



Abstract Book

International e- Conference

on

Progress of Science & Technology During Pandemic

(PSTSP-2021)



JAI RAM THAKUR



**CHIEF MINISTER
HIMACHAL PRADESH
SHIMLA-171 002**

Message

It gives me immense pleasure to know that Him Science Congress Association (HSCA) is going to organize its 8th International Conference on 'Progress of Science and Technology during Pandemic' on 11th and 12th September, 2021 virtually.

The Covid-19 pandemic has brought science to center stage in the decision making. The corona virus pandemic has thrown up new challenges which the world never faced before, but it has also made people to learn new things.

Himachal has become the first state in India to have administered at least one dose of Corona vaccine to its entire eligible population and emerged as a champion in fighting against the pandemic.

I hope that Conference would provide an appropriate platform to the participants to discuss various issues related to them besides sharing and improving their knowledge about the latest research and development.

I convey my good wishes for the success of the event and successful publication of souvenir.

(Jai Ram Thakur)



Prof. Nagesh K. Thakur
Chief Patron, HSCA



DEPARTMENT OF PHYSICS
(UGC-SAP, DRS Level-I)
HIMACHAL PRADESH UNIVERSITY
(NAAC Accredited 'A' Grade University)
SUMMER HILL SHIMLA 171005

No. –HPU/PHY/

Dated: 07-09-2021

Message

I am glad to know that Him Science Congress Association is organizing 8th HSCA International Conference on Chemical, Physical and Biological Sciences on 11th-12th September 2021 by virtual mode.

Friends, as we know that Science generates solutions for everyday life and helps us to answer the great mysteries of the nature. In other words, science is one of the most important channels of the knowledge. It has a specific role, as well as a variety of functions for the benefit of our society, creating new knowledge, improving education, and increasing the quality of our lives.

I hope that fruitful deliberations would be held in the conference and all participants shall gain knowledge in different segments of Science.

Prof. Nagesh Thakur

06-09-2021

Prof PK Khosla
Chancellor

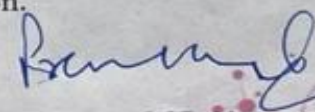
Message

I am glad to know that the Him Science Congress Association (HSCA), Himachal Pradesh is organizing its 8th International e-Conference on “Progress of Science and Technology during Pandemic” on 11th September, 2021 at 9.55 AM.

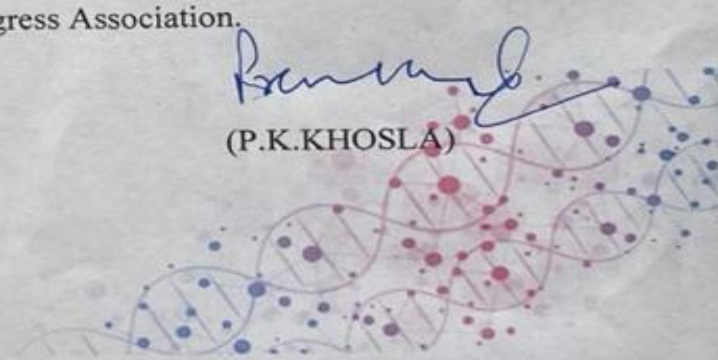
Shoolini has made rapid strides especially in research. As per QS Asia Ranking, Shoolini’s citational data per paper is the highest in India and 14th best in Asia. In three parameters – Citations per publication, Output in Top 10 per cent Citation Percentile and Output in Top 1% citation Percentiles Shoolini is ahead of top world universities. Shoolini’s h-index of 78 is 2nd best in the country. The university has filed 630 patents till date and most of these have been granted.

Academic events such as the 8th International e-Conference on ‘Progress of Science & Technology during Pandemic’ is very relevant as the Covid-19 pandemic has tremendously impacted the teaching-learning process. However, Shoolini University stands with pride as far as on-line teaching is concerned. We have developed a software ‘Addoo’ for on-line teaching and learning.

I extend my best wishes for a grand success of this International conference being organized by the Him Science Congress Association.



(P.K.KHOSLA)





Prof. (Dr.) Deepak Pathania
President, HSCA

Welcome Message

On Him Science Congress Association, I am truly honored and delighted to take this opportunity to welcome you all in this *8th International Conference on Progress of Science and Technology During Pandemic (PSTDP-2021)* on 11-12 September 2021 organized virtually. The COVID-19 pandemic has affected many parts of our lives and activities have been shifted from in-person to virtual meetings. Holding the conference virtually will be a great opportunity for HSCA to explore 'New Researches in Sciences' during the pandemic to reach a wide audience across the world. I am happy to write that Him Science Congress Association with the support and contribution of some researchers and members has published and distributed to large audience "eBooklet Series: SCIENCE AND ITS IMPACT ON SOCIETY- THE CORONAVIRUS (COVID - 19) PANDEMIC in year 2020. Members of Association have also helped the needy people of the society during this pandemic time.

The aim of conference is provide perfect platform for budding Scientists to share their innovations with world renowned speakers and scientists. I commend you for having exciting and memorable events filled with enlightening interactive sessions.

The two-day conference program focuses on a broad range of issues and challenges in the field of sciences during the pandemic period. Around 180 papers are divided into different oral sessions. Best Oral and Poster Presenter, respectively in each discipline followed by Young Scientist Awards are being given as recognition to the salient work of the selected researchers.

In this virtual conference, we to a certain extent engage with each other in the ideas about Sciences and Society. I hope the deliberations from various distinguished interdisciplinary speakers will benefit the participants to update their knowledge.

I congratulate wish you all the success. Thank you for your attention.

A handwritten signature in blue ink that reads "Pathania".

Prof. Deepak Pathania



Him
Science
Congress
Association

Him Science Congress Association (HSCA)
Himachal Pradesh, INDIA

**International e- Conference on Progress of Science & Technology During
Pandemic (PSTSP-2021)**

Himachal Pradesh, India.

PROGRAMME SCHEDULE

Day -1 | Saturday | 11th September, 2021 | Programme

Inauguration

09:30-10:15 AM

Welcome Address

Prof. Rajesh Kumar, Vice-President HSCA

Time: 09:30 09:33AM

Brief about Conference

Dr. Sita Ram Sharma, Co-Patron

09:34-09:38

Address by HSCA President

Prof. Deepak Pathania

Time: 09:38-09:44 AM

Address by Guest of Honor

Dr. Sher Singh Samant, Director HFRI shimla

Time: 09:44-09:55 AM

Address by Special Guest

Prof. P.K. Khosla, Chancellor, Shoolini University

Time: 09:55-10:00 AM

Address by Special Guest

Prof. Nagesh Thakur, HPU Shimla

10:00-10:05

Address by Chief Guest

Prof. C.L. Chandan, Vice-Chancellor SVPCU Mandi

Time: 10:05-10:15 AM

Vote of Thanks

Dr. Sunil Kumar, Conference Chairman & Gen. Sec. HSCA

Time: 10:15 AM

SESSION – I

Time: 10:15-12:49

Session Chairs: Prof. Bhuvanesh Gupta, IIT Delhi

Session Co-Chairs: Dr. Ramesh Chand Thakur, HPU Shimla

Moderators: Dr. Mahender Singh Thakur, Dr. Arush Sharma

SESSION CHAIRS:

Prof. Bhuvanesh Gupta, IIT Delhi

SESSION CO-CHAIRS:

