus obviating the need for water during administration, an attribute that makes them highly attractive for paediatric and geriatric patients<sup>2</sup>, and also have been found to be choice for psychiatric as well as patients suffering from stroke, thyroid disorder, Parkinson's disease and multiple sclerosis and motion sickness. The aim of the present work is to investigate the formulation of mouth dissolving tablet containing naproxen by direct compression method to induce rapid onset of acting. Basic goals in the development of mouth dissolving tablet are to increase patient compliance, ease of administration, safety and appropriate dosing. It has perceived faster onset of action as the dosage form is disintegrated prior to reaching the stomach and is ideal for acute diseases like allergies, nausea, and vomiting and particularly applicable to manage breakthrough systems. Direct compression method was used to compress the tablets as it is the easiest way to manufacture tablets and less time consuming. Conventional equipment, commonly available excipients and limited number of processing steps are involved in the direct compression and so manufacturing cost is low. Keeping in view the advantages of this delivery system, in the present study, attempts were made to formulate mouth dissolving tablet. In vitro drug release of formulation N6 had shown that maximum drug release  $98.46 \pm 0.74$ . The optimized formulation will be subjected to stability studies according to ICH guidelines.

### **Development and Evaluation of Gastric Floating Tablet of Lamivudine**

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Lamivudine is an antiretroviral is commonly used in the treatment of HIV infected patients, which are showing better absorption in the stomach. Gastric floating drug delivery systems (GFDDS) offer numerous advantages over other gastric fluids and thus remain buoyant in the stomach without affecting the gastric emptying rate for a prolonged period of time. In the present work, effervescent floating tablets of different formulation were developed with an objective of achieving 24 hours floating time. Using hydrophilic polymers like HPMC (K4M), HPMC (K100M) & hydrophobic polymers like Chitosan. Polymer with lower

viscosity (HPMC K100M) was shown to be beneficial than higher viscosity polymer (HPMC K4M) in increasing the floating properties of GFDDS. The GFDDS were developed in the form of tablets comprising of an effervescent agent, swellable polymer and binding agent. The formulations were evaluated for various physical parameters, buoyancy studies, dissolution parameters and drug release Profile. Formulation L10 showed maximum floating time of 24 hours and gave slow and sustained drug release of lamivudine.

**PP-43**

### **Formulation and Evaluation of Orodispersible Tablets of Lamotrigine**

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Oral drug delivery remains the preferred route for administration of various drug to produce systemic effects of drugs. Solid oral dosage forms represents the preferred class of product, as tablet represents a unit dosage form in which one usual dose of the drug has been accurately placed. It avoids errors in the total dose to be taken when the drug is self-administered by the patient. Over a decade, the demand for development of orally disintegrating tablets (ODTs) has enormously increased as it has significant impact on the patient compliance. Orally disintegrating tablets offer an advantage for populations who have difficulty in swallowing. It has been reported that dysphagia (difficulty in swallowing) is common among all age groups and more specific with pediatric, geriatric population along with institutionalized patients and patients with nausea, vomiting and motion sickness complications. ODTs with good taste and flavor increase the acceptability of bitter drugs by various groups of population. Orally disintegrating tablets are also called as orodispersible tablets, quick disintegrating tablets, mouth dissolving tablets, fast dissolving tablets, rapid dissolving tablets, porous tablet and rapimelts. However, of all the above terms, United States Pharmacopoeia (USP) approved these dosage forms as ODTs. Recently European Pharmacopoeia has used the term orodispersible tablet for tablets that disperses readily and within three minutes in mouth before swallowing. United States Food and Drug Administration (USFDA) defined ODT as "A solid dosage form containing medicinal substance or active ingredient which disintegrates rapidly usually within a matter of seconds when placed upon the tongue". The disintegration time for ODTs generally ranges from several seconds to about a minute. Thus, in the work under taken, an attempt was made to enhance the water solubility by complexation with  $\beta$ -cyclodextrin (1:5 molar ratios). The mouth dissolving tablet of LMG was prepared by direct compression method using different concentration of subliming agent like menthol and superdisintegrant like sodium starch glycolate. The formulations were evaluated for weight variation, hardness, friability, drug content, wetting time, water absorption ratio, *in vitro* disintegration time and *in vitro* dissolution studies etc. The prepared tablets were characterized by fourier transform infra red spectroscopy, differential scanning calorimetry, powder X-ray diffraction studies, scanning electron microscopy. The disintegration time for the complexed tablets prepared by different concentration of menthol are found to be in range of  $25 \pm 2.52$  to  $91 \pm 3.05$  sec and the formulation which are prepared by different concentration of sodium starch glycolate are found to be in range of  $35 \pm 2.30$  to  $98 \pm 3.62$  sec. All the formulation showed almost 100 percent of drug release within 40 min. Among all the formulation, F5 prepared with 40 mg

menthol and L13 prepared with 35 mg sodium starch glycolate shows faster drug release, respectively 12 min and 15 min. Further formulations were subjected to stability testing for 2 months at temperature of  $40\pm 5^{\circ}\text{C}/75\pm 5\%\text{RH}$ . Tablets have shown no appreciable changes with respect to physical appearance, drug content, disintegration time, and dissolution profiles.

**PP-44**

### **Formulation and Evaluation of Extended Release Tablets of Pentoxifylline**

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There are several approaches existing for the administration of drug to treat the patient. If the drug is given in conventional dosage form, it has to be administered several times a day to produce the desired therapeutic effect. Due to frequent dosing, fluctuation in plasma drug level concentration occurs. Extended-release products provide an immediate release of drug that promptly produces the desired therapeutic effect, followed by gradual release of additional amounts of drug to maintain this effect over a predetermined period. The major advantage of this category is that, in addition to the convenience of reduced frequency of administration, it provides blood levels that are devoid of the peak & valley effect which are characteristic of the conventional intermittent dosage regimen. In general, the goal of an extended release dosage form is to maintain therapeutic blood or tissue levels of the drug for an extended period. This is usually accomplished by attempting to obtain zero order release constitutes drug release from the dosage form, i.e. a constant release rate. Oral controlled release dosage forms are being developed for the past three decades due to their advantages. Oral route remains the preferred route of administration of therapeutic agents, because of low cost of therapeutic and ease of administration leads to high levels of patient compliance. Due to poor bioavailability of orally administered drugs extensive advancements in drug discovery process are made. The goal of any drug delivery system is to provide a therapeutic amount of drug to the proper site in the body to promptly achieve and maintain the defined drug concentration. In pharmaceutical practice, drug administration to patient exists in several approaches, one of which is conventional, i.e. drug is given several times a day, to produce desired therapeutic effect. Due to frequent dosing, fluctuation in the drug blood level occurs; hence maintenance of defined drug level can be above or below the minimum therapeutic level. The conventional tablet provides only a single transient release of drug. Hence the above potential problem can be minimized or reduced by formulating the drug in release control matrix i.e. sustain release system. This system minimizes or eliminates side effects, provides patient compliance, economically and promptly achieves and maintains the desired effect. Controlled release dosage forms are those dosage formulations designed to release an active ingredient at rates which differ significantly from their corresponding conventional dosage forms. The controlled release drug delivery systems are aimed at controlling the rate of drug delivery, sustaining the duration of therapeutic activity and/or targeting the delivery of drug to a tissue. Drug release from these systems should be at a desired rate, predictable and reproducible. The controlled or sustained release dosage forms are designed to complement the pharmaceutical activity of the medicament in order to achieve better selectivity and longer duration of action. The aim

of this study is to formulate and evaluate the extended release tablets of Pentoxifylline. Pentoxifylline is prescribed to patients who are suffering from chronic peripheral heart diseases. Pentoxifylline in the Extended release may be used to improve the bioavailability and to improve the Patient non-compliance. The present study is to investigate the possibility of developing extended release dosage form for the drug Pentoxifylline by using polymers HPMCK4M, HPMCK15M, HPMC-K100M and HPC in different ratios as matrix. It can be achieved by planning for trials until the desired release pattern is obtained. The aim is to evaluate the release profile of drug from extended release tablets. Pentoxifylline containing HPC (20%) batch P8 can be taken as an ideal or optimized formulation for 12 hour release as it fulfills the requirements for extended release tablet.

**PP-45**

### **Isolation of Xanthine Stimulant from Waste Tea**

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Xanthine is a purine base found in most of body tissues and fluids, in certain plants and also in some other organisms. Different types of stimulants are derived from Xanthine and commonly these are Caffeine and Theobromine. Xanthine (Stimulant of Caffeine) is a widespread naturally occurring compound found in a variety of plants but commonly found in coffee beans and tea leaves. Caffeine containing products have been consumed for hundreds of years for their taste aroma and central nervous system (CNS) stimulating properties. Caffeine finds widespread application in Agriculture, Military and as stimulant. The present study deals with isolation of caffeine stimulant from waste tea. For the isolation of caffeine from waste/consumed tea, out of several techniques Liquid-Liquid extraction technique is adopted. This technique involves the transfer of desired compound from one liquid to another. For this purpose the solvent are used which is of lower solubility or mainly it is immiscible.

**Keyword:** Xanthine (stimulant of caffeine), Waste tea, Alkaloid

**PP-46**

### **Structural Properties of Doped Zinc Oxide Nanoparticles**

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By Co-precipitation method, Undoped and Zn<sub>1-x</sub>Ag<sub>x</sub>O NPs (X = 0, 0.25M, 0.45M) were synthesized and characterized by powder XRD. The XRD analysis demonstrates that the nanoparticles have the single hexagonal wurtzite phase structure and the crystalline size decreases with increasing concentration of the silver and evaluated by using scherrer method

and W-H method. The crystalline size in both the method increases with increase in concentration of Ag doped ZnO nanoparticles. The optical band gap decreases with increase in dopant concentration. The physical parameters such as strain values were calculated more precisely for all the reflection peaks of XRD corresponding results.

**Keywords:** Nanoparticles, Co-precipitation method and crystalline size

**PP-47**

### **Helminth Parasites: A Neglected Threat to Mankind**

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Helminths are parasitic worms which plagued mankind since time immemorial. Helminthiasis is the most neglected disease of various parts of tropical India. The general assemblage of helminths is recognized as platyhelminthes and Aschelminths. More than 24% of people are globally infected with helminthiasis. Preschool children, miners, soil picker and childbearing women are more prone to the infection of parasitic helminths. In India more than 241 million children are infected by soil transmitted Helminths. A new strategy by WHO came into existence in 2001 which recommended the deworming programmes in endemic countries. WHO donated Albendazole and mebendazole to these endemic countries to eliminate the morbidity and complications due to helminths. Deworming is not a permanent solution for this. There is a need of fresh approach to target these parasites before entering in human body by removing the intermediate hosts. It has been seen that using certain predators can low the chances of survival of these parasitic helminthes. Removal of this intermediate host from the life cycle of certain helminths can contribute much for controlling helminthiasis.

**Keywords:** Helminthiasis, Parasitic helminths, Deworming, Control of helminths

**PP-48**

### **A Study on Viscosities of Oxalic Acid and its Salts in Water Rich Binary Aqueous Mixtures of Dioxane**

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Relative viscosities of oxalic acid and its salts viz. ammonium oxalate, sodium oxalate and potassium oxalate at different concentrations have been determined in different compositions of dioxane (3, 6, 9, 12 and 15% by weight of dioxane ) at 298.15K and 3% (w/w) dioxane + water at five different temperatures. The data have been evaluated using Jones-Dole equation and the obtained parameters have been interpreted in terms of solute-solute and solute-solvent interactions. The activation parameters of viscous flow have been

obtained which depicts the mechanism of viscous flow. Oxalic acid and its salts behave as structure breaker in binary aqueous mixture of dioxane.

**PP-49**

**Phytoconstituents evaluation of *Rhododendron arboreum* Sm. by GC-MS**

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The presence of phytochemical constituents has been reported from various plants. Up till now no reports exist on the phytoconstituents of petroleum ether extract of *Rhododendron arboreum* leaves. The present study was designed to determine the bioactive compounds in the petroleum ether extract of *Rhododendron arboreum* leaves using GC-MS. Gas chromatography-mass spectrometry (GC-MS) analysis of the petroleum ether extract of *Rhododendron arboreum* leaves was performed on a GC-MS equipment (Shimadzu GC-MS QP2010 Plus). The extract showed the existence of various bioactive compounds with an extensive range of countless therapeutic values. It was found that petroleum ether extract contained 30 metabolites including 1,2-Benzenedicarboxylic acid, gallic acid, 9-octadecene, phthalic acid, margaric acid, heptafluorobutyric acid, octadecanal, stearaldehyde, 1-octacosanol, thiosulfuric acid, dodecanoic acid and stigmast-5-en-3.β-ol. From the results, it is clear that *Rhododendron arboreum* Sm. be full of a variety of phytochemicals. Presence of these compounds in leaves of *R. arboreum* proves the promising utilization of this plant in the therapeutics.