Dr. Ramesh Chand Thakur, HPU Shimla

Keynote Talks

Time	Author/Title/ Affiliation
10:15-10:40 AM	Prof. Philippe Roger , Institut de Chimie Moléculaire et des Matériaux d'Orsay Université, Paris, France
10:40-11:00 AM	Prof. M. Panayotova , Dept. of Chemistry University of Mining and Geology, Sofia, Bulgaria

Oral Presentation (Agriculture & Allied Sciences)

Presenting Author	Paper No	Title/Affiliation
Reshma K	27	Consequences of Covid-19 on Indian Agriculture, Food Security and Supply chain, <i>Vidyavardhaka College of Engineering, Mysuru</i>
Anuradha bhardwaj	38	Genom Editor: a web tool for effiecient design of TALENs and CRISPRs for the purpose of genome editing and beyond. <i>Gautam Budha University, Greater Noida,</i>
Ankurdeep preety	40	Effect of different fertilizers on growth of Cinnamomum tamala seedlings, <i>Himalayan Forest Research Institute</i>
Umesh sharma	41	Influence of different organic mulches on ginger crop under bamboo-based agroforestry system in mid hills of Himalayas, <i>College of Forestry, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan</i>
Sunny sharma	42	Response of different bulky organic manures along with liquid formulations on growth, yield and quality of <i>Actinidia deliciosa</i> Chev. in mid-hills of Himalayas, <i>Dr Yashwant Singh Parmar</i>

			<i>University of Horticulture and forestry</i>
Tanuja thakur	92		Threatened plants of Kotli Tehsil of District Mandi of Himachal Pradesh: Their diversity, distribution, indigenous uses and need of conservation, <i>SVPCU</i>
Moneesh thakur	2		Clinical investigation and its therapeutic management of canine demodicosis with special reference to herbal nano-medicine, <i>CVSc & AH, SELESIH, AIZAWL, CAU, MIZORAM</i>
Arun kumar	7		“Hypsometric Analysis for Assessing the Erosional Status of the Himalayan Watershed”, <i>IGNOU</i>
M prashanth	32		Medical Geology – A Major Contributor to the Environment, Health and Well Being, Discipline of Geology, School of Sciences, <i>Indira Gandhi National Open University, New Delhi</i>
Koushik das	91		A novel parasite-secreted lysine (K) and glutamic acid (E) rich protein 2 (KERP2) from <i>Entamoeba histolytica</i> infiltrates the host nucleus and regulates the host-parasite relationship, <i>University of Petroleum and Energy Studies, Dehradun, India</i>
Astha chauhan	120		An Account of Floristic Wealth and Ethnobotany of Sarahan in Shimla district, Himachal Pradesh, <i>Himalayan Forest Research Institute</i>
Shweta bhimta	125		Nirgal Group of Hill Bamboo-Providing Essential Ecosystem Services to Native Communities, <i>Himalayan Forest Research Institute</i>

LUNCH [Time: 12:50 PM - 01:30 PM]

SESSION – II

Time: 01:30-04:53

Session Chairs: [Dr. D.K. Vatsa, CSKHPKV Palampur](#)

Moderators: [Dr. H.S. Banyal, Dr. P.C. Pathania](#)

SESSION CHAIRS:

[Dr. D.K. Vatsa CSKHPKV](#)

Keynote Talks

Time	Author/Title/ Affiliation
01:30-01:50	Prof. Hideaki Yoshitake, Yokohama National University Yokohama, Japan
01:50-02:10	Dr. Abdul Syukor Bin ABD Razak, Faculty of Civil Engineering Technology University Malaysia Pa

Palampur	02:10-02:40	Dr. Basanta Kumar Biswal, National University of Singapore, Singapore	
	Oral Presentation (Allied & Biological Sciences)		
	Presenting Author	Abstract No	Title/ Affiliation
	Smriti thakur	126	Indigenous metabolites as immune-modulators from natural plant based traditional herbs. <i>Sardar Vallabhbhai Patel Cluster University, Mandi, H.P.</i>
	Mamta devi sharma	128	Isolation and identification of multidrug-resistant (MDR) bacterial contaminants from water resources of Solan City of Himachal Pradesh, <i>Shoolini University</i>
	Jagdeep verma	89	Astavarga' orchids as promising immune boosters, <i>Government College, Rajgarh - 173101, Himachal Pradesh, INDIA</i>
	Pitamber singh negi	10	Studies on effect of storage containers and conditions on seed longevity of abies spectabilis (d.don) spach. <i>Himalayan Forest Research Institute, Conifer Campus, Panthaghati, Shimla-171 013 (H P)</i>
	Rajinder singh jandu	28	Toxic effects of polyethylene microplastics exposure in Indian major carp, <i>Labeo rohita</i> (Hamilton, 1822), <i>Punjab Agricultural University, Ludhiana</i>
	Vibhu vaid	29	Elemental and lepidological alterations in the scales of <i>Labeo rohita</i> due to heavy metal toxicity, <i>Punjab Agricultural University, Ludhiana</i>
	Swaran lata	34	Folkloric therapeutics and conservation measures of <i>Fritillaria roylei</i> Hook. in north western Himalaya: An important plant of Ashtaverga group, <i>Himalayan Forest Research Institute, Shimla, H.P.</i>

	Bhavna bhavna	39	Length Weight Relationship of <i>Schizothorax Richardsonii</i> , <i>Central University of Himachal Pradesh, Dharamshala</i>
	Mohit sharma	58	Documentation of Herbal Potential of Some Pteridophytes of Himachal Pradesh: A review., <i>HPU Shimla</i>
	Yogita thakur	60	Ethnomedicinal Importance of some herbaceous angiospermic plant resources of Shimla district of Himachal Pradesh: A review, <i>HPU Shimla</i>
	Sunita saklani	62	Studies of Anti-inflammatory Potential of Some Plants of Himachal Pradesh: A Review. <i>HPU Shimla</i>
	Heena thakur	63	Study of Religious aspect of some plants of Mandi District which are associated with deities, <i>HPU Shimla</i>
	Shailja kumari	81	Cytological observation in some medicinal plants, <i>Punjab university Chandigarh, India</i>
	Minakshi sharma	86	Modern technologies for tackling Covid-19 pandemic, <i>Govt. Degree College Sanjauli</i>
	Alka rani	123	In-vitro evaluation and assessment of anticancer activity of methanolic extracts of <i>Gracilaria corticata</i> against breast cancer cells, <i>Central University of Punjab</i>
	Chaman lal	130	<i>Salix</i> - Multipurpose Arboreal taxa in the Cold Deserts of Spiti, North West Himalaya, <i>Himalayan Forest Research Institute Shimla</i>
	Anju singh	109	An updated review on phytochemistry and biological activity of <i>Skimmia laureola</i> , <i>Chandigarh University</i>
	Jagdeep verma	90	On the occurrence of two therapeutic orchids in HIMACHAL PRADESH, <i>St. Bede's College, Shimla</i>

SESSION – III	Time: 02:45-04:37
Session Chairs: Prof. Sunil Dhar, Central of University Jammu	Moderators: Dr. Mamta Kumari, Dr. Manita Thakur