**Keywords:** GCMS, *Rhododendron arboreum* Sm., Chemical composition, GC-MS

**PP-50**

**Comparative Determination of Antioxidant Activity in Sugarcane Juice of Inter node Borer Resistant Varieties**

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Sugarcane juices of four genotypes resistant to internode borer namely Co86032, Co62175, Co419 and Co7804 were evaluated for antioxidant activity using 1,1-Diphenyl-2-picrylhydrazyl (DPPH) radical scavenging and reducing power assays. In addition, antioxidant enzymes (Catalase [CAT], Superoxide dismutase [SOD], Peroxidase [POX] and Polyphenol oxidase [PPO]), total flavonoid and total phenol content were also determined. Results indicated higher DPPH radical scavenging activity in Co7804 followed by Co86032,

Co62175 and Co419. Co7804 exhibited higher reducing power compared to other sugarcane varieties. The total flavonoid content in Co7804 was higher (183.13µg/mL) compared to other sugarcane varieties (153.02 to 159.3813µg/ml). The total phenolic content in Co62175, Co7804, Co86032 and Co419 sugarcane varieties are 3.092, 2.636, 1.52 and 2.351 mg/ml, respectively. The sugarcane genotype Co7804 showed higher CAT, SOD and PPO enzyme activity than Co62175, Co86032 and Co419. The SOD and PPO activity exhibited by Co86032 and Co419 were almost similar. Peroxidase activity was higher in Co62175 compared to other genotypes. These results signify the influence of genotype on the occurrence of varied antioxidant enzymes/molecules in internode borer resistant sugarcanes.

**Keywords:** Sugarcane, Internode borer, Antioxidant, Catalase (CAT), Superoxide dismutase (SOD), Peroxidase (POX) and Polyphenol oxidase (PPO)

**PP-51**

### **Effect of Drought Stress on Medicinal Properties of *Withania somnifera***

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*Withania somnifera* (Ashwagandha) is a well known Indian medicinal plant widely used in the treatment of many diseases in India. It has various therapeutic properties such as Anti-inflammatory, Anti-stress, Anti-rejuvenating and Sedative. It contains various Secondary metabolites such as Ascorbic Acid, Tocopherol and reduced Glutathiones. As a result of drought stress secondary metabolites of *Withania somnifera* shows significant increase. So an attempt has been made in this review paper to explore various effect of drought stress on medicinal properties of *Withania somnifera*.

**Keywords:** *Withania somnifera*, Therapeutic properties, Secondary metabolites, Drought stress

**PP-52**

### **GIS in Management of Power Transmission and Distribution**

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There are various challenges faced by power utilities such as large gap between supply and demand, lack of effective management, more transmission & distribution losses, poor revenue collection, power quality issues such as interruptions, flickers and poor voltage. Lack of proper administration & power theft are some common reasons for the high losses. Thus the present distribution system requires to be upgraded to minimize the losses and for improving efficiency of power sectors. GIS is a competent and effective tool for managing transmission and distribution activities. A well-designed GIS based transmission and

distribution network may help minimize loss of electricity and enable pooling of supply and demand in order to maximize efficiency of the electric power system. GIS creates spatial information about utility assets such as poles, wires, transformers, duct banks, customers and serves that information to the utility. GIS can effectively manage information on the distribution of electricity to customers and information describing the attributes of each customer such as location and electricity use. GIS is a digital representation of consumers, network elements & important landmarks on a geo referenced map, with their attributes stored in a database. This technology is also used for the identification of suitable sites for locating new hydropower projects. With GIS, the electric companies will have the ability to improve customer service by better gathering and processing customer information by improving record-keeping and making data accessible to more users. With GIS, we can easily manipulate and carry out different task related to power system planning & management of electricity with efficient results. GIS is useful not only in planning a routine maintenance but also to easy handling the customer's enquiries. This paper gives an idea that how GIS technology is efficient in better customer services, reduction of technical losses, energy audit and accounting, trouble call management, real time operation of distribution network, better revenue protection and long term distribution planning. Paper shows that how GIS can be effectively used for transmission line settlement and managing electricity distribution facilities. It has the ability to improve upon traditional practices and hence today it has become an important aspect in power delivery. The electric utility industry has realized that GIS is a valuable tool not only for mapping facilities but to improve decision making and better managing infrastructure.

**PP-53**

**Investigations on Diversity and Distribution of Wood Rot Fungi in Sarkaghat Region of District Mandi, Himachal Pradesh**

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The dead wood inhabiting fungi that cause decay/degradation of wood by acting on cellulose and lignin are called wood rot fungi. Owing to the ecological and economic importance and in contrast to the insufficient data available on the geographical distribution, floristic and diversity of wood rot fungi in Sarkaghat region of District Mandi of Himachal Pradesh, the floristic investigations were initiated to describe and preserve the wood rot fungi of this region. During the present investigation, eleven species of wood rot fungi viz. *Auricularia auricula-judae* (L.:Fr.) Schroet., *Fomitopsis dochmia* (Berk & Broome) Ryv., *Ganoderma lucidum* (Leyss.-Curt.:Fr.) Karst., *Hexagonia sulcata* Berk., *Phellinus fastuosus* (Lev.) Ryv., *Polyporus grammocephalus* Berk., *P.hirsutus* Wulf. ex Fr., *Schizophyllum commune* Fr.:Fr., *Trametes gibbosa* (Pers.:Fr.) Fr., *T. versicolour* (L.:Fr.) Pilat and *Xylobolus frustulatus* (Pers.) Boidin, belonging to nine genera of seven families viz. Auriculariaceae, Fomitopsidaceae, Ganodermataceae, Hymenochaetaceae, Polyporaceae, Schizophyllaceae and Stereaceae of basidiomycota have been recorded for the first time from the study area. Of these six species and five genera viz. *Ganoderma* Karst., *Fomitopsis* Karst., *Auricularia*

Bull., *Polyporus* (Pers.) Gray and *Xylobolus* Karst have been recorded for the first time from district Mandi of Himachal Pradesh.

**Keywords:** Wood Rot, Diversity, Basidiomycota, Sarkaghat, Floristic

**PP-54**

**Biopesticidal efficacy of *Dodonaea viscosa* and *Datura innoxia* against *Callosobruchus maculatus***

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*Callosobruchus maculatus* (Fabricius) is a serious pest of stored grains, worldwide. In an attempt to find natural and cheaper methods of control of stored product pests some traditionally useful materials have been evaluated for their pesticidal properties. Biopesticidal efficacy of *Datura innoxia* (Miller) and *Dodonaea viscosa* Linnaeus (Jacquin) in acetone and methanol extracts have been tested on *C. maculatus*. All the concentrations viz. 5, 10 and 20% of the acetone and methanol extracts were effective in controlling the pest *C. maculatus*. All the extracts were effective in increasing mortality, decreasing the mean oviposition and F1 adult emergence of the insect pest which has been arranged in decreasing order as : Acetone extract *D. innoxia* > Methanol extract of *D. innoxia* > Acetone extract of *D. viscosa* > Methanol extract of *D. viscosa* and 20% acetone extract of *D. innoxia* was most effective among all the four extracts. Hence it is recommended that the two plants may be exploited to control *C. maculatus* in particular and against other pests in general. However some more biochemical and biological parameters of both the plants and insect species may be taken under consideration for efficient and enlarged scale control of pest species.

**Keywords:** Biopesticidal efficacy, Pest control, Plant extract

**PP-55**

**Distribution and Ethnobotany of Wild Plants of Hamirpur (H.P.)**

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Hamirpur district is smallest district of Himachal Pradesh which falls in Shivalik hills. Due to favourable conditions, this region is rich in diversity of flora and traditional knowledge associated with the use of wild plants for various purposes. The present study is to explore the traditional knowledge and cultural practices of wild plants in this area. An ethnobotanical survey was conducted on lower foot hills of Himachal Pradesh during 2017. The survey was conducted among indigenous villagers residing in remote areas of Hamirpur. Indigenous knowledge was conducted through questionnaire from local people. A total of 15 plants belonging to 14 Genera, 13 families were reported in this region. All these were reported under dicotyledons class. There is very less work on wild plants of district Hamirpur (H.P.). Besides this, the region is rich in diverse flora and people depends upon

wild plant products to meet their day to day needs .The study revealed that the traditional knowledge is vanishing due to changing social values and non participation of younger generation in conservation of traditional knowledge about such wild plants.

**Keywords:** Wild plants, Traditional knowledge, Indigenous, Ethnobotanical, Social values

**PP-56**

### **Energy Efficient Green Computing in Wireless Network Communication**

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It is a worldwide goal to reduce energy consumption and CO<sub>2</sub>emissions. A part of this energy reduction scheme concerns the wireless communication industry and ICT that participates in a direct, indirect and systematic way. Characteristic examples are green networks, smart buildings, smart grids, energy efficient electronics (OLEDS, photonics, nanotechnology) and the application of embedded systems towards low carbon and energy efficient technologies. Capacity issues and delivery of complex real time services are some of the main concerns that yield high power consumption patterns. In the increasingly competitive mobile telecommunication sector, operators are turning to emerging markets for their next step growth situation that increases the number of subscribers and required base station equipment. This creates the need for equipment installation to areas where off grid renewable energy solutions are required and energy efficient networks are important. This research paper provides review of green computing in the wireless environment which will help to reduce the energy consumption as the wireless devices operate on battery power.

**Keywords:** Green Computing, Green Networks, Green Energy, Green Computing Techniques, Energy Efficient

**PP-57**

### **Energy Optimization Techniques in Mobile Cloud Computing**

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Mobile and wireless communications have become an important new paradigm in the 21st century with the wide use of cell phones, (PDA) personal digital assistants, and smart phones. These devices are not used only for voice communication but also send and receive text, video, and pictures. Mobile computing is a technology that allows the continuous access to network services, in which user will be able to access data or any information from any mobile device in any network while user on the move. On the other hand, mobile devices have serious limitations such as battery life time, computation power, and storage capacity. Mobile Cloud Computing (MCC) is an emerging technology that helps in avoiding such limitations in mobile devices, mainly saving energy. The main goal of this paper is to

present a review of energy optimization algorithms MCOP and EMSO that reduce the energy consumption.

**Keywords:** Cloud computing, Mobile computing, Mobile cloud computing, Energy optimization techniques

**PP-58**

### **Analysis of Routing Protocol to Maximize the Lifetime of Wireless Sensor Network**

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A wireless sensor network is type of wireless network. Basically it consist a collection of tiny device are called sensor node. In wireless sensor network sensor nodes have limited battery available with no recharging. Sensor node has some constraints due to their limited energy, storage capacity and computing power. The communication of gathered data in the network from the node to base station is a prominent activity and this consumes the maximum amount of energy .Thus affect the lifetime of the wireless sensor network .Data are route from one node to another using different routing protocol. There are number of routing protocol for wireless sensor network. These energy efficient routing protocols select a best path for data transmission and consume less energy. In this paper the LEACH and PEGASIS protocol is analyzed through simulation with sink mobility to maximize the life time of WSN.

**Keywords:** Wireless Sensor Network, Routing Protocols, LEACH, PEGASIS

**PP-59**

### **Virtual Cloud Data Centre Resource Utilization through Scheduling Algorithm**

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The increasing demand for storage and computation has driven the growth of large data centers the massive server farms that run many of today's Internet and business applications. A data center can comprise many thousands of servers and can use as much energy as a small city. The massive amounts of computation power contained in these systems results in many interesting distributed systems and resource management problems. Data centers are facing many challenges and one of them is how modern virtualization technologies can be used to simplify deployment, improve resource efficiency, and reduce the cost of reliability. It defines the models of virtualization overheads can be utilized to accurately predict the resource needs of virtualized applications, allowing them to be smoothly transitioned into a data center. This research paper provides review of scheduling algorithm used for better server consolidation, reducing hardware and energy costs within the data center.

**Keywords:** Virtual cloud data centre, Resource scheduling, Round robin scheduling, Throttled Load balancer, Fastest Response Time

### A Comparative Study of Classification Algorithms of Data Mining

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Data mining is the process of discovering meaningful new correlations, patterns and by sifting through large amounts of data stored in repositories, using pattern recognition technologies as well as statistical and mathematical techniques. Data mining is the knowledge discovery process by analyzing the large volumes of data from various perspectives and summarizing it into useful information. In recent years, explosive development in internet, data storage and data processing technologies has been one of the greater concerns in data mining. Data mining is the notion of all methods and techniques which allow analyzing very large data sets to extract and discover previously unknown structures and relations out of such huge heaps of details. In this research paper the performance of four classification algorithms were evaluated on the basis of two parameters i.e. cross validation and percentage split.

**Keywords:** Data mining, Naïve Bayesian, Naïve Bayes, J48, ZeroR

### A Comparative Study of Cryptography Algorithms

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Cryptography is “The science of protecting data” & Network security “Keeping information private and secure from unauthorized users”. In cryptography encryption decryption of data is done by using secret key provide data confidentiality, data integrity and authentication. The process of encoding plain text message into cipher text message is called as encryption. The reverse process of transforming cipher text message back to plain text message is called as decryption. This paper provide a comparative study of various encryption Algorithms like DES, AES, BLOWFISH and DIFFIE-HELLMAN based on different factors like speed, security, and performance of cryptography Algorithms.

**Keywords:** Cryptography, Encryption, Decryption, DES, AES, BLOWFISH AND DIFFIE-HELLMAN

### Automatic Facial Recognition in Image Processing: A Survey

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Facial recognition technique is based on the security system or security network, that consists how detect the face in controlled environment. A large number of face recognition techniques have been used for PCA algorithm with eigen face. This technique is based on computer application that is automatically identifying a person. This paper represents the review of face recognition and there advantages and disadvantages. It is a real time applications used number of algorithms like PCA, LDA and PCA with eigen face. This paper basically work on the two factors like improvement pictorial information for human interpretation and processing of images data for storage and providing a survey for different algorithms used for face recognition.

**Keywords:** Introduction, Pattern recognition, Facial recognition, Evaluation different algorithms, Future enhancement, Conclusion

### Data Mining: Comparitive Analysis of Clustering Algorithms

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Data mining is used to find the hidden information pattern and relationship between the large data set which is very useful in decision making. Clustering is very important techniques in data mining, which divides the data into groups and each group containing similar data and dissimilar from other groups. Clustering using various notations to create the groups and these notations can be like as clusters include groups with low distances among the cluster members, dense areas of data space, intervals or particular statistical distributions. There are many clustering algorithms. In this research study two most widely used clustering algorithms namely k-mean clustering and hierarchical clustering in terms of their execution time, number of iteration, and accuracy using weka tool.

**Keywords:** Web mining, Clustering, k-mean clustering, Hierarchical clustering, Weka tool

**Preliminary Investigations on Inventorization of Pteridophytes of Hamirpur District,  
Himachal Pradesh**

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Whereas, pteridophytes are the second largest component of the Himalayan flora after flowering plants, however certain areas of the Himalaya such as Hamirpur District of Himachal Pradesh remained unexplored for pteridophytic flora. Keeping in view the ecological and economic importance and in contrast to the insufficient data available on the geographical distribution, floristic and diversity of pteridophytes in this area, the floristic investigations were initiated to describe and preserve pteridophytes of this Himalayan region. The present investigations have revealed the occurrence of twelve species of pteridophytes viz. *Adiantum capillus-veneris* L., *Adiantum incisum* Forsskal, *Asplenium dalhousiae* Hook, *Athyrium attenuatum* (Wall, ex Clarke) Tagawa, *Cheilanthes bicolor* (Roxb.) Fraser-Jenkins, *Coniogramme affinis* Wall, ex Hieronymus, *Equisetum ramosissimum* Desf., *Pteris cretica* L., *Pteris vittata* L., *Pyrrosia stictica* (Kunze) Holttum, *Selaginella chrysocaulos* (Hook. & Grev.) Spring and *Thelypteris dentata* (Forssk.) St. John, belonging to nine genera (*Adiantum* L., *Asplenium* L., *Athyrium* Roth, *Cheilanthes* Swartz, *Coniogramme* Fee, *Equisetum* L., *Pteris* L., *Pyrrosia* Mirbel, *Selaginella* Paliset de Beauv., *Thelypteris* Schmidel in Keller) of eight families (Adiantaceae, Aspleniaceae, Equisetaceae, Polypodiaceae, Pteridaceae, Selaginellaceae, Thelypteridaceae and Woodsiaceae) of pteridophytes. All these species have been recorded for the first time from Hamirpur District of Himachal Pradesh.

**Key words:** Flora, Pteridophyte, Himalaya, Hamirpur, Diversity

**Drought Stress Response in *Rauwolfia serpentina***

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There are so many environmental stresses, which affect the plants. One of them is a drought stress. The present study was done to explore the effect of drought stress on medicinal properties of *Rauwolfia serpentina*. The *Rauwolfia serpentina* is an important medicinal plant in pharmaceutical worldwide due to presence of its immense therapeutic properties. The plant is known for curing various disorders due to presence of its primary or secondary metabolites such as carbohydrates, alkaloids, phenol, resin, sterol, terpene. Its widely use in Ayurveda for curing the large number of diseases like high blood pressure, epilepsy, sedative insomnia, mental agitation. The medicinal plant contains more than 50 alkaloids. *Rauwolfia serpentina* also known for its antimicrobial, antifungal, anti-inflammatory,

antidiuretic activities. There is enhancement of secondary metabolites and medicinal properties on increasing the drought stress on *Rauwolfia serpentina*.

**Keywords:** *Rauwolfia serpentina*, Therapeutic, Drought stress

PP-66

**Natural Regeneration Status of Indian Hazelnut (*Corylus Jacquemontii* Decne.) in Western Himalaya of Himachal Pradesh**

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The Indian hazelnut (*Corylus jacquemontii* Decne.) belonging to family betulaceae is considered synonym of Turkish hazelnut (*C. colurna* L.). Indian hazelnut is sparsely distributed in small scattered group, varies from 10-15 ft bush form to 70 to 80 ft medium sized tree distributed in North-western temperate Himalayas from Kashmir to Kumaon between 1800-3300 m a.m.s.l. It is found associated with oak, fir, spruce, deodar, betula, maple and walnut in natural zone. In India, the species is little known except in high Himalayan regions where it is used mainly by the locals, graziers and the tribals (Pangwal and Bhot) as food. No literature/systematic work has been undertaken regard its distribution pattern, growth and regeneration potential, both natural as well as artificial till date in India. Beside valuable nuts, the species is extensively lopped for fodder and fuel along with maple (*Acer* spp.) and kharsu oak (*Quercus semecarpifolia*) in its natural zone. To access its natural regeneration status in wild the study was carried out in Hazel bearing forests of and of Himachal Pradesh. The manuscript describes the natural regeneration status of Indian hazelnut and associated species in selected hazelnut bearing sites in Sach (Pangi Forest Division, ) and Kotkhai Forest Range (Theog Forest Division) in district Chamba and Shimla of Himachal Pradesh. In all, eleven tree species were recorded from Pattidhank and Sali forest, while seven and ten species appeared in Gajta and Mindal forests, respectively. Natural regeneration was highest in Gajta (29.07%), followed by Sali (26.25%) forests distributed across two Forest Ranges i.e. Kotkhai (Shimla Circle) and Sach Range (Chamba Circle), respectively. Thus, proper silvicultural measures, along with in-situ conservation and large scale afforestation of this species with the participation of local communities is the need of the hour.

**Keywords:** Hazelnut, Regeneration, Species, Density, Himalayas

## **Image Segmentation Using Watershed Algorithm by Applying Distance Transformation**

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The aim of this paper is to present the image segmentation using watershed algorithm by applying distance transformation. The watershed algorithm is the most advanced and simple algorithm especially segmenting the objects which are touching each other. The watershed algorithms with canny edge detector produce an image with fine edges. The landscapes of these edges are punched which forms a grooves like structure called catchment basin and these basins are separated by a water bridge line, after this the flooding takes place which cover these catchment basin, which will detect an accurate image.

**Keywords:** Image segmentation, Canny edge detector, Watershed transform

## **Hybrid Effect of Micro Particles with Glass Fiber on the Wear Properties of Polymer Composites**

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In this paper the friction and wear characteristics of glass fiber reinforced vinylester composites have been investigated under dry sliding conditions for different applied normal load, sliding speed and sliding distance. The experiments have been carried on a pin on disc arrangement at normal room temperature conditions. The influence of friction and wear parameters like normal load, speed, sliding distance and percentage of filler content has been investigated. In this study, a plan of experiments, based on the techniques of Taguchi, was performed to acquire data in a controlled way. An orthogonal array  $L_{27}(3^{13})$  and Analysis of variance (ANOVA) were applied to investigate the influence of process parameters on the coefficient of friction and sliding wear behaviour of these composites. The experimental result shows that the wear rates of the hybrid composites decreased with the increasing applied load and sliding distance. It is also observed that the thin film formed on the counterface is effective in improving the tribological characteristics SEM analysis also has been carried to identify the phenomenon of wear.

### Screening of Bacteria Isolated from the Gut of a Lepidopteran for their Susceptibility to Standard Antibiotics

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A total of six bacterial isolates (4 gram positive; 2 gram negative) were obtained from the gut of *Spodopora litura* (L.) feeding on cauliflower leaves. These isolates were screened for their susceptibility to standard antibiotics. Gram negative isolate G-11 was most sensitive to ceftriaxone (38mm) whereas completely resistant to antibiotics such as co-trimoxazole, nalidixic acid and amikacin. Antibiotic ticarcillin was highly effective against another gram negative isolate G-14 (40mm). These isolates were least sensitive to colistin in common. The isolate G-1 was highly susceptible to azithromycin and erythromycin (36mm) while resistant to penicillin and ampicillin. Isolate G-4 was maximum sensitive to cephalothin (42mm) but completely resistant to amoxicillin, ampicillin and penicillin, whereas the isolate G-6, being resistant to co-trimaxazole, clindamycin, clarithromycin and erythromycin, showed high sensitivity towards novobiocin (34mm). Another isolate G-9, being most susceptible to ofloxacin (40mm), was interestingly resistant to 9 standard antibiotics, *i.e.*, penicillin, linezolid, clindamycin, ampicillin, novobiocin, erythromycin, teicoplanin, oxacillin and vancomycin.

**Keywords:** Gut bacteria, Insect, Effect of antibiotic

### Inhibition of Growth and Reproductive Performance of *Tribolium Castaneum* by Keto-Compounds from Essential Oils

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Keto-compounds present in plant essential oil were evaluated to determine the effect on growth and reproductive performance of *Tribolium castaneum*. Five compounds used were carvone, fenchone, menthone, pulegone, and verbenone. Carvone, menthone and pulegone significantly inhibited the larval growth ( $EC_{50} = 1.4-3.1$  mg/g of diet; fenchone and verbenone were moderately active ( $EC_{50} = 25.6$  and  $18.7$ mg/g, respectively). Significant larval mortality was obtained in the course of development under various treatments and

surviving pupae ranged between 50 to 60% and adults between 44.4 to 53.3% in various treatments in comparison to controls where 97.8% of adults survived. The experiments were carried out through F1 generation and the impact was evaluated from the adults obtained from the parental population treated at EC<sub>50</sub> levels. Deformed larvae and pupae were obtained in treatment groups, and interestingly the number was significantly similar in all treatments. Deformed adults were also observed after some abnormal pupae were able to undergo eclosion. The data suggest that structures of the compounds contribute to biological activity, as the stereochemistry of carvone, menthone and pulegone being similar, with variation in the keto group substitution at ortho- and meta-positions, indicated that  $\alpha,\beta$ -unsaturated carbonyl ketones act as potential anti-insect compounds.

**Keywords:** Plant essential oil, Inhibitory effects, *Tribolium castaneum*, Growth and development

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### Selection of Health Friendly Utensils for Cooking

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Condition of human health is directly related to the type of food we are taking. Over cooking of food and mixing of heavy metals from utensils used for cooking are the main causes of degradation of food nutrients. Even some types of chemicals can convert the food into poison. According to AMA (American medical association) main diseases reported these days are directly linked with the type of harmful utensils used for cooking such as Teflon coating utensils, Aluminium and Plastics utensils. The solution for the food cooking problem is the utensils made up of cast iron and earthen pots which were used for cooking by our ancestor in history. Diseases prevention is much easier than their cure. So, let's change the cooking utensils to less harmful or useful material utensils for restoring nutrients and cure of diseases.

**Keywords:** Utensils, Heavy metal, AMA, Diseases, Teflon, Aluminium, Plastic, Cast Iron, Earthen pots

## **Non Chemical Approaches to Control Lesser Wax Moth, *Achroia grisella* Fabricius in Beekeeping**

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The lesser wax moth is a mixed blessing for beekeepers. They are raised for various purposes such as fish bait, animal feed, scientific research and for study purposes. The wax moth has caused severe damage in plains and lower altitudes but rare in high altitude areas. Newly hatched larvae burrow into wax comb and endeavor to approach the comb midrib. Fully grown larvae spin a silk cocoon that is dense and tough. The appearance of *Achroia grisella* F. adults is silver-grey in colour, with a distinct yellow head. The body lengths of adult female and male are about 13 and 10 mm, respectively. The fecundity of female varies from 250 to 300 eggs with total life span of about seven days. The infestation of lesser wax moth is more prone to the weak colonies than high strength colonies. They generally prefer to feed on dark areas. The bald (uncapped) brood damage symptoms occur by the damage of this pest. The fecal matter of larvae is also observed on the pupae of honey bees after their infestation. It also acts as destructive pest for stored combs. Traditionally, various practices used by the beekeepers to control this moth includes: uniting of weak colonies, exposure to sunlight for 15-20 minutes, burning of debris and making the combs air tight. Storing the empty combs at low temperature (0 to -10°C) for 5 hours leads to destroying all stages of wax moth. The application of fumigants in colonies lead to residual contamination in honey so, fumigation with various chemicals such as naphthalene, ethylene di-bromide and PDB is avoided. In conclusion from the above review, it is suggested that the chemicals used in beekeeping have a long lasting residual effect on bee products so, their application should be avoided and eco-friendly methods should be promoted.