Oral Presentation (Biotechnology & EVS)			
SESSION CHAIRS: Prof. Sunil Dhar Central of University Jammu	Oral Presentations		
	Presenting Author	Abstract No	Title/ Affiliation
	Bhawna	31	Emerging use of nanoparticles in breast cancer treatment, <i>Faculty of Applied Sciences and Biotechnology Shoolini University Solan</i>
	Swati kumari	88	Antimicrobial potential of green synthesized ZnO nanoparticles using Trillium govaniatum rhizome as a reducing agent in environmental management, <i>Shoolini University of Biotechnology & Management Sciences, Solan (HP)</i>
	Richa	102	Isolation of Keratinase Producer Microbes from Poultry Waste Soil, Division of Microbiology, <i>Career Point University, Hamirpur (H.P.) – 176041</i>
	Hem lata	115	Assessment of Oxidative stress associated biomarkers in pesticide exposed occupational workers in Himachal Pradesh, <i>Department of Biotechnology, SBAS, Maharaja Agrasen University, Kalujhanda (HP)</i>
	Monika rani	116	Study of oxidative stress in polycyclic aromatic hydrocarbons(PAHs) in exposed brick kiln workers, <i>Maharaja Agrasen University, Kalujhanda (HP)</i>
	Vandana sethi	3	Monitoring of Physiochemical Qualities of Riverine of Baddi Area of Himachal Pradesh, <i>Career Point University Hamirpur H.P.</i>
	Indica mohan	9	Phytoremediation: An in-situ reclamation of contaminated soil ecosystem, <i>Central University of</i>

			<i>Jammu</i>
	Anayat ahmad quarshi	70	Proglacial lake evolution in parts of Eastern Karakoram, Nubra Shyok valley, Ladakh, India, <i>Indra Gandhi Open University Delhi</i>
	Kiran kumari	75	Effect of Meteorological Parameters on Concentration of Total Suspended Particulates over North-Western Himalayan Region, Jammu, India, <i>Central University of Jammu</i>
	Ibha suhani	79	Introduction of Earthworms for Amelioration of Salt Affected Soils, Institute of Environment and Sustainable Development, <i>Banaras Hindu University</i>
	Sagar dhakal	95	Assessment of factors affecting the natural regeneration of <i>Taxus contorta</i> Griff. in north-western Himalaya region, India, <i>Shoolini University</i>
	Umesh sharma	105	GIS based modeling of landslide susceptibility in mid-hills of Himachal Pradesh, <i>Dr yashwant singh parmar university of Horticulture and Forestry</i>
	Monika chauhan	124	Meteorological Variables and Tree Line shift in the High Altitude Transition Zones of Himachal Pradesh, North Western Himalaya, India, <i>Himalayan Forest Research Institute Shimla</i>
SESSION – IV			Time: 02:45-05:00
Session Chairs: Prof. Sunita Rattan, Amity University, Noida Session Co-Chairs: Dr. Sandeep Chauhan, HPU Shimla			Moderator: Dr. Ajay Kumar, Dr. Moneesh Thakur
Oral Presentation (Chemistry)			
	Presenting Author	Abstract No	Title/ Affiliation
	Abhishek singh	23	Zinc oxide nanoparticles-mediated delivery of quercetin for breast cancer therapy, <i>Mizoram</i>

**SESSION
CHAIRS:**

**Prof. Sunita
Rattan, Amity
University, Noida**

**SESSION CO-
CHAIRS:**

**Dr. Sandeep
Chauhan, HPU
Shimla**

			<i>University, Aizawl-796004, Mizoram, India.</i>
Neelam thakur	24		Mesoporous silica nanoparticles as smart drug delivery system for targeted and controlled delivery of umbelliferone in cancer therapy, <i>Mizoram University, Aizawl-796004, Mizoram, India.</i>
Neeraj tejwan	25		Synthesis of ZnO nanorods as a drug delivery system for enhanced antibacterial and anticancer activity, <i>Mizoram University, Mizoram</i>
Anil kumar	26		Enhancement of Podophyllotoxin concentration in the roots of Podophyllum hexandrum using precursors and elicitors: A new HPLC-MS/MS Method, <i>Govt Degree college Jaisinghpur Kangra</i>
Anirudh sharma	30		Targeted delivery of curcumin via pH-sensitive ZnO nanoparticles for breast cancer therapy, <i>Mizoram university, Aizawl</i>
Vandna thakur	36		Photodegradation of FSB and CV using psyllium husk mucilage@ZAP nanoparticles, <i>IEC University</i>
Anjali	47		Green Extraction of Natural Products: Concept and Principles, <i>Maharaja Agrasen University Himachal Pradesh Baddi</i>
Rajappa s	48		Corrosion protection studies of treated zinc surface in aqueous chloride–sulphate medium, <i>Karnatak Science College, Dharwad</i>
Manisha chandel	52		Photosensitization of rgo-modified binary heterojunction with chlorophyll for photocatalytic removal of malachite, <i>IEC University Baddi</i>
Sandeep kumar	54		Expanding Horizon of Nanomedicine, <i>Sri Sai University Palampur, Himachal Pradesh</i>
Gurunath s janakunavar	55		Chemical and Electrochemical studies of imidazole derivative on corrosion of mild steel in hydrochloric acid medium, <i>Karnatak Science College, Karnatak University, Dharwad</i>

	Kariyappa s katagi	59	Investigation on seed oil chemistry of Bauhinia racemosa for the production of liquid biofuel, <i>Karnatak Science College, Dharwad, Karnataka, India</i>
	Nihkil kadam	61	Acesulfame conjugates a potent anti TB drug like compounds linked with legendary Coumarin, <i>Karnataka science college DHARWAD</i>
	Nikita kurkuri	66	Identification of fatty acids present in Nutraceuticals using ¹ H NMR, <i>Karnatak University's Karnatak Science College Dharwad</i>
	Mahesh akki	67	Design and Synthesis of Novel Coumarin-Piperazine Conjugates as New Potent Anti-TB Chemotypes, <i>Karnataka science college DHARWAD</i>
	Arjun g kalkhambkar	68	Saussurea obvallatta (Brahma Kamal) leaves extract as a potential source of bio-active eco-friendly corrosion inhibitor for mild steel in HCl solution, <i>KARNATAKA SCIENCE COLLEGE DHARWAD KARNATAKA 580001</i>
	Tanika thakur	73	Green synthesis of Silver Oxide Nanoparticles by Using Butea Monosperma Plant Extract, <i>CUHP, Shahpur</i>
	Suraj m sutar	82	Ultrasound assisted amination of 1-aryltriazenes with nitrile to synthesize N-arylamides employing GIL promoter under mild and metal free conditions, <i>Karnatak Science College Dharwad</i>
	Vandana kumari	18	Fabrication of Electrospun Polycaprolactone Hybrid for Wound Healing Applications, <i>IIT Delhi</i>
SESSION – V			Time:02:45-03:57
Session Chairs: Prof. Bhag Chand Chauhan, CUHP Dharamshala			Moderator: Mr. Ankush Chauhan, Mr. Ritesh Verma

Oral Presentation (Physics)