**Keyword:** Lesser wax moth, *A. grisella*, Colonies, Bee-keeping, Residual effect

## **Screening Bacterial Diversity for their Plant Growth Promoting Potential**

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A wide variety of cash crops are cultivated every year in Punjab and for improving the productivity and sustainability of these crops a number of chemical fertilizers are used. These chemicals are costly and their regular use over the years had lead to serious human health and environmental concerns. Thus, bioformulations are envisaged to be an integral

part of the biologically safe strategies for controlling the excessive use of chemicals. The plant growth promoting (PGP) bacteria has emerged as an environment friendly alternative for increasing productivity. These beneficial bacteria positively influence the growth of plants by production of diverse metabolites like phytohormones, siderophores, chitinases, phosphate solubilization etc. In light of this, the bacterial diversity was isolated from roots, stems, leaves and rhizospheric soil of wheat, rice, potato, pea and tomato. The bacterial isolates were screened for plant growth promoting (PGP) attributes viz. production of siderophores, chitinases, hydrocyanic acid (HCN), indole-3-acetic acid (IAA) and phosphate solubilization. Out of 115 isolates screened, 37 were positive for phosphate solubilization; 55 were positive for siderophore production and 23 were positive for production of IAA. All the isolates were negative for production of HCN and chitinases. The potential isolates based upon their ability to produce siderophores, indole-3-acetic acid (IAA) and phosphate solubilisation were further evaluated for their plant growth promoting potential.

**Keywords:** Bacterial diversity, Plant growth, Human health

**PP-74**

**Current Senario of Greater Wax Moth *Galleria mellonella* Linnaeus and its  
Management Strategies in Beekeeping**

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Beekeeping contributes immensely to the welfare and economy of mankind. It involves the practice of keeping and manipulating honey bees. The occupation of bee keeping has swiftly increased in India and in other Asian countries due to their favourable environment and high market potential of bee products. The Greater wax moth, *G. mellonella* L. (Lepidoptera: Pyralidae) causes a lot of destruction in apiaries by damaging both stored as well as hive combs. In colonies, firstly, it destructs the combs and secondly, it transfers the pathogen of serious bee diseases. The weak strength colonies are more prone to Greater wax moth than stronger colonies. This pest causes a severe damage in areas with high temperature and relative humidity. The beekeepers attempt various methods to control wax moth population. These includes cold storage (<15°C), frost and heat treatment, hermetic storage (minimum for 2 months), male sterile technique (MST) etc. The *Bacillus thuringiensis* is an important bio-control agent against wax moth. Another promising biological control agent is red fire ant of wax moths, but was found to be consistently effective only at excessive colony densities when equipment was stored in a manner which promoted increased light and ventilation conditions. The various plant extracts can also be used for the control of wax moth such as neem products. The traditionally used chemicals to the control of greater wax moth are sulphur, ethylene dibromide (EDB), paradichlorobenzene (PDB), acetic acid and

formic acid. There are some other methods to control *G. mellonella* like incorporation of compounds into the diet of wax moth, controlled release of liquid or crystalline compounds, Gamma-rays irradiation and sterilization, entomopathogenic control of wax moths etc. The greater wax moth attained resistance against various traditional methods, so there is need to diversify their management practices to optimise their control in beekeeping.

**Keyword:** Greater wax moth, *G. mellonella*, *Bacillus thuringiensis*, Bee-keeping, Apiaries, colonies, Residual effect

PP-75

**Endophyte-Mediated Tritrophic Interactions among the Cauliflower, the Herbivore *Spodoptera litura*, and its Ectoparasitoid *Braconhebetor***

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Plant symbionts influence trophic interactions among host plants, herbivores and natural enemies of herbivores. Endophytic fungi are a ubiquitous group of microbial plant symbionts that occur in living tissues of plants without causing any overt symptoms. Fungal endophytes of host plant can influence trophic interactions directly through production of mycotoxins or indirectly by induction of plant allelochemicals. To evaluate these interactions, we used a lepidopteran pest and its generalist parasitoid to evaluate the effect of endophyte-infected plants on a third trophic level. Endophytic fungi, *Aspergillus flavus* and *Aspergillus niger*, isolated from *Acacia arabica*, were used to infect cauliflower plants. We found that feeding of host *Spodoptera litura* (Fab.) on endophyte-infected plants adversely affected the development and performance of its parasitoid, *Braconhebetor* (Say). A negative impact was also recorded for longevity and fecundity of endophyte-naïve parasitoid females due to the parasitization of host larvae fed on endophyte-infected plants. The presence of endophytes in the diet of the host larvae significantly prolonged the development of the parasitoid. A strong detrimental effect was also recorded for larval survival and emergence of parasitoid adults. The longevity and parasitism rate of female wasps were reduced significantly due to the ingestion of endophyte-infected cauliflower plants by *S. litura* larvae.

**Keywords:** Endophytes, Host plant interactions, Parasitoids, Tritrophic interactions

**Human-Leopard Conflict in Hamirpur District, Himachal Pradesh, India**

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Human-wildlife conflict is a worldwide problem for wildlife management. We studied the human-leopard conflict in Hamirpur district located in foothills of Shivalik Himalayas (Himachal Pradesh), India. Human-leopard conflicts data was collected from the H.P State Forest Department and also by randomly interviewing the affected families. A total of 156 human casualties were recorded since 1995 to 2010. Male casualties (n=127) were higher in comparison to female casualties (n=26). Human mauling (99%) were high as compared to the killing (1%) cases. There is marked yearly variation in human casualties with highest casualties in 1993 (n=23) followed by 1995 (n=18) and 2000 (n=16). Monthly variation shows linear correlation. 48% cases occurred in the vicinity of villages followed by crop field with 33% cases. Most of the incidences occurred in the evening and morning time with 62 and 51 casualties respectively. Most of the human casualties (n=46) were of the age between 13-30 years. Leopard killed 4347 livestock in 2556 attacks. Most of them were recorded in Hamirpur range with (90%) livestock killed in (88%) attacks. There is increasing trend in the livestock killed from 1990 that reached highest in 1994 (n=584) and then decreasing gradually onwards. Goat (46%) and sheep (40%) were the most favoured livestock kills. There is linear correlation in monthly variation of casualties. In most of the attacks leopard invade in cowshed (70%) followed by grassland (14%). Night time period is worst for livestock killing (48%) followed by evening (27%). Recommendations for mitigation of human-leopard conflicts and its conservation have been made.

**Key words:** Human-Leopard Conflict, Wildlife, Livestock, Shivalik Himalayas, Mitigation

**Hybrid Effect of Micro Particles with Glass Fiber on the Wear Properties of Polymer Composites**

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In this paper the friction and wear characteristics of glass fiber reinforced vinylester composites have been investigated under dry sliding conditions for different applied normal load, sliding speed and sliding distance. The experiments have been carried on a pin on disc arrangement at normal room temperature conditions. The influence of friction and wear parameters like normal load, speed, sliding distance and percentage of filler content has been

investigated. In this study, a plan of experiments, based on the techniques of Taguchi, was performed to acquire data in a controlled way. An orthogonal array L<sub>27</sub> (3<sup>13</sup>) and Analysis of variance (ANOVA) were applied to investigate the influence of process parameters on the coefficient of friction and sliding wear behaviour of these composites. The experimental result shows that the wear rates of the hybrid composites decreased with the increasing applied load and sliding distance. It is also observed that the thin film formed on the counterface is effective in improving the tribological characteristics SEM analysis also has been carried to identify the phenomenon of wear.

**PP-78**

**Preliminary Floristic Investigations on Lichens of Hamirpur District, Himachal Pradesh**

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Lichens are structurally organized entity consisting of permanent association of a fungus and an alga. Lichens are of ecological and economic importance. In contrast to the insufficient data available on floristic of lichens of district Hamirpur of Himachal Pradesh, the investigations were initiated to describe and preserve the lichens of this region. During the course of present study a total of eight species viz. *Candelaria concolor* (Dicks.) Arn., *Canomaculina subsumpta* (Nyl.) Elix, *Chrysothrix candelaris* (L.) Laund., *Flavoparmelia caperata* (L.) Hale, *Parmotrema dilatatum* (Vain) Hale, *Phaeophyscia orbicularis* (Necker) Moberg, *Physcia P. caesia* (Hoffm.) Fűrnr. and *Punctelia borreri* (Sm.) Krog, belonging to eight genera of four families (Candelariaceae, Chrysothricaceae, Parmeliaceae and Physciaceae) have been recorded from the study area.

**Keyword:** Lichen, Fungus, Alga, Ecological, Species

**PP-79**

**Developments in Fuel Cell Technology: A Critical Review**

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Fuel Cell is an electrochemical device that continuously converts the chemical energy into electrical energy as long as the fuel and oxidant are applied. Currently fuel cells are under intense investigation as a part of indispensability vitality toward carbon neutral energy

source. Different types of fuel cells have been used for portable devices, stationary appliances, automobiles, etc. Proton exchange membrane fuel cells (PEMFCs) are the most promising for their use in temperature range of 80-120°C. The polymer electrolyte membrane (PEM), being a cardinal component of PEMFCs, is studied in detail over two decades. The state-of-art Nafion is the commercially available PEM with very high proton conductivity and fuel cell efficiency. All the PEM related properties such as water uptake, ion exchange capacity, proton conductivity, oxidative stability, methanol permeability, thermal stability and mechanical stability has major impact on the fuel cell efficiency. Therefore, in this review article all these PEM properties are also discussed.

**PP-80**

### **Non Timber Forest Product Plants of Hamirpur District and Their Uses**

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Hamirpur district is the smallest district of Himachal Pradesh which falls in the Shivalik hills. A survey was carried out in District Hamirpur, Himachal Pradesh for documentation of important flora and information from local community about non timber forest product plants and their uses. The indigenous knowledge of local traditional uses were gathered through questionnaire and personal interviews during field trips. Plants with their correct nomenclature were arranged by family name, vernacular name, part used and essential medicinal uses. The use of 25 plant species belonging to 21 families which yield Non Timber Forest Product explored. The forest dwellers are progressively dependent on NTFPs for sustaining their daily livelihood instead of utilizing it as a prospective income source and for their socio-economic development. Aim of present work was to accumulate knowledge regarding ethnic uses of plants so that they can be used for modern formulation of paper, timber, dye and tannins, gums and resins etc in industries.

**Keywords:** Himachal Pradesh, Hamirpur, Non timber forest product plants, Traditional knowledge, Shivalik Range

### **Aromatic Plants of District Bilaspur and their Traditional Uses**

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A survey was carried out in district Bilaspur, Himachal Pradesh for documentation of important flora and information from local community about aromatic plants and traditional uses. The indigenous knowledge of local traditional uses were gathered through questionnaire and personal interviews during field trips. Plants with their correct nomenclature were arranged by family name, vernacular name, part used and essential oil uses. Total 643 aromatic plants were found in Himachal Pradesh out of which 15 species of aromatic plants belonging to 12 families enlisted, out of which 11 were monocots and 1 was of dicot family. Aim of present work was to accumulate knowledge regarding ethnic uses of plants so that they can be used for modern formulation of perfumes in Industries and for food purposes.

**Keywords:** Himachal Pradesh, Bilaspur, Aromatic plants, Traditional uses

### **Elemental Analysis of Pesticides from Some Common Vegetables**

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Elemental analysis is the qualitative (determining what element are present) and quantitative (determining how much of each are present) detection of the element in a sample. Elemental analysis on Carbon, Hydrogen and Nitrogen is most essential. The aim of this study was to evaluate the presence of pesticides in some common vegetables of local market. Pesticides are the substance which means to attract and then destroy the pest. For example DDT, BHC, zinc phosphide, Mercuric chloride, dinitrophenol etc. The sodium fusion test or Lassaigne's test is used for the elemental analysis for the qualitative determination of the presence of pesticides. The test involves heating the sample strongly with clean sodium metal 'fusing' it with the sample. Pesticides are used to control organism that are considered to be harmful. For example they are used to destroy or kill the mosquitoes that can transmit potentially dead diseases like malaria and also kill bees, wasps or ants that can cause allergic reaction. Pesticide usage is very often necessary to maintain both agricultural productivity as well as human health. It can prevent sickness in human that could be caused by moldy food. Experimental study shows that the vegetables that we consume especially tomato and potato contain nitrogen containing pesticides. This process is useful as it helps determine if a sample sent is desired compound and confirms the purity of a compound.

**Keywords:** Pesticides, Vegetables, Lassaigne extract

### Preliminary Investigations on Diversity of Wood Rot Fungi

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Wood rot fungi play an important role in ecological nutrient cycling due to their ability to decompose lignified cells of coarse woody material through enzymatic action of lignocellulolytic enzymes. Keeping in view, the ecological and economic importance of wood rot fungi and in contrast to the insufficient data available on the geographical distribution and diversity of wood rot fungi in Hamirpur district of Himachal Pradesh, the floristic investigations were initiated to describe and preserve the wood rot fungi of this region. During the present investigation, eight species of wood rot fungi have been recorded from the study area. Out of these eight species, one species viz. *Daldinia concentrica* (Bolt. ex Fr.) Ces & de Not., belongs to a genus (*Daldinia* Ces. & De Not.) of a family (Xylariaceae) of ascomycota, whereas other seven species viz. *Auricularia auricula-judae* (L.:Fr.) Schroet., *Fomitopsis dochmia* (Berk & Broome) Ryv., *Hexagonia sulcata* Berk., *Polyporus hirsutus* Wulf. ex Fr., *Schizophyllum commune* Fr.:Fr., *Trametes gibbosa* (Pers.:Fr.) Fr. and *T. versicolour* (L.:Fr.) Pilat, belong to six genera of four families (Auriculariaceae, Fomitopsidaceae, Polyporaceae and Schizophyllaceae) of basidiomycota. Six species viz. *Auricularia auricula-judae* (L.:Fr.) Schroet., *Daldinia concentrica* (Bolt. ex Fr.) Ces & de Not., *Fomitopsis dochmia* (Berk & Broome) Ryv., *Hexagonia sulcata* Berk., *Polyporus hirsutus* Wulf. ex Fr. and *Trametes gibbosa* (Pers.:Fr.) Fr. have been recorded for the first time from the study area.

**Key Words:** Diversity, Wood Rot Fungi, Lignocellulolytic enzymes

### Optical Absorptance of Home made Perovskite Solar Cell

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In the context like Nepal, the experimental setup for Perovskite solar cell is a challenge. Due to unavailability of needed chemicals and proper equipments, it is very difficult to work under certain circumstance. Also for Perovskite, major challenges is that resolved in terms of reproducibility, stability and durability. Consequently, intense competition is ongoing internationally to achieve practical use of these solar cells. For the preparation of Perovskite Solar Cell, we used FTO (Fluorine Doped Tin Oxide) above the glass plate. After that, Aluminium doped ZnO is coated above FTO. Then after,  $\text{CH}_3\text{NH}_3\text{PbCl}_x\text{I}_{1-x}$  film was fabricated by two steps. Solution with 462 mg  $\text{PbI}_2$  in 1 ml DMF (Dimethyl Formamide) heated till dissolved, was spin coated at 3000 rpm for 30 sec. Then it was heated for 30 min in  $70^\circ\text{C}$ . After cooling to room temperature, finally, the film was dipped into  $\text{CH}_3\text{NH}_3\text{Cl}_x\text{I}_{1-x}$ .

x solution of iso-propanol with a concentration of 10 mg/ml for 20 min and then dried for 30 min. For the characterization, we used Raman Spectrum and UV-viz. spectrophotometer. In Raman spectrum, the peak lies between  $100\text{ cm}^{-1}$  to  $200\text{ cm}^{-1}$  which show the same nature of Perovskite Solar Cell. In UV-viz spectrophotometer the film's optical absorption lies between the range of 350 nm to 770 nm which indicates the presence of perovskite in thin film.

**PP-85**

**Effect of Maltodextrin on the Micellar Properties of Synthesized 12-2-12 Gemini Surfactant in Aqueous Medium: Conductometry and Fluorescence Probe Studies**

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In the present work, the micellar behaviour of synthesized 12-2-12 gemini surfactant in aqueous solutions of (0.5 and 1.0%)(w/v) maltodextrin has been investigated by measuring conductivity of the mixtures in temperature range (293.15-313.15) K at an interval of 5 K. The concentration –conductivity profiles have been used to calculate the value of CMC of surfactant. The trend of CMC values follows the order: no additive > 0.5% maltodextrin > 1.0% maltodextrin which reveals the enhanced micellization of surfactant in the presence of maltodextrin. It has been assumed that in presence of maltodextrin, water-water interaction are replaced by water-malto- dextrin interactions which lead to dehydration of the hydrophilic group and may cause decrease in CMC. Various thermodynamic parameters of micellization like standard enthalpy of micellization,  $\Delta H_m^0$ , standard entropy of micellization  $\Delta S_m^0$ , and standard free energy  $\Delta G_m^0$ , have been computed by Pseudo-phase separation model. The temperature dependence of CMC gave a better insight regarding the hydrophilic as well as hydrophobic interactions prevailing in carbohydrate-surfactant-water system. Further, the spectroscopic technique i.e. fluorescence probe study supports the results obtained from conductivity measurement. The study of Gemini surfactant-aqueous carbohydrate system may be helpful in the effort being done towards a healthier world from both personal and environmental aspects of life.

**Keywords:** 12-2-12 Gemini surfactant, Maltodextrin, Critical micelle concentration, Thermodynamic of micellization, Spectroscopic technique

**PP-86**

**Surface Activity and Micellar Behaviour of Bile Salts at Varying Temperatures:**

**Surface Tension Study**

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In this study, an attempt has been made to explore some information about the effect of disaccharide (lactose) on the micellization mechanism of bile salts namely sodium cholate

(NaC) and sodium deoxycholate (NaDC) by applying surface tension measurements for ternary (water + lactose + NaC/NaDC) system. The critical micelle concentration (CMC) values for NaC and NaDC in aqueous solutions of lactose (0.0, 0.5, 1.0, and 1.5) % w/v in the temperature range 293.15 to 313.15 K at an interval of 5 K, have been determined from surface tension-concentration plots. The variations in the micellization behaviour induced by lactose for these bile salts have been explained in terms of hydrophobicity and hydrophilicity of NaC and NaDC. Different interfacial and thermodynamic parameters derived from surface tension ( $\gamma$ ) values and their variations have been explained in terms of modification in surface activity and micellar behaviour of these bile salts.

**PP-87**

### **Aggregation of Bio-surfactants in Aqueous Solutions of Galactose: Volumetric Study**

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The aggregation behaviour of bio-surfactants (bile salts), sodium cholate (NaC) and sodium deoxycholate (NaDC) in aqueous solutions of galactose has been investigated by measuring the density ( $\rho$ ) and speed of sound ( $u$ ) of the mixtures at different temperatures 298.15, 298.15, 303.15, 308.15 and 313.15 K. The variation of density and speed of sound may be interpreted as solute-solvent/solvent-solvent interactions respectively, of the solvent on the addition solute. The data have been further used to calculate derived volumetric and compressibility parameters such as apparent molar volume ( $V_\phi$ ), isentropic compressibility ( $\kappa_s$ ), apparent molar adiabatic compression ( $\kappa_{s,\phi}$ ). The concentration dependence of these parameters signifies the modification of water-water interactions on the addition of surfactant molecules. The study has been useful to get an idea about the interplay of intermolecular interactions prevailing in the studied ternary (bio-surfactant + saccharide + water) system.

**PP-88**

### **Environmental Radioactivity: A Review**

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Radon is a radioactive gas which is present everywhere on the earth with different proportions according to the place. Radon is noble gas that mainly exists in soil and rocks. It occurs as a product of uranium decay. It can also be found in drinking water and this can sometimes present a hazard. Research in indoor air radon and outdoor air radon are very significant for hygiene. Indoor air radon joins from outdoor air radon through buildings material and ventilation. Outdoor air radon changes with geographical region, season and month. Presence of radon and their decay products in household environment are considered

a potential health hazard. Measurement of their levels is an important aspect to assess the threat they may pose to humans.

**PP-89**

**Intermolecular Interactions of Antimicrobial Drug (Terbinafine hydrochloride) and CTAB in Hydro-Ethanollic Solutions: Transport Properties Examination**

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This present investigation deals with the effect of antimicrobial drug viz. terbinafine hydrochloride on properties of cationic surfactants i.e cetyltrimethylammonium bromide (CTAB). Considering the significance of micellar solution as carrier, we examined the transport properties viz. apparent molar volume, apparent molar adiabatic compression and isentropic compressibility. The physico-chemical parameters apparent molar volume and apparent molar adiabatic compression are found to be positive at all temperatures and concentrations which are indicative of the existence of hydrophobic interactions. Convincingly, this study not only casts light on the binding interactions but also provides a hint to utilize the micellar system in stabilization and maintenance of pharmaceutical materials.

**Keywords:** Terbinafine hydrochloride, Cetyltrimethylammonium bromide, Physico-chemical studies, Apparent molar volume

**PP-90**

**Effect of Surfactants (CTAB and GEMINI) on the Structural Properties of ZnO NPs and their Utilization for the Degradation of Methyl Orange Dye and Detection of PNP**

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ZnO nanosheets were successfully synthesized in the presence of cationic surfactants CTAB and Gemini (12-2-12) surfactant. The interaction of surface active molecules and nanoparticles strongly affect their size, properties and applications. The synthesized nanoparticles were characterized in terms of their morphological, structural, optical and compositional properties by using different characterization techniques viz. UV-Visible spectroscopy, powder X-Ray Diffraction (XRD), Energy Dispersive Spectroscopy (EDS) and Field Emission Scanning Electron Microscopy (FESEM). UV-Visible spectrum exhibits the peak in the range of 363 -369 nm which are characteristic of ZnO nanomaterial. The characterization techniques revealed that the prepared samples were well crystalline possessing sheet-like shape; crystal size of ZnO NPs prepared in the presence of CTAB and gemini surfactant was 28.33 nm, 20.8 nm respectively, while 25.68 nm in the absence of surfactant. From the FESEM study capping ability of CTAB has been confirmed. The

applicability of these NPs has been checked to degrade hazardous methyl orange (MO) dye under UV- light irradiation. Moreover, the sensitivity of ZnO has been confirmed by the detection of PNP (p-Nitrophenol) within the detection limit to be 4.35  $\mu\text{M}$  , 8.40  $\mu\text{M}$  in the presence of CTAB and gemini surfactant respectively whereas 9.85  $\mu\text{M}$  in the absence of surfactant. Thus, we find that ZnO nanomaterial prepared by simple solution process holds potential as efficient photocatalyst and highly sensitive chemical sensor.

**Keywords:** Nanosheets, Solution method, Energy dispersive spectroscopy, Capping ability

**PP-91**

**Thermo-acoustic Approach to Study the Volumetric and Compressibility Properties of Cationic Surfactants (CTAB and DTAB) in Aqueous Solutions of Glycyl dipeptide**

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The effect of glycyl dipeptide on compressibility and volumetric properties of a cationic surfactants, CTAB (Cetyltrimethylammonium bromide) and DTAB (dodecyltrimethylammonium bromide) has been examined by measuring the density ( $\rho$ ) and speed of sound ( $u$ ) in aqueous solutions over a wide range of temperature (298.15 to 318.15 K) at an interval of 5 K. The density and speed of sound measurements are expected to shed light on both solute-solute and solute-solvent interactions. By using the experimental data, various parameters viz. apparent molar volume ( $V_\phi$ ), isentropic compressibility ( $\kappa_S$ ) and apparent molar adiabatic compression ( $\kappa_{S,\phi}$ ) have been derived. Volumetric data suggest that CTAB interacts strongly with the zwitterionic end group of the dipeptide, and has a strong dehydration effect on the glycyl dipeptide. The trends of all these parameters have been examined in terms of competing pattern of various intermolecular interactions existing in ternary (dipeptide + water + surfactant) system.

**Keywords:** Glycyl dipeptide, Cationic surfactants, Apparent molar volume, Apparent molar adiabatic compression, Intermolecular interactions

**PP-92**

**Micellization and Thermodynamic Behaviour of Bile Salt in Aqueous Solutions of Galactose at Various Temperatures: Conductometric and Fluorescence Probe Studies**

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The conductometric and fluorescence techniques have been employed to get information regarding the interactions between the surfactant and additive in the system. In the present work, the micellization and interactions of bile salt i.e. sodium deoxycholate (NaDC) in aqueous solutions of galactose have been carried out at various temperatures (293.15-313.15

K). The critical micelle concentration (CMC) values and thermodynamic parameters such as standard Gibbs free energy  $\Delta G_m^o$ , enthalpy  $\Delta H_m^o$ , and entropy ( $\Delta S_m^o$ ) of micelle formation have been calculated from the conductivity measurements at different temperatures. The CMC values are in very close agreement with those obtained from fluorescence that substantiates both studies. Thermodynamic data have been known to provide the evidences for a significant contribution of the size of hydrophobic part of saccharides towards micellization of bile salt. The varying size (hydrophobic part) as well as the hydrophilic part may be the principal factor in determining the thermodynamics of micellization for studied bio-surfactant in aqueous solutions of saccharides.