**SESSION
CHAIRS:**

**Prof. Bhag Chand
Chauhan, CUHP
Dharamshala**

Presenting Author	Abstract No	Title/ Affiliation
Leelavati thakur	20	Band gap engineering of Cd _{1-x} Mn _x O crystalline thin films, <i>Nit Hamirpur(h.p.)</i>
Veena G. Bhat	53	Synthesis and Thermal Properties of Silver Nanoparticles doped Poly (vinyl alcohol) / Guar gum/ Gum ghatti nanocomposite. <i>Department of Chemistry, Karnatak Science College,Dharwad 580001,Karnataka, India</i>
Manohar rathod	64	Anticorrosive performance of Garcinia livingstonei leaves extract as an effective green corrosion inhibitor for mild steel in 1M HCl solution, <i>Karnatak Science College Dharwad</i>
Debashis saikia	69	Development of A Wireless Sensor Network Based Heat Index Monitoring System for Indoor Environment, <i>Gauhati University</i>
Manjot kaur	121	Nanostructured boron carbide for anti-cancer therapy, <i>Sri Guru Granth Sahib World University, Fatehgarh Sahib- 140 406, Punjab, India</i>
Ishant chauhan	122	Study on WTe ₂ thin films for photodetector application, <i>Sri Guru Granth Sahib World University, Fatehgarh Sahib- 140 406, Punjab, India</i>
Nishat bhatia	132	Plant extract mediated economic green synthesis of copper and silver nanocomposites for biological application, <i>Career Point University, Hamirpur (HP) India</i>

Day -2 | Sunday | 12th September, 2021 | Programme

SESSION – 1

Time: 09:30-11:06

Session Chairs: Dr. B.S. Kaith, NIT Jalandhar
Session Co-Chairs: Dr. Kiran Grewal, HPU Shimla

Moderator: Dr. Dilbagh Rana, Dr. Swadeep Sood

Oral Presentation (Chemistry)

SESSION CHAIRS:
Dr. B.S. Kaith, NIT Jalandhar

SESSION CO-CHAIRS:
Dr. Kiran Grewal, HPU Shimla

Presenting Author	Abstract No	Title/ Affiliation
Shruti s. Malunavar	85	Ultrasonic assisted copper catalyzed facile synthesis of highly functionalized arylsulphones using arylsulphonyl hydrazides and 1-aryltriazene as coupling partner in GIL, <i>Arnatak Science College Dharwad</i>
Manali somani	12	Smart and Functional Silver Nanogel for Human Healthcare System, <i>India Institute of Technology Delhi</i>
Manila	93	Oxidation of ortho amino benzyl alcohol: a concise kinetic study, <i>Gurukula Kangri (Deemed to be University), Haridwar</i>
Abha shukla	98	Antioxidant Contour of Green Solvent Extracts of <i>Ficus subincisa</i> Bark, <i>Gurukul Kangri (Deemed to be University)</i>
Ambalika	103	Synthesis of water mediated silver sulphide quantum dots and its antibacterial applications, <i>Career Point University Hamirpur</i>

	Anu radha pathania	110	A Review on Study of Proline Organo-Catalysis and its Function, <i>Chandigarh University</i>
	Bhanupriya	117	La/Co/Zn trimetallic nanoparticles for adsorptional photodegradation of malachite green from water system, <i>SILB</i>
	Sangeeta	131	New and Novel La/Cu/Zr trimetallic nanoparticles as efficient photocatalyst for remediation of organic pollutants, <i>SILB</i>
	Richa sharma	133	Bioinspired green synthesis of zinc oxide nanoparticles from <i>Tinospora cordifolia</i> stem extract, characterizations and evaluation of its photocatalytic activity, <i>Career Point University Hamirpur</i>
	Sheetal sharma	135	CQDs decorated MnIn ₂ S ₄ /CdS/Bi ₂ S ₃ heterojunction for enhanced photocatalytic degradation and bacterial disinfection under visible light: A tandem double Z-scheme mechanism, <i>Shoolini University</i>
	Vishal dutta	136	CNTs mediated Ag-CuBi ₂ O ₄ /AgBiO ₃ heterojunction with enhanced photocatalytic and antimicrobial activity, <i>Shoolini University</i>
	Ankit verma	140	Sodium alginate cross-linked acrylic acid/graphite hydrogel composite synthesis and application in malachite green dye removal, <i>Shoolini University</i>
	Raksha saini	141	Structural and optical properties of Zn-doped chromium oxide nanoparticles synthesized by Co-precipitation method, <i>Department of Chemistry Sri Sai University, Palampur</i>
SESSION – II			Time:09:30-10:58
Session Chairs: Dr. Pawan Rana, HFRI SHIMLA			Moderator: Dr. P.C. Pathania, Dr. Sanjay Narang

Oral Presentation (Zoology)

**SESSION
CHAIRS:**

**Dr. Pawan Rana
HFRI SHIMLA**

Presenting Author	Abstract No	Title/ Affiliation
Shailja kumari	13	Phylogeny of peregrine Aporrectodea trapezoides (Dugès, 1828) earthworm from Western Himalaya, <i>Shoolini University</i>
Harpreet kaur	37	Effect of imidacloprid on reproductive performance and genotoxicity in earthworms; <i>Eudrilus eugeniae</i> and <i>Metaphire posthuma</i> , <i>Punjab Agricultural University</i>
Monika panchani	77	Structure of Corona Virus & Role of (RAS) Renin Angiotensin System, <i>Sardar Vallabh bhai Patel Cluster University Mandi</i>
Radhika jamwal	80	Methods for detection of honey adulteration, <i>Sardar Vallabhbhai Patel Cluster University, Mandi, Himachal Pradesh</i>
Sanjay kumar narang	96	Pathophysiology of Beta-Agonist as Bronchodilator Agent in Treatment of Asthmatic Conditions, <i>Sardar Vallabh Bhai Patel Cluster University, Mandi.H.P.</i>
Kiran chauhan	97	Protective Potential of <i>Ocimum</i> Against Genotoxicity of Chemical Clastogens, <i>M. L. S. M. College, Sundernagar, Dist. Mandi, H. P.</i>
Priyanka thakur	112	A curious case of cysteines in human peroxiredoxin I, <i>Shoolini University</i>
Santosh kumar	106	Screening of inhibitors against viral envelop protein VP24 and VP26, <i>Department of Zoology, Maharaja Agrasen University, Baddi, Solan, Himachal</i>

			<i>Pradesh India.</i>
	Shweta sharma	129	Cytoprotective Effects of Dietary Plants, <i>Government College Theog, Distt. Shimla (H P)</i>
	Neha sharma	144	Study of insect infestation in Himalayan Oaks and their management, <i>Himalayan Forest Research Institute Shimla</i>
	Bhumika kanwar	143	Study on insect pest infestation in economically important trees of high altitudinal transitional zones and their management, <i>Himalayan Forest Research Institute Shimla</i>
SESSION – III			Time: 09:30-11:06
Session Chairs: Dr. Sanjeev Kumar, GDC Palampur			Moderator: Dr. Ashok Kumar, Dr. Sita Ram Sharma
Oral Presentation (Mathematics)			
SESSION CHAIRS: Dr. Sanjeev Kumar, GDC Palampur	Presenting Author	Abstract No	Title/ Affiliation
	Jai chand mehalwal	1	Three-Phase-Lag Model- A Study of frequency under the impact of Magnetic field for void material, <i>GDC Bilaspur,H.P</i>
	R. Sathiya shanthi	49	An heuristic approach for solving three machine FSSP with the objective of minimizing total completion time, <i>Shanmuga Industries Arts and Science Colledge Tiruvannamalai</i>
	R. Sathiya shanthi	50	A novel objective for two machine flow shop scheduling problems, <i>SHANMUGA INDUSTRIES ARTS AND SCIENCE COLLEGE TIRUVANNAMALAI</i>

Mustaque hussain borbora	51	A Comprehensive Review on Lattice Boltzmann Method for Cavity Flow with Nanofluids, <i>Motilal Nehru National Institute of Technology, Allahabad</i>
Nagaraja S.	56	CS-LBP Descriptor for Extraction of Texture Features of Underwater Images, <i>Karnatak Science College, Dharwad</i>
Vijayata pathania	65	Characteristics of Circular Waves in Coupled Poro-Thermoelastic Solid with Liquid Half-space, <i>Himachal Pradesh University Regional Centre Dharamshala</i>
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Prakash thakur	139	Free Vibrations of nonlocal thermo-elastic cylinder with voids, School of Basic Sciences, <i>Bahra University, Solan Himachal Pradesh</i>
Madhu Bala	137	Volumetric and acoustic methods for investigating molecular interactions of the drug Streptomycin sulphate in aqueous Sorbitol solutions at different

			temperatures, HPU Shmila
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Session Chairs: Prof. Bhag Chand Chauhan, CUHP Dharamshala			Moderator: Dr. Tarun Sharma, Dr. Ajay Kumar
SESSION CHAIRS:	Keynote Talks		
	Time	Author/Title/ Affiliation	
	11:15-11:40	Dr. Gyeongho Son , School of Electrical Engineering, Korea Advanced Institute of Science and Technology, Daejeon, South Korea	
	11:40-12:05	Prof. MV Reddy , Institute of Research Hydro-Québec, Centre of Excellence in Transportation Electrification and Energy Storage (CETEES), Canada	
Oral Presentation (Chemistry)			
Prof. Bhag Chand Chauhan, CUHP Dharamshala	Presenting Author	Abstract No	Title/ Affiliation
	Jagriti behal	142	Sonochemical synthesis, characterization, of tris (1,3 diamminopropane) cobalt(III) azide., <i>Department of Chemistry Sri Sai University, Palampur</i>
	Shuchi sharma	4	Surface Modification of Silica Nano Particles with Different Percentage Concentration of Thiol Group and Shear Thickening Behavior of Suspension of Silica Nano Particles in PEG, <i>Career point university Hamirpur</i>
	Ajay sharma	33	Green synthesis of xyloglucan@ Zirconium (IV) Selenophosphate nanoparticles for photodegradation of Crystal Violet, <i>IEC University</i>

Jayalakshmi kamaiah	72	Application of ¹ H-Nuclear Magnetic Resonance Spectroscopy in Quality Measurement Studies, <i>Karnatak University's Karnatak Science College</i>
Inesh kumar	101	Molar volume, Acoustic and Conductance studies of anti-diabetic drug Metformin Hydrochloride (MH) in water and aqueous dulcitol as a function of temperature, <i>Himachal Pradesh University</i>
Kajal sharma	107	Synthesis and characterization of La ₂ FeTiO ₆ /g-C ₃ N ₄ /RGO heterojunction for degradation of Dichlophenac under visible light, <i>IEC University (H.P)</i>
Chetna verma	87	Polyvinyl Alcohol based Functional Nanogels for the Bioactive Finishing of Cotton Fabric, <i>IIT Delhi</i>
Swadeep sood	113	In vitro antioxidant and photo catalytic activity of tragacanth gum -cl-p(lactic acid-co-Itaconic acid)/ZnO-Ag nanocomposite, <i>Govt degree college dhaliara, kangra</i>
Jyoti yadav	145	Instantaneous photocatalytic degradation of pesticides over coupled ZnO@CdS nanocomposite as a robust and eco- friendly catalyst, <i>MNIT, Jaipur</i>
Meenu	146	Novel metal ferrite photocatalytic performance for bisphenol A: endocrine disruptor, <i>MNIT, Jaipur</i>
Vikash kumar	147	Eradication of brominated flame retardants (BFRs) by using nanomaterials. <i>MNIT, Jaipur</i>
Sudha chaudhary	148	Synthesis and characterization of BiHCF and MoHCF for degradation of pesticide, <i>MNIT, Jaipur</i>

	Ankita Sharma	11	Antimicrobial Evaluation of Cotton Fabric Immobilised with Nano Silver Loaded Carboxymethylcellulose Nanogels, <i>IIT, Delhi</i>
	Pratibha Singh	16	Development of thyme oil loaded carrageenan-based hydrogels as an antimicrobial wound care system, <i>IIT delhi</i>
	Rishu katwal	149	Guar gum/Al ₂ O ₃ nanocomposites: Synthesis, characterization and their applications, <i>CSKHPKV, Palampur</i>

Valedictory Session

01:45-02:35

Welcome Address

Dr. Mahender Thakur, Gen. Sec. HSCA

01:45-01:50

Report on Conference

Dr. Arush Sharma, Organizing Sec. HSCA

01:50-02:00

Award Presentation

Prof. Deepak Pathania, President, HSCA

02:00-02:15

Address by Guest of Honour

Prof. Adarsh Pal Vig, Chairman, Punjab Pollution Control Board

02:15-02:25

Conference Chief Guest

Prof. S.K. Mehta, Vice-Chancellor, University of Ladakh

02:25-02.35

Vote of Thanks

Dr. Jagdeep Verma, Convener, HSCA

02.35

AGRICULTURE AND ALLIED SCIENCES

Submission 02

Clinical investigation and its therapeutic management of canine demodicosis with special reference to herbal nano medicine

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Abstract: Present investigation was conducted for incidence of demodicosis in dogs and its therapeutic management with special reference to herbal nano formulation. A total of 1200 dogs were screened for demodicosis and 35 cases were confirmed for demodicosis by skin scraping & PCR examination. Overall incidence of demodicosis was 2.91% (35/1200). Month wise incidence study revealed highest incidence in summer season (April-July) and lowest in the winter season (October-March). Dogs of 0-6 months and >3 years age group was found more susceptible to demodicosis during the study period. Sex wise incidence showed males were more susceptible to demodicosis. Breed wise incidence revealed crossbred dogs (34.28%) were more affected followed by American Pitbull (17.14%). The typical characteristics of *Demodex* spp. were confirmed in (20/35) 57.14% cases by skin scraping examination while PCR examination demonstrated (35/35) 100% by the amplification of an approximately 483bp. Sequencing of PCR products were analyzed by BLAST & the results indicated 99.7% identical to available sequences of *D. canis* MG372354 (1:99.7) and 98.8 identical with *D. canis* KU253790 (33:98.8) & MG372359 (1:96.8). The sequence of the PCR product of positive samples was submitted to NCBI GenBank for accession number and MK177513 accession number was obtained for GenBank. Anaemia, Leucocytosis, Eosinophilia, Hypoalbuminemia significant ($p < 0.01$) increased in globulin, blood glucose, total protein were the characteristics haemato-biochemical changes in canine demodicosis. Among DLC, % of Lymphocyte were significantly ($p < 0.01$) decreased, whereas granulocyte count was significantly ($p < 0.01$) increased in *Demodex* infected dogs as compared to healthy dogs in the present study. Study of oxidant-antioxidant status of demodicosis, revealed a significant ($p < 0.01$) reduction in the mean values TA (0.76 ± 0.04 mM),

GSH ($0.33 \pm 0.03\mu\text{M}$), SOD ($3.41 \pm 0.20\mu\text{/ml}$), LPO ($0.06 \pm 0.00\text{nmol}$) in *Demodex* infected dogs. The therapeutic evaluation of herbal formulation against demodicosis revealed all the parameters viz, haemato-biochemical changes and oxidant-antioxidant status was improved on day 21 post therapy onwards which was similar with standard therapy i.e. Amitraz. From the present study it seems that Herbo-Nano medicine can be an effective alternative of Amitraz in case of demodicosis.