**Keywords:** Micellization, Critical micelle concentration (CMC), Standard Gibbs free energy, Enthalpy, Entropy

**PP-93**

**Effect of Additives on Volumetric and Viscometric Properties of Amino Acids**

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In this paper, we have reported the results of density,  $\rho$ , and viscosity,  $\eta$ , measurements of glycine and arginine at molalities ranging from (0.01-to 0.09) mol·kg<sup>-1</sup> in the presence and absence of various additives viz. alcohols, electrolytes, and saccharides (0.05) mol·kg<sup>-1</sup> at 298.15 K. By using experimental density and viscosity data, the partial molar volumes,  $\phi_v^o$ , transfer partial molar volumes,  $\Delta_r\phi_v^o$ , the viscosity B-coefficients by employing the Jones-Dole equation, and viscosity B-coefficient of transfer,  $\Delta_rB$ , have been calculated. The trends of variation of different parameters have been interpreted in light of the solute-solvent/cosolute and solute-solute interactions occurring in the ternary systems. An attempt has also been made to compare the effect of different additives on volumetric and viscometer parameters of studied amino acids.

**Keywords:** Alcohol, Arginine, Electrolyte, Glycine, Saccharide

**PP-94**

**Circular Waves Propagation on Surface of Transversely Isotropic Thermoelastic Solid with Liquid Interface**

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This paper studies the propagation of circular waves in a homogeneous transversely isotropic, thermally conducting elastic solid half-space in contact with a half-space of inviscid liquid at uniform temperature in the context of coupled theories of thermoelasticity.

Based on mathematical model, the secular equations for circular waves in compact form are derived. The results for isotropic case, in the absence of fluid loading and uncoupled theories of thermoelasticity have been obtained as particular cases from the derived secular equations. Finally, anisotropy effects on the phase velocity, attenuation coefficient are graphically presented for zinc material solid (half-space) underlying an inviscid liquid half-space in order to present the analytical results and make comparison. The MATLAB software tools have been employed for numerical computations.

**PP-95**

### **Effect of Deficit Irrigation on Canopy Temperature and Water Relations of Various Kiwifruit Cultivars**

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The five kiwifruit cultivars viz. Allison, Hayward, Abbott, Monty and Bruno were investigated for their tolerance to water stress condition during the year 2011 and 2012 in the department of Fruit Science in university of Horticulture and Forestry, Nauni, Solan (H.P). These cultivars were subjected to two irrigation levels standard irrigation (at 80 % Field Capacity) and deficit irrigation (at 60 % Field Capacity). The comparative study of canopy temperature and water relations of these cultivars was conducted. The deficit irrigation resulted in increase in canopy temperature and stomatal resistance; reduction in leaf water potential, transpiration rate, leaf photosynthetic rate and chlorophyll contents of different cultivars. The Hayward cultivar was proved to be more sensitive to deficit irrigation levels in terms of canopy temperature, leaf water potential, stomatal resistance, transpiration rate, photosynthetic rate and chlorophyll content whereas the cultivar Bruno was proved to be least sensitive.

**Keywords:** Kiwifruit, Deficit irrigation, Water stress, Canopy temperature, Water relations, Leaf water potential, Transpiration rate, Photosynthetic rate, Chlorophyll content, Stomatal resistance.

**PP-96**

### **Semi-Groups of Composition Operators on Weighted Banach Function Spaces**

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In this paper, we characterize boundedness, compactness and semi-groups of composition operators on some weighted Banach function spaces such as absolutely continuous Banach function Spaces on a resonant measure spaces. In addition, we study some properties of semi-groups of composition operators on weighted Lorentz-Karamata spaces.

**Keywords:** Boundedness, Compactness, Operator, Resonant, Semi-group, Weight

## Study of Microbiological Quality of Ready to Eat Food Samples Collected from Mohali Food Outlets

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Ready-to-eat foods can be described as foods and beverages that can be bought directly from street vendors or hawkers and are consumed at the point of sale or at later time without further processing. The present study was conducted to check the microbial quality of ready to eat food items. Nine different food items including sandwich, burger, cream roll, muffins, McCain tikki, juice, pizza, butter and milk badam were taken and examined for microbial load by using microbiological methods like total viable count, culture characterization, biochemical characterization and antibiotic susceptibility of microorganisms isolated from ready to eat food items. The results obtained revealed that the total bacterial count ranged from  $1.0 \times 10^{-4}$  to  $4.1 \times 10^{-4}$  cfu. The morphological, cultural and biochemical analysis of samples revealed the presence of bacterial species which belong to genera *Bacillus*, *Clostridium*, *Staphylococcus*, *Enterobacter* and *Listeria*. These results were acceptable according to the specification by Centre of Food Safety. The contamination of food items indicated inadequate processing and storage due to which microorganisms can multiply to a dangerous level causing serious health problems for the consumers. There is need to prepare and preserve the food ingredients under appropriate and hygienic conditions. A closer and strict supervision of ready-to-eat foods should be carried out by the relevant authorities to prevent possible outbreak of food borne illness. Furthermore, health education should be provided to improve the knowledge of food vendors on food safety and hygiene practices.

## A Review on Self Healing Coatings

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Polymer coatings are applied to the surface of metals to protect the substrates from environmental exposure as they are highly stable to the species present in the environment. Coatings are damaged by the microcracks which are difficult to repair. Thus, self preparation of polymeric components is important. Self healing polymers possess the ability to repair the damage automatically, inspired by the wound healing processes in biological systems. This review covers the various approaches for achieving healing functionality which are aimed to improve the natural mechanism of autogenous crack healing and modifying concrete by embedding capsules with healing agents. This paper reviews the self-healing techniques that have been developed by researchers in the laboratory for real life applications.

## Extraction, Utilization Pattern and Prioritization of Fuel Resources for Conservation in Kanawar Wildlife Sanctuary

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Fuel wood is the main source of the energy in mountainous regions. Hence, annual wood consumption is very high. Excessive collection of timber, fuel wood, food plants and commercial exploitation of medicinal plants has provided great deal of vulnerability to individual species. The process of biomass extraction has been intensified due to increasing populations of human and livestock. Excessive and unplanned harvesting of fuel wood, fodder and timber has profound effects on the biodiversity of the forest ecosystem. Information on fuel wood resources, and their extraction and availability is very scanty. Therefore, present study was carried out to study the diversity of fuel wood species, annual collection, preference and availability of fuel species in the forests. Surveys of the villages were conducted to identify and quantify the fuel resources. The information generated from different samples was pooled for each village. For each species average quantum collection ( $\text{kg sample}^{-1}\text{day}^{-1}$ ,  $\text{kg household}^{-1}\text{day}^{-1}$  and  $\text{kg household}^{-1}\text{year}^{-1}$ ), Probability of Use (PU) and Resource Use Index (RUI) were calculated. Twenty eight species (19 trees and 9 shrubs) were extracted for fuel by the inhabitants. Total collection and species preference was highest for *Picea smithiana*, *Cedrus deodara*, *Pinus wallchiana*, *Abies pindrow* and *Desmodium elegans* respectively. Resource use index indicating use pressure was highest for *C. deodara*, *P. smithiana* and *Abies pindrow* respectively. Besides native species, some non-native horticultural and agroforestry species such as *Maluspumila*, *P. domestica* and *Celtis australis* etc. were also being used as fuel. Preferred species showed their availability in eight forest types, whereas, population and regeneration status was poor. Therefore, immediate actions are suggested to sustain current and future demand of fuel wood. The afforestation of degraded, uncultivated and marginal lands through high quality and preferred fuel species might reduce pressure on wild and selective species.

**Keywords:** Utilization Pattern, Extraction, Prioritization, Fuel Resources, Conservation

## An Enumeration of Lichens from Sarkaghat Region of District Mandi, Himachal Pradesh

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Lichen is a dual organism entity in which two entirely different types of organisms i.e. an alga (Photobiont) and fungus (mycobiont), survive the environmental barriers through a unique symbiotic association. Floristic investigations on lichen flora of Sarkaghat region of

Mandi district of Himachal Pradesh were initiated in contrast to insufficient data on their geographical distribution and diversity in this area. During the present enumeration, a total of thirteen species of lichens viz. *Aspicilia calcarea* (L.) Mudd., *Buellia indica* Singh & Awasthi, *Chrysothrix candelaris* (L.) Laund., *C. chlorina* (L.) Laund., *Collema polycarpon* Hoffm., *Dermatocarpon miniatum* (L.) Mann., *Heterodermia diademata* (Tayl.) Awasthi, *H. leucomela* (L.) Poelt, *Lecanora muralis* (Müll. Arg) Poelt, *Parmotrema tinctorum* (Nyl.) Hale, *Phaeophyscia orbicularis* (Necker) Moberg, *Physcia caesia* (Hoffm.) Fürnr. and *P. dubia* (Hoffm.) Lettau, belonging to ten genera of seven families (Chrysothricaceae, Collemataceae, Hymeneliaceae, Lecanoraceae, Parmeliaceae, Physciaceae and Verrucariaceae) have been reported for the first time from the study area.

**Keywords:** Lichen, Diversity, Floristic, Sarkaghat, Symbiosis

PP-101

**Diversity and Distribution of Medicinal Plants in Sacred Groves of Kullu district, Himachal Pradesh**

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Sacred groves are a small area of forest protected by the local people. These are one of the rich biodiversity spots wherein rare plants, animals and medicinal plants are established in reserved forests. In the remote areas of the Indian Himalayan Region, the inhabitants largely depend on medicinal plants for curing diseases and income generation. But, proper documentation of the medicinal plants has been poorly attempted. The present study provides comprehensive information on the diversity, distribution pattern, nativity, endemism, rarity and indigenous uses of the medicinal plants of the Sacred groves in Kullu district of Himachal Pradesh. Total 298 species of medicinal plants belonging to 78 families and 192 genera were recorded to be used by the inhabitants of the area for curing various ailments. These medicinal plants comprise of 30 trees, 216 herbs, 48 shrubs, 4 climbers and 4 ferns. Maximum medicinal plants were reported in the altitudinal zone 1500-2600m and the number decreased with increasing altitude. Of the total medicinal plants, 158 were natives, 04 endemic and 54 near endemic. The continued over-exploitation, habitat degradation and changing environmental conditions may lead to the extinction of these species within a few years.

**Keywords:** Sacred groves, Conservation, Over-exploitation, Diversity, Habitat

**Environmental Legislation**

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The term environment generally connotes surroundings. According to Encyclopedia Britannica the expression environment connotes the entire range of external influence acting on an organism, both the physical and biological and other organism, i.e. forces of nature surrounding and individual. The primitive societies lived in forests and open lands without any dwelling place on any occupation, trade, business or industry. Their livelihood mainly depended on hunting beasts, birds and animals and eating whatever was available in forests i.e. leaves, fruits, roots etc. Gradually as the society developed and headed towards civilization the idea of agricultural, cultivation, framing developed with greater interaction between human beings. Their growing needs led to new avenues for their survival. The natural resources available on earth provided them raw material as a sources for their livelihood and survival. However, the misuse or abuse of natural resources and surroundings vitiated the natural environment which adversely affected the health and ecosystem. It has been universally accepted that human happiness and growth which are fundamental for the well being of the society cannot be achieved without protection and preservation of environment. The right to a healthy natural environment is therefore recognized as a fundamental human right. The core issue involved in protection of environment is need for maintenance of a proper balance of the eco-system through sustainable development so that natural resources be preserved for future generation without any environmental degradation. These efforts can succeed only when we have effective laws for the protection and preservation of environment in its varied forms and adopting an integrated growth strategy of sustainable development compatible with ecological stability and parameters of socio-economic justice.