Submission 27

Consequences of Covid-19 on Indian agriculture, food security and supply chain

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Small and marginal farmers make up about 90 percent of the agricultural industry in India. Economic shocks, such as those caused by COVID-19 lockdowns, are highly hazardous for these farmers. According to preliminary reports, the lack of migrant labour is causing certain harvesting efforts to be disrupted, notably in northwest India, where wheat and pulses are being picked. Supply chains are being disrupted as a result of transportation challenges and other concerns. Wheat, vegetables, and other products have seen lower prices, but consumers are still paying more. According to accounts in the media, the lockdown has already reduced milk sales by closing hotels, restaurants, confectionery stores, and tea shops. Meanwhile, disinformation, particularly on social media, has harmed poultry farms by implying that chickens are transporter of viruses. This paper deals with the consequences of Covid-19 on the Indian agricultural field and supply chain management. To begin, it assesses the global food supply situation as well as the situation in India to determine the likelihood of a food crisis. Secondly, it reviews the disruptions in food supply chains induced by the pandemic. At the end of this paper, we discuss some of the issues that the agriculture sector is facing and their possible solutions.

Submission 35

Uncovering the differences between mutant and wildtype MLO proteins against Powdery Mildew resistance in *Solanum lycopersicum*

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Powdery Mildew (PM), caused by *Oidium neolyopersici*, is a widespread fungal disease resulting in a 100 percent yield loss in tomato fields. The plant Mildew Locus O (MLO) gene family has homologs that act as susceptibility factors for PM disease. The ol-2 allele is derived from a wild accession of *Solanum lycopersicum* var. *cerasiforme*, a close relative of the common cultivated tomato that confers broad-spectrum resistance to the PM pathogen *O. neolyopersici*. Structure prediction of both wild type and mutant protein indicated the absence of calmodulin binding domain in PM resistant varieties. Since functions of mlo proteins are elusive, these insights may help to devise effective strategies for PM resistance.

Submission 40

Effect of different fertilizers on growth of *Cinnamomum tamala* seedlings

Ankurdeep Preety and Sandeep Sharma

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Cinnamomum tamala (Buch.–Ham.) Nees. And Eberm., commonly known as Tejpatta, Malabar leaf or Indian bay leaf is a promising medicinal plant species which is used in various Ayurvedic formulations, essential oils and for edible purposes due to its aromatic, astringent, stimulant and carminative properties. Owing to its economic importance and exhaustive harvesting practices, this species is being depleting at a fast rate from wild. Production of quality nursery stock of this species through vegetative propagation can relieve its natural population from commercial collection pressures. Keeping this in view, the present study was conducted to test the effect of different fertilizers on the growth of *Cinnamomum tamala* seedlings with the objective to find out the best fertilizer and its dose for fast growth and establishment of healthy nursery stock of

the species. Different doses of four fertilizers viz. Neem Coated Urea, Ammonium Sulphate, Potassium Nitrate and Calcium nitrate were tested for increase in the height of the seedlings. It was observed that Neem coated urea at a dose of 2.5g/lit resulted in maximum increase in the height of the seedlings (3.05 cm) which was found significantly higher than the control (0.65 cm) and all the other treatments. The best treatment was followed by Neem coated urea treatment at dose of 1.5 g/lit and Ammonium sulphate at 1.5 g/lit treatments, which resulted in mean increase in height of the seedlings by 1.97 cm and 1.77 cm, respectively.

Submission 41

Influence of different organic mulches on ginger crop under bamboo-based agroforestry system in mid hills of the Himalayas

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Ginger Production in India's northwest Himalayan region is a productive and profitable use of land resources. A study was carried out to elucidate the influence of different mulches on ginger crops under a bamboo-based agroforestry system in the mid-hills of the Himalayas. A Randomized Block Design experiment was initiated in April 2019. Ginger was sown in the alleys of the two 14-yr-old bamboo species (*Dendrocalamus asper* and *D. balcooa*) spaced at 9 m × 5 m and an open field condition (standard mono-cropping of ginger) to study the impact of bamboo species and mulch on the productivity of the ginger crop. Ginger (*Zingiber officinale*) was grown under different mulch treatments. When compared to open field conditions, intercropping with bamboo species enhanced ginger output by 10.5–12 percent. Most of the growth and yield traits of the ginger crop, such as rhizome sprouting, tillers per plant, rhizomes per plant, rhizome length, rhizome fresh weight, yield, and oleoresin content (%) were found to be the highest in treatment leaves mulch of *Toona ciliata* along with a recommended dose of fertilizers (RDF) + Farmyard manure (FYM). Various soil Physico-chemical properties like OC and available N were found best in *Alnus villosa* + FYM + RDF). However, available P was reported as highest in (*Toona ciliata* + FYM + RDF), while available K was highest in *Celtis australis* + FYM + RDF. Moreover, during the research period, soil moisture content was higher under *D. balcooa*, and the Light transmission ratio was reduced up to 40 percent under the

bamboo canopy. According to the findings present investigation, ginger performed better in a bamboo-based agroforestry system as compared to a sole crop system. Hence, the application of *Toona ciliata* + FYM along with RDF significantly ameliorates the ginger growth and yield traits over control.

Submission 42

Response of different bulky organic manures along with liquid formulations on growth, yield and quality of *Actinidia deliciosa* Chev. in mid-hills of the Himalayas

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A study was carried out to elucidate the effect of bulky organic manures along with liquid formulations on growth, fruiting, and quality of kiwifruit in mid-hills of the Himalayas. Study was carried out in an experimental block of Department of Fruit Science during the year 2017-18. Nine-year-old vines of uniform size and vigor planted at 4.0 m × 6.0 m spacing were selected for the studies. The experiment was laid out in a Randomized Block Design with eight treatments viz. T1 [Recommended N through dairy manure (DM) (100%)], T2 [Recommended N through Vermicompost (VC) (100%)], T3 [Recommended N through Poultry manure (PM) (100%)], T4 [Recommended N through DM and PM (50:50)], T5 [Recommended N through DM and VC (50:50)], T6 [Recommended N through PM and VC (50:50)], T7 [Recommended N through DM, PM and VC (in equal proportions)] and T8 [Recommended nutrients (FYM:40 kg, N:800 g, P:600 g, K:800 g)]. There were two common organic amendments that were applied i.e. foliar spray of Jeevamrut and Panchkavya along with Soil application of Neem Cake @ 1 kg /plant except for T8. The highest leaf area, chlorophyll content, and yield were recorded with treatment T8. The highest fruit size and average fruit weight were also recorded with this treatment. Fruit quality parameters namely, total sugars, reducing sugars and fruit firmness were also found highest in T5 [Recommended N through FYM and Vermicompost (50:50)].