**Conservation Prioritization of the Economically Important Floristic Diversity in Nadaun Block of Hamirpur District, Himachal Pradesh, North West Himalaya, India**

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The Indian Himalayan Region (IHR) is one of the most astonishing features in the world, and is considered as the repository of biological and cultural diversity, where floral and faunal diversity vary extensively with climate from one region to the other. The present study recorded 265 economically important species belonging to 81 families and 211 genera from the Nadaun Block. Of the recorded species, 78 species were trees, 46 shrubs and 141 herbs. The dominant families were Poaceae (20 spp.); Fabaceae (18 spp.); Asteraceae (14 spp.); Lamiaceae (10 spp.); Moraceae, Caesalpiniaceae and Brassicaceae (9 spp.);

Cucurbitaceae and Apocynaceae (8 spp.); Rutaceae and Solanaceae (7 spp.); Euphorbiaceae and Rosaceae (6 spp.); Apiaceae and Myrtaceae (5 spp.) respectively. *Brassica* (5 spp.); *Bauhinia*, *Terminalia* and *Citrus* (4 spp., each); *Albizzia*, *Prunus* and *Cassia* (3 spp., each); and *Achyranthes*, *Agave*, *Trachelospermum*, *Asparagus*, *Ageratum*, *Bidens*, *Berberis*, *Cucurbita*, *Euphorbia*, *Vigna*, *Mentha*, *Allium*, *Acacia*, *Morus*, *Syzygium*, *Dendrocalamus*, *Saccharum officinarum*, *Pyrus*, *Grewia*, *Viola* and *Vitis*, (2 spp., each) were the dominant genera. Twenty eight families were monotypic. The inhabitant of Nadaun Block use these species as medicine (210 spp.), wild edible/food (109 spp.), fodder (88 spp.), fuel (42 spp.), religious (23 spp.), making agricultural tools (6 spp.), timber (12 spp.), and various other purposes (12). The recorded species of economically important species were distributed between 400-1000m. The over exploitation and habitat degradation have been identified as major causes of threats to floristic diversity. Suitable management plans need to be implemented to conserve the biodiversity.

**Keywords:** Himalayan, Conservation, Prioritization, Floristic Diversity, Over exploitation

PP-104

### HPLC Quantification of Safranal from Saffron (*Crocus sativus* L.) and Simultaneous Method Validation

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Commercial saffron enterprises demand aroma evaluation more and more insistently through simple and reproducible techniques. Consumer knowledge of the spice has improved and they begin to demand saffron that possesses quality in a much wider sense. This study reports the effects of drying methods (Shade-drying and microwave drying) on Safranal content of saffron (*Crocus sativus* L.) and simultaneously method validation is presented. Various samples of saffron were analysed seven each from shade drying and microwave drying by High Performance liquid chromatography. This analysis quantified the one of the major component of saffron by HPLC. Several parameters have been taken into account and evaluated for the validation of method, namely: RSD, LOD, LOQ, Spike amount, % Recovery. Result suggested that microwave drying retain maximum concentration of safranal ( $0.072 \pm 0.009$  mg/100mg of stigma) as compared with sample dried under shade, safranal ranged from ( $0.045 \pm 0.005$  mg/100mg of stigma). Further there is significant ( $P < 0.05$ ) decrease in its quantity in case of shade drying. It is concluded that microwave drying could be the best drying method for saffron stigmas in order to retain its aroma.

**Keywords:** *Crocus sativus* L, Safranal, HPLC Quantification

## Quantitative Analysis of Floral Aromatic Water of *Salix caprea* by Gas Liquid Chromatography

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The present contribution was aimed at the quantitative analysis of floral aromatic water of *Salix caprea* obtained from unani Dawakhanna. Furthermore, this study was also aimed to determine its antioxidant and anti-inflammatory activities. Unani physicians prescribe it in nervousness and palpitation, also as a supporting medicine in psychological stress and cardiac affections. The floral water was extracted with *n*-hexane and petroleum ether separately. Antioxidant activity was assessed as free radical scavenging capacity (RSC) towards 2, 2-diphenyl-1-picrylhydrazil (DPPH) radicals. Anti-inflammatory activity was examined by HRBC membrane stabilization method and Quantitative analysis of the aromatic water was evaluated by GLC. Quantitative analysis of hexane extract of aromatic water was performed by GLC which revealed the presence of five constituents. On the other hand GLC analysis of hexane extract of aromatic water showed the presence of 7 constituents. The percentage scavenging effects of aromatic water of *Salix caprea* on DPPH radical were 25.50 %, 32.98 % and 39.83 % at 1 ml, 2 ml and 3 ml respectively. Furthermore, percentage stabilization of HRBC membrane of this aromatic water was 2.68, 14.23 and 35.34 at 1 ml, 2 ml and 3 ml, respectively. The percentage of these constituents in the aromatic water plays an important part in determining its quality. The potent antioxidant activity and significant anti-inflammatory potential of aromatic water may justify the Unani claim.

**Keywords:** Floral aromatic water, *Salix caprea*, Antioxidant, Anti-inflammatory, GLC

## Review on Wireless Sensor Network System and ZigBee Technology

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Wireless sensor network (WSN) are used in variety of fields which includes military, healthcare, home and other commercial application. Wireless sensor technology impose an increasing number of organizations are using it for a wide range of purpose. ZigBee technology is a new standard in wireless personal areas after Bluetooth. ZigBee is a standard that defines a set of communication protocols for low-data-rate short-range wireless networking. A new wireless meter-reading system based on ZigBee protocol has evolved. The Maximum data rate is 250 K bits per second. ZigBee targeted mainly for battery-powered application where data rate, low cost low and power consumption wireless sensor network technology has become one of technological basic needs of us.

**Keywords:** Bluetooth, ZigBee, RFID, Wireless sensor network, Healthcare

### Calculus of Variation and its Applications

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The calculus of variation is an efficient technique for the solution of problems in dynamics of rigid bodies and other mathematical problems. The calculus of variation is concerned with the problem of extremising “functional”. This problem is a generalization of the problem of finding extrema of functions of several variables. The calculus of variations gives us precise analytical techniques to find the shortest path (i.e. geodesic) between two given points on a surface. It also used to find the curve between two given points in the plane that yields a surface of revolution around a given axis. It also formulates “brachistochrone problem”. Calculus of variation also underpins much of modern mathematical physics via Hamilton Principle of least action. It can be used both to generate interesting differential equations. The Fermat’s Principle in optics and the principle of least action in physics are written as variational principles.

**Keywords:** Functional, Geodesic, Extrema, Brachistochrone problem

### Health Implication of Radon Gas in Darlaghat Area of H.P.

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Radon is a radioactive inert gas. Its atomic no. is 86 is radioactive, colourless, odorless and tasteless gas. It occurs naturally as an intermediary step in radioactive chains through which thorium and uranium slowly decay into lead, radon itself is a decay product of radium. Radon is easily inhalable gas under normal circumstances unlike other radioactive elements which make it a leading causative agent of array of Lung diseases. Epidemiological studies have shown a proportional link between high concentration breathing of radon gas and incidences of Lung Cancer. According to a study conducted by united states Environmental Protection Agency, Radon is the second most frequent cause of Lung Cancer, after smoking, causing 21000 lung cancer deaths every year about 2900 of these deaths accused among people who never smoking. In Himachal Pradesh, thriving Cement Industry at Darlaghat is posing immense health hazards as Radon gas is being liberated insignificant amounts. A recent study has shown that cases of Lung Cancers & Tuberculosis have increase since the operationalization of cement Industry. Therefore the present situation prevailing at the Darlaghat area warrant an urgent need to exclusively study the presence and implications of Radon gas.

**Study of Ethnomedicinal Plants in and Around col. Sher Jung National Park  
Simbalbara, Sirmour, H.P. India**

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A series of preliminary research attempt have been initiated in ethnobotany was carried in the Western Himalayas from last three decades. But Col. Sher Jung Park, Simbalbara and its surroundings although rich in plant diversity still excluded in particular. This protected area having altitudinal variation between 350-700m with mean annual rainfall of 1260mm. Present study was planned to collect information of plants used by inhabitants in and around Col Sher Jung National Park, Simbalbara. Field surveys were conducted during January 2010 to December 2016 in different season to collect data on ethnobotanically important plants from villagers and traditional healers. Total 214 plant species belonging to 68 families were documented having medicinal importance. Among the families recorded Fabaceae was the largest with altogether 26 species followed by Poaceae (12 species), Euphorbiaceae (11 species), Rutaceae (10 species), Lamiaceae and Moraceae with 9 species each. Traditions, customs and cultural rights play a key role in protection of biodiversity and environment. Hence, there is immense need to utilize the ethnobotanical information and promote the indigenous people being playing a key role in conserving the biodiversity in real sense.

**Keywords:** Ethnobotany, Simbalbara, Sirmour, Himachal Pradesh, Ethnomedicinal

**Synthesis of Thiazole based Small Molecules for Treatment of Metabolic Diseases**

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Metabolic diseases are becoming a great threat to society and these are increasing with rapid pace. It is estimated that around 60% of population will be affected with these diseases by 2060. We have synthesized thiazole based small molecules which have shown better in vitro activity in comparison to some commercially available molecules.

**Estimation of Heterosis in Newly Evolved CSR Bivoltine Hybrids of Silkworm  
(*Bombyx mori* L.) at Room and High Temperature**

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Silkworm breeds/hybrids which are reared over a series of environment exhibiting less variation are considered stable. Identification of high temperature tolerant bivoltine breeds/hybrids by screening for thermo tolerance in silkworm is an essential prerequisite for the development of thermo-tolerant bivoltine breeds/hybrids. One of the main aims of the breeders is to recommend breeds/hybrids that are stable under different environmental conditions and minimize the risk of falling below a certain yield level to farmers. In the present study, an attempt was made to evaluate and identify thermo-tolerant, adaptable bi×bivoltine silkworm hybrids suitable for rearing throughout the year, raised by involving seven productive breeds (CSR2, CSR3, CSR4, CSR5, CSR6, KA and NB<sub>4</sub>D<sub>2</sub>) and two thermo-tolerant breeds (CSR18 and CSR19) at two different temperature regime (25±1°C and 36±1°C). The data was subjected to the estimation of heterosis in relation to mid parent value and heterobeltiosis in relation to better parent value. Observations made for four economically important traits namely; pupation percentage, single cocoon weight, single shell weight and shell ratio percentage revealed that at 25±1°C (optimum environmental conditions) productive hybrid CSR3×CSR6 (heterosis over mid parent value (66.99) and heterobeltiosis over better parent value (50.62)) results in better qualitative and quantitative traits as compared to other hybrids studied. Robust hybrid, CSR18×CSR19 showed better tolerance to high temperature i.e. at 36±1°C and recorded heterosis for mid parent value of 55.03 and heterobeltiosis for better parent value of 32.40 when compared to productive hybrids.

**Keywords:** Heterosis, Heterobeltiosis, Hybrid vigour, Thermotolerant, Adaptable

**Synthesis and Characterization of Silica/Gelatin-based Hybrid Materials for Sustained  
Release of Doxorubicin**

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It is highly desirable that the release of an anti-cancer drug delivery apart from being target specific should also be prolonged and sustained. In view of this, nanoporous hybrid materials containing gelatin as the organic component were synthesized and investigated as drug carriers. Using a sol-gel method a series of four new hybrid materials was synthesized from the precursor tetraethylorthosilicate (TEOS) in the presence of gelatin or gelatin/silica and sodium dodecyl sulphate. As-synthesized hybrid materials were subjected to calcination at 550 °C. Characterization of hybrid materials was carried out by various techniques to get

evidence of composition and different physical and chemical characteristics of the synthesized hybrids. The hybrid material synthesized from silica/gelatin a high surface area,  $394.86 \text{ m}^2\text{g}^{-1}$  and  $427.79 \text{ m}^2\text{g}^{-1}$ , was observed before and after calcination, respectively. The hybrid materials were used as drug carriers using doxorubicin as the model drug. All the four materials used exhibited high uptake of the drug and exhibited time-dependent release behavior. The later was studied by applying six kinetic models, but the best fit was observed with Hixson-Crowell model.

**Keywords:** Hybrid materials, Controlled release, Doxorubicin, Gelatin, Kinetic models

**PP-113**

### **Ethenobotanical use of some Breathtaking Medicinal Plant of Kullu**

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The use of plants as a source of medicines and human sustenance has been vogue since antiquity. India has rich heritage of use of plants as medicines. Indian system of medicine utilizes 80 percent of material derived out of plants.

In this study an etheno-medicinal survey of plant diversity was carried out at district Kullu in Himachal Pradesh. The study was mainly focused on the medicinal plants used for treatment of various diseases. The Tribes are now still dependent on such type of indigenous health care and there is an immediate need of documentation and conservation of such valuable knowledge and plants for future generation.

**Keywords:** Medicinal plants, Tribes, Valuable, Diseases

**PP-114**

### **Preparation of Novel Crosslinked poly(Ionic Liquids) For Use as Extractants**

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We present here the synthesis of a series of crosslinked and Quaternized poly(*N*-Vinylimidazole) and poly(4-Vinylpyridine) polyionic liquids (PILs) having  $\text{Cl}^-$  as counter ion. 1,4 and 1,6-dichlorobutane acts as quaternizing agent. These quaternized PILs were characterize by FTIR, SEM, XRD and EDX (C, H, N ) for investigation of qualitative and quantitative structural aspects. As(V) ion adsorption behavior of these PILs from distilled water solution as a function of time, temperature, concentration, and pH were determined quantitatively by using ion chromatogram.