Submission 76

**Influence of pre-harvest spray of various chemicals on fruiting behavior and quality of
Kinnow mandarin**

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Present investigation was conducted in a well maintained Kinnow orchard of Department of Horticulture, Khalsa College, Amritsar during the year 2018-19. Healthy and uniform eight years old Kinnow trees were selected and treated with 2,4-D (10, 20 and 30 ppm), NAA (15, 20 and 25 ppm) and SA (10, 20 and 30 ppm) while the trees under control were treated with plain water only. The experiment was laid out in Randomized Block Design (RBD) with ten treatments that replicated thrice. The results revealed that marked variations were recorded among the pre harvest treatments on fruit drop, yield and quality in Kinnow mandarin. Among all treatments, T1 (2,4-D 10 ppm) treated trees registered maximum fruit set (81.97%), fruit retention (68.57%), fruit yield (75.13 kg per tree) with minimum fruit drop (32.2%) and also having least seed count (19). The fruit physical parameters in terms of fruit size and weight was found to be maximum under treatment T2 (2,4-D 20 ppm) and was also closely followed by treatment T1 (2,4—D 10 ppm) with fruit size of (10.90 cm x 6.86 cm) and weight of 152.93 g. Whereas fruit biochemical parameters were enhanced significantly with the pre harvest application of SA 10 ppm (T7) with T88 of 12.3 °Brix, total sugars of 9.49%, reducing sugars of 4.40% and ascorbic acid of 25.07 mg/ 100g. The study suggested that 2,4-D (10 ppm) proved to be beneficial for increasing fruit yield and fruit retention by checking fruit drop, while SA (10 ppm) for enhancing fruit quality.

Submission 125

Nirgal group of Hill Bamboo: Essential ecosystem services provider to native communities

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Himachal Pradesh is represented by two Hill bamboo species viz. *Drepanostachyum falcatum* (= *Sinarundinaria falcata*; *Arundinaria falcata*) and *Thamnocalamus spathiflorus* (*Arundinaria*

spathiflora). This group of bamboos is traditionally known as ‘Nirgal’ or ‘Naghal’. *D. falcatum* occurs more commonly at 1500 – 2100 m amsl, while *T. spathiflorus* between 2800 – 3500 m altitudes or above in the moist temperate forests. More commonly, the plants grow as moderately dense undergrowths in evergreen forests of oak, chir pine, deodar and rhododendron. Hill bamboo has been providing essential ecosystem services to native communities since time immemorial. It forms very versatile local raw materials associated with day today life of the rural households. Basketry forms the main products, which are used for carriage of material, storage of grains, plucking of apples, winnowing of grains, forming live hedge, stakes for cash crops, etc. Ecologically too, this bamboo is very important for wildlife, providing food for animals such as bears and shelter for birds such as the threatened pheasants. It does not hinder regeneration of trees as seedlings can grow in the gaps between the clumps. Hill bamboo is harvested for making baskets, mats, flowerpots etc., and other commercial purposes. Hill bamboos remain green during winter when all other fodder species become dry and shed leaves. Therefore, this foliage forms an important source of fodder during scarcity period. These bamboos are intimately associated with human wellbeing and despite their numerous uses, there has been little focus on the assessment of their ecosystem services.

BIOLOGICAL SCIENCES

Submission 10

Studies on effect of storage containers and conditions on seed longevity of *Abies spectabilis*

(D. Don) Spach.

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Abies spectabilis (D. Don) Spach. is one of the ecologically important conifer of higher temperate Himalayan region. Commonly known as 'Talispatra', it is found in the Western Himalayan states of Himachal Pradesh, Jammu and Kashmir, Uttarakhand and North-East India at altitudes of 2800 – 4000 m amsl. It is well known for its medicinal value and is commonly used in Indian system of medicine especially in Ayurvedic system for preparing different medicines. The leaves are astringent, carminative, expectorant, stomachic and tonic. An essential oil obtained from the leaves is used to treat cold, rheumatism and nasal congestion in traditional health system. The seedlings of this conifer species are generally raised in the nursery through seeds, however, good seed year occurs in 6-7 years interval. Keeping in view the ecological and medicinal importance of this conifer, a seed storage trial was conducted to study the effect of storage containers and conditions on seed longevity. The seeds of *A. spectabilis* collected from naturally growing trees at Kalabagh near Churdhar in Shimla district were stored in different storage containers and conditions viz., Cotton bag, Poly bag, Jute bag and Plastic Container at Room Temperature, at $5\pm 1^{\circ}\text{C}$ in Cooling Cabinet and at $-5\pm 1^{\circ}\text{C}$ in Deep Freezer. The longevity of stored seeds was tested periodically after every three months up to 18 months of storage period through germination test. Significant differences were observed in germination percentage of seeds stored in different storage containers and conditions under different storage periods. The seeds stored in air tight plastic containers at $-5\pm 1^{\circ}\text{C}$ in Deep Freezer registered maximum 38% germination after three months of storage which subsequently decreased to 32% germination after six months, 29% germination after nine months, 27% germination after twelve months, 23% germination after fifteen month and 21% germination after eighteen months of storage whereas, seeds stored in cotton bag at room temperature recorded minimum germination of 25.33% after three months of storage which further decreased to 20.66% after six months, 14% after nine months, 9% after twelve months, 6% after fifteen months of storage and there after loses germinability completely after eighteen months of storage. Present investigation revealed that with increase in storage period, longevity of *A. spectabilis* seeds tends to decrease considerably. The study further revealed that best storage container and condition for storing seeds of *A. spectabilis* for maintaining seed longevity during storage is air tight plastic container at $-5\pm 1^{\circ}\text{C}$ in Deep Freezer.

Submission 16

Development of thyme oil loaded carrageenan-based hydrogels as an antimicrobial wound care system

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The healing of wounds in patients who suffer from grave tissue damage due to burns or severe medical conditions such as diabetes or ischemia continues to pose a serious challenge in healthcare. Thus, rapid wound closure with dressings is required for effective wound management which facilitates wound healing and prevents a bacterial invasion. Polysaccharides-based hydrogels are considered promising biomaterials in accelerating the wound healing process due to their adequate flexibility, biocompatibility, biodegradability, structure diversity, water swellability, and antimicrobial nature. In the present study, we have developed a thyme oil-loaded κ -carrageenan-polyethylene glycol-based hydrogel membrane for protecting bacterial invasion and accelerating wound healing.

Physicochemical properties and microstructures of fabricated hydrogel membranes were investigated adopting Fourier transform infrared (FT-IR) spectroscopy, mechanical studies and scanning electron microscopy (SEM). The addition of PEG to κ -CG polymeric network resulted in mechanically flexible hydrogel network. Furthermore, the introduction of TO within the CG-PEG-based hydrogel membrane enhanced antimicrobial properties. The antimicrobial behavior of the obtained membranes has been investigated with zone of inhibition, colony counting and bacterial adherence test. These obtained membranes exhibited good antimicrobial activity and holds huge potential in the fields of biomedical science.

Submission 34

Folkloric therapeutics and conservation measures of *Fritillaria roylei* Hook., an important plant of 'Ashtaverga' group

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Fritillaria roylei Hook. is a perennial herb found in temperate and alpine regions (3000 – 4200 m amsl) of North Western Himalaya. It belongs to family Liliaceae, and is one of the eight high value medicinal herbs, referred to as ‘Asthaverga’ plants in Indian system of medicine. Known locally as ‘Kakoli’ and ‘Jungli lahsun’, bulb is the main medicinal part of this plant which is used as important constituent in many medicines and health tonics including ‘Chyawanprash’. Bulb is used to cure bronchial, gastroenterological, Urinary disorders and also used as tonic and aphrodisiac. Due to its high demand in traditional health care system its market demand is very high thus local communities collect all the bulbs from their locality in the month of June -July by uprooting whole plant except few which escape from their sight. Heavy unsustainable harvesting and anthropogenic pressures i.e. massive extraction of bulbs prior to seed maturity, over exploitation, low seedling establishment, competition with associated species, excessive grazing pressure, tourism activities beyond carrying capacity and continuous changing climatic conditions are the major cause of its rapid habitat and population depletion from natural ecosystem. In view of its declining population the International Union for Conservation of Nature (IUCN) categorized the species as endangered for Himachal Pradesh, and critically endangered for Uttarakhand, and Jammu and Kashmir. Due to declining status from the wild, this important herb requires immediate steps for its conservation and restoration in the Western Himalayan region.