**Keywords:** Polymerization, Quaternizing agent, Quantitative

**Study of Local Plants of Hamirpur District of Himachal Pradesh which are used Traditionally as Source of Dye and Tannin**

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Hamirpur district is the smallest district of Himachal Pradesh which falls in the Shivalik hills. This region is rich in diversity of flora and traditional knowledge associated with the use of local plants for various purposes such as food, fuel, fodder, timber, religious, medicinal, shelter, tannin and dye which forms the basis of various commercial industries. The local people of study region depend upon traditional use of local plant parts for meeting their daily requirements. Tannin are the organic compound which are chiefly glucosidal in nature which have an acid reaction and very astringent. They may be concerned with the formation of cork or pigments or with the protection of plants. Tannins are of economically interest because of their ability to unite with certain types such as those in the animal skins, to form a strong flexible, resistant and insoluble known as "Leather". This paper reveals the use of 12 plant species belonging to 11 families which yield dye and tannin.

**Keywords:** Dye, Tannin, Traditional Knowledge, Shiwalik Range

**Physical Adsorption of Lipolase 100L onto Mesoporous Silica**

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Lipases are versatile enzymes that catalyze the hydrolysis of the ester bonds of lipids. For this study commercial enzyme Lipolase 100L was studied as a commercial lipase. Two silica preparations, varying in mesh size (Silica<sub>70-230</sub> and Silica<sub>230-400</sub>), were used for immobilisation of Lipolase 100L (1:10 = lipase: tris buffer). It was observed that activity assay gave the highest values when treated with 2% of gutraldehyde. 9 mM *p*- NPP gave the best results as suitable substrate. The enthalpy of activation for silica immobilized lipase decreased with an increase in temperature leading to negative results whereas  $K_m$  and  $V_{max}$  was analysed on the Lineweaver Burk Plot, the values were observed for  $S_{70-230}$  lipolase ( $K_m = 66.67$  mM,  $V_{max} = 3.34$  U/mg/min.,  $k_{cat} = 35.22$  s<sup>-1</sup> and specificity constant = 10.56 s<sup>-1</sup>Mm<sup>-1</sup>),  $S_{230-400}$  lipolase ( $K_m = 52.64$  mM, of  $V_{max}$  is 2.32 U/mg/min.,  $k_{cat} = 27.80$  s<sup>-1</sup> and specificity constant = 12.00 s<sup>-1</sup>Mm<sup>-1</sup>) and pure lipolase enzyme ( $K_m$  value as 62.5mM,  $V_{max}$  2.1875 U/mg/min,  $k_{cat} = 33.02$  s<sup>-1</sup> and specificity constant = 15.09 s<sup>-1</sup>Mm<sup>-1</sup>). The thermostability of silica immobilized showed that the half-life ( $t_{1/2}$ ) of immobilized lipase was approximately 30 minutes at 55°C. Among chelating and denaturing agents like SDS, EDTA, mercaptoethanol and PEG affected the activity by lowering its value too. The lipase immobilizes silica is reusable upto 5 cycles during which it retained its activity upto 50%.

**Keywords:** Lipase, Immobilization Silica, Kinetic study, Reusability

**Ethno-Medicinal uses of Some Plants of Fabaceae Family of Suratgarh Tehsil,  
Sriganganagar (Rajasthan)**

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Rajasthan is large state act as a good hot spot for the growth ethno- medicinal plants. This regions having variation in geology, physiographic, climatic, edaphic and basic conditions and shows the diversity of ethno- medicinal plants which grows in the wide range of habitat. Rajasthan includes 12.44% of tribal population of tribal population the major tribes of Rajasthan are: Kaibelia, Nats, Raika, Bhil, Garasia, and Saharia. Meena, Damor, Kathodi, Patelia, Kanjar, Gardalia lauhar etc these tribes. In this study, an ethno-botanical survey of the plant diversity is carried out in the different remote areas of Suratgarh tehsil ie Manaksar, Piperan, Rampura and Bhagwansar in Sriganganagar district, Rajasthan. The study mainly emphasizes traditional uses of some herbal plants of study area which are used for the treatment of various diseases and health problems. The information is carried out about the uses of herbal plants for primary health care and the treatment of various health disorders through the personal contact and personal interview of rural old people of study area. This study mainly focuses on keeping the record of the herbal potential possessed by the cultivated plants in this area and their sustainability for the welfare of human race.

**Keywords:** Ethno-medicinal, Primary healthcare, Sustainability, Suratgarh

**Study of Wave Propagation at Human Muscle-Compact Bone**

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The plane wave propagation at an imperfect interface s between an elastic half-space (human muscle) and micropolar viscoelastic half-space (human compact bone) have been studied. The expressions for the reflection and transmission coefficients which are the ratios of the amplitude of reflected and transmitted waves to the angle of incident wave are obtained and deduced for normal force stiffness, transverse force stiffness and perfect bonding. The variations of amplitude ratios with angle of incidence have been shown graphically. It is noticed that the amplitude ratios of reflected and transmitted waves are affected by stiffness and viscosity effect. Some special cases of interest have been deduced from the present investigation.

**Keywords:** Micropolar viscoelastic Solid, Wave propagation, Normal force stiffness, Transverse Force Stiffness, Perfect bonding, Amplitude Ratio

**Impact of Two Temperature on Reflection and Transmission in Temperature Rate  
Dependent Thermoelasticity**

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The present investigation is concerned with reflection and transmission of thermoelastic waves between two thermoelastic half-spaces with two temperatures at an imperfect interface. The amplitude ratios for reflection and transmission coefficients are obtained and deduced for normal force stiffness, transverse force stiffness, thermal contact conductance and perfect bonding. The numerical results obtained have been illustrated graphically to understand the behavior of amplitude ratios versus angle of incidence of longitudinal wave (P-wave), thermal wave (T-wave) and SV-wave. It is found that the amplitude ratios of various reflected and transmitted waves are affected by the stiffness and two temperature effects. Some special cases of interest have been deduced from the two problems also.

**Keywords:** Wave Propagation, Thermoelastic solid with two temperature, Amplitude ratio, Perfect bonding

## PROGRAMS

The University programs are approved by the Regulatory Commission of HP Government and fee structure by the Department of Higher Education, Government of Himachal Pradesh.

The University has 04 schools/19 departments and is imparting education in more than 48 programmes at under-graduate, post-graduate and research level as follows;

S.No.	Name of School	Unit	Programme
1.	Engineering and Technology	Civil Engineering	B.Tech, M.Tech and Ph.D
		Mechanical Engineering	B.Tech, M.Tech and Ph.D
		Electrical Engineering	B.Tech
		Computer Science and Engineering	B.Tech, M.Tech, BCA, MCA, PGDCA and Ph.D
		Vocational Training	B.Voc (Automobile / IT / Construction Management)
2.	Commerce & Management Studies	Commerce & Management Studies	Diploma in Food Production, Diploma in Food & Beverage Services, B.Com (Hons.), BBA, BHMCT (Hotel Management), MBA, Ph.D
3.	Basic and Applied Sciences	Chemistry	B.Sc. (Hons), M.Sc., M.Phil and Ph.D
		Physics	B.Sc. (Hons), M.Sc., M.Phil and Ph.D
		Mathematics	B.Sc. (Hons), M.Sc. and Ph.D
		Botany	B.Sc. (Hons), M.Sc. and Ph.D
		Zoology	B.Sc. (Hons) and M.Sc.
		Micro Biology	B.Sc. and M.Sc.
		Bioinformatics	B.Sc.
		Forensic Science	B.Sc.
		Fashion Technology	B.Sc.
		Food Science	B.Sc.
		Pharmacy	B.Pharm*
		Agriculture / Horticulture / Forestry	B.Sc.*
4.	Legal Studies and Governance	Naturopathy	Diploma in Naturopathy*
		Law	BA-LLB and LLM, Diploma* in Cyber la / IPR / Labour & Industrial Law
		Journalism & Mass Communication	BA - Journalism & Mass Communication

\*Subject to Approval

## IMPORTANT CELLS / BODIES

### TRAINING & PLACEMENT CELL

The cell is aimed to bridge the industry academia gap, by providing a platform for internship of students as per market requirement. The cell assists the students in jobs/placements by conducting campus/off-campus placement drives.



### VALUE ADDITION CELL

The cell helps the students in preparing Civil Service Exams like; IAS/IPS/IFS, CDS, HAS, Allied Services, Judiciary Service, Engineering Service and competitive examinations like NET/SET/GATE etc. General studies courses are well integrated in the curriculum with a credit associated with it.

### COMMUNITY DEVELOPMENT CELL

- Community development cell is working to benefit the local community in vicinity of the University. The cell has adopted Mahal Panchayat (backward panchayat) for upliftment of living standards of residents.
- Regular Blood Donation Camps are organized in the campus.
- A unit of NSS registered with the Government of Himachal Pradesh has been established to undertake various social activities and other various national programmes.

### ENTREPRENEURSHIP CELL

Cell is established with the objective to create interest in entrepreneurship & awareness among the students about the various schemes/policies framed by the state/central government to entrepreneurs. The cell advises the students that why and how to be an entrepreneur.



### LEGAL AID CENTRE

H.P. State Legal Authorities Shimla has sanctioned and setup a Legal Aid Centre in the University. The law-department of the University in association with the Distt Legal Authorities organizes 1 to 2 legal literacy camps in a year, where people of surrounding Panchayats are educated by the Judges, Advocates, University teachers & local Police Authorities about their rights and counsel on different legal matters.

### WOMEN EMPOWERMENT

The university is in continuous process of empowerment of women. Self defense training is imparted once in a semester to girl students and female staff. Presently 46% girl students are studying in the university. '

### UGC INFLIBNET

The University is registered with UGC INFLIBNET to assist students/researchers and faculty members in their research areas. Since 2012, more than 100 research papers have been published by the faculty members in national/international journals.

# CAREER POINT UNIVERSITY HAMIRPUR

## Where Expertise & Experience Meet for Excellence

The Career Point University Hamirpur was established by the Government of Himachal Pradesh vide Act No 12 of 2012 under section 2 (f) of the UGC Act, 1956. The University is empowered by the University Grant Commission (UGC), a statutory body of Government of India, for the award of degrees under Section 22 of the UGC Act 1956. The University has about 1500 students and over 100 teaching/ supporting staff comprising of renowned scientists, academicians and corporate leaders. The teachers/staff members of University are responsible and supportive. From the year 2012, the admission of meritorious students is increased by 600% in four years.

### VISION

To be a premier educational institution for graduate, post graduate studies and research activities by educating leaders of the future.

### MISSION

To promote global competitiveness by providing multiple opportunities for excellent education, applied research, academic innovation and service to the humanity.

### CORE VALUES

Core values of the University are defined to provide good services by good governance system.

- Academic excellence
- Research and Innovation
- Integrity, Ethics and Social Responsibility

### COLLABORATIONS, MEMBERSHIPS, RECOGNITIONS AND AWARDS



#### Collaborations

- MOU signed with CSIR, Palampur to promote eco-friendly & pollution free environment.
- MOU signed with IIT Bombay to promote latest IT knowledge amongst rural population by training students and other youths of the region.
- MOU signed with Global Crop Diversity Trust, Bonn, Germany to support the conservation and rural development programmes to ensure food security in developing countries.

#### Membership

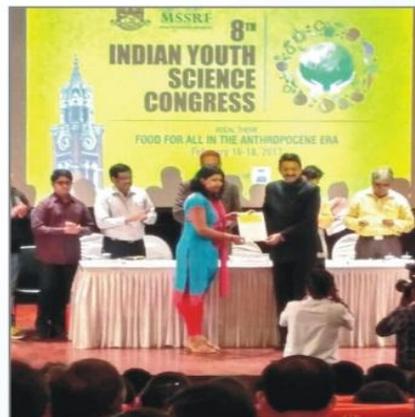
- University is active member of Association of Indian Universities, Delhi.

#### Recognition

- The University is recognized by the UGC.

#### Award

- Himachal Rattan Award from the "All Indian Conference of Intellectuals" for the recognition of the distinguished services rendered to the society at large.
- Bharat Gaurav Award 2017 presented by Mr Karicho Samuel, Minister Govt of Kenya.
- Students of CPUH awarded with "Moment Award" by Indian Youth Science Congress at University of Mumbai



### INFRASTRUCTURE

The location of University provides conducive ambience for learning & research. The University has the needed essential academic infrastructural facilities. The University students have access to electronic information resources for online books, study/research materials, databases etc. The library is stalked with around 10,000 books, national/international journals, periodicals, and e-books covering all aspects of research/ academic studies. All the class rooms are in good condition for focused discussions. The University has more than 40 labs for conduct of practical learning.

The University has an ATM, cafeteria, sports facility-indoor and outdoor games, first-aid-clinic, and separate hostel for boys and girls and Ayurvedic Primary Health Center at a distance of 100 yards.