Submission 58

Documentation of herbal potential of some pteridophytes of Himachal Pradesh: A review

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Himachal Pradesh is a beautiful state with many forests, mountains and rivers. The forests are rich in vegetation due to the presence of favourable climatic and topographical conditions. The

pteridophytes are vascular cryptogamic plants which are found in moist and shady areas of Himachal Pradesh. Most of the population of Himachal Pradesh lives in rural areas and tribal areas near the vicinity of forests. These rural/ tribal communities have good reservoir of traditional knowledge regarding the utilization of medicinal aspects of the local plant diversity for the treatment of various health problems in the form of folk remedies and herbal therapies. These communities gained this traditional knowledge from their ancestors; it is transferred from one generation to next generation orally. Therefore, documentation of this traditional knowledge is necessary for its conservation. This paper emphasis on the documentation of herbal potential of some pteridophytes such as *Adiantum capillus-veneris*, *Chelianthes albomarginata*, *Dryopteris cochleate*, *Onychium japonicum*, *Pteris vitata*, etc. which are useful in treatment of various diseases due to the presence of different kinds of secondary metabolites in them.

Submission 60

Ethnomedicinal importance of some herbaceous angiospermic plant resources of Shimla

District of Himachal Pradesh: A review

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“Shimla” – the capital and the largest city of the Indian State of Himachal Pradesh has a rich ethnomedicinal flora due to the varied climatic conditions. Shimla is a mountain city characterized by an extreme landscape featuring several peaks. The population of Shimla is composed of a variety of different ethnolinguistic groups and social castes that practice the traditional medicine. Local people use herbaceous angiospermic plant resources in several forms for the treatment of various types of ailments in their daily lives. By studying and comparing the traditional medicine based on bioactive compounds in plants, scientists can evolve better ways of dealing with certain diseases. For example; the drug ‘digitalis’ obtained from *Digitalis purpurea* is a cardiac stimulant that improves the nutrition of the heart. Some species of *Viola* are used in traditional medicine system for treatment of cough, cold, flu and malaria. This paper focuses on review of ethnomedicinal importance of some herbaceous angiospermic plant resources of Shimla city, and how we as young learners can use this information to make advancements in

ethnomedicine during this hard time of pandemic. Ethnomedicinal studies can lead to improved health practices both in rural and urban settings.

Submission 62

Studies of anti-inflammatory potential of some plants of Himachal Pradesh: A review

Nitesh Kumar and Sunita Saklani¹

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Inflammatory diseases are those which are characterized by inflammations such as allergy, asthma, auto-immune diseases, hepatitis, etc. Herbal treatment is good and beneficial for the cure of various diseases without any side effects. Himachal Pradesh is a hilly state with wide range of forests and mountains which are full of diverse flora. There are several medicinal plants such as *Cissus quadrangularis*, *Curcuma longa*, *Plumbago zeylanica*, *Terminalia bellarica*, *Terminalia chebula*, *Zingiber officinale*, etc. which possess anti-inflammatory properties due to the presence of various secondary metabolites present in them. This paper documents some medicinal plants of Himachal Pradesh which have high anti-inflammatory potential. The knowledge of medicinal plants by different rural/ tribal communities of Himachal Pradesh can form the basis of developing new pharmaceutical drugs.

Submission 63

Study of religious aspects of some plants of Mandi city which are associated with deities

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Plants play important role in the life of the rural people of Mandi district. They are used to meet their daily requirements such as food, fodder, fiber and medicine. Mandi city is popularly known as “Choti Kashi” because of the presence of a number of temples. Many plants are associated with various deities and their worshipping. Each religion has its own sacred plants, and these

plants play an important role in the life of people right from birth to death. Present work documents the plants used in various religious ceremonies in Mandi city and their relationship with the worshipping of local deities.

Submission 81

Cytological observation in some medicinal plants

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Angiosperms are the most dominant flora on the earth. Plants species of some medicinal significance need very careful identification. Angiosperm species contain different chemical constituents which make them unique medicinal plants to treat various human ailments. So besides morphological, anatomical and biochemical characterization, cytological tools have their own importance in the correct and accurate identification of a particular species. Ten species of flowering plants viz. *Cosmos sulphureus*, *Euphorbia hirta*, *Spilanthes ciliata*, *Eshscholzia californica*, *Mazus rugosus*, *Boerhaavia diffusa*, *Nicotiana plumbaginifolia*, *Chenopodium album*, *Tridax procumbens* and *Vicia sativa* were studied for their chromosome number and meiotic configurations. These species belongs to seven families. Anthers were squashed in acetocarmine stain for this purpose. The chromosome number in these species varies from $n=6$ to $n=39$. Normal meiosis was observed only in *Mazus rugosus*. Chromosomal abnormalities are dominant in the form of univalents followed by quadrivalents and trivalents. Chromosomal abnormalities in the form of B chromosome, cytotoxicity and polyads were very rare in these species. *Vicia sativa* and *Nicotiana plumbaginifolia* were the only two species having B chromosome. Univalents were found in *C. album*, *E. hirta* and *S. ciliata*. However, chromosome stickiness has been observed in *C. album*. Trivalents were observed in *Spilanthes ciliata*, *Cosmos sulphureus* and *Euphorbia hirta*. *Chenopodium album*, *Tridax procumbens* and *Spilanthes ciliata* were found having quadrivalents. Cytotoxicity was, however, recorded only in *Boerhaavia diffusa* and *Tridax procumbens*.

Submission 86

Modern technologies for tackling Covid-19 pandemic

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As Covid-19 pandemic evolves, technological applications and initiatives are multiplying in an attempt to contain and control the spread of the disease, treat patients and take off the pressure from the exhausted healthcare sector. Present study aims to discuss various aspects of modern technology used to fight against Covid-19 crises at different scales. With the growing pandemic, researchers all over the world are looking forward to find the ways to address the challenges of this virus. In this war against pandemic, science and technology is playing a vital role. Emerging technologies are urgently needed to tackle and improve the efficiency of the global efforts in epidemic monitoring, virus tracking, control and prevention, treatment, vaccine development and predicting the outbreaks. The social media is also an aspect of modern technology which provides platform for communication with the general public. Mobile and smartphone-based applications are being used to connect with loved ones during these testing times. The e-learning platforms are being used to accomplish teaching-learning goals. Emerging technologies including artificial intelligence, telemedicine, robotics, drones, Medical image processing, and Computational biology and open source technologies, can be of high importance in tackling Covid-19 as well as other diseases.

Submission 89

'Astavarga' orchids as promising immune boosters

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Orchids are popular worldwide because of their beautiful flowers, but their therapeutic properties are also well documented. They have been considered as a source of medicine in Indian Ayurveda and Traditional Chinese medicine. A variety of active phytochemicals such as polysaccharides, alkaloids, phenols, flavonoids, phenanthrenes, stilbenes, etc. are responsible for inducing anti-inflammatory, antioxidant, antimicrobial, anti-aging and immunomodulatory properties in these plants. Ancient Indian literature refers to a group of eight medicinal plants, called 'Astavarga', which were used for preparation of some rejuvenating herbal formulations, and four of these are orchids. They are known by the names Riddhi [*Habenaria intermedia* D. Don], Vriddhi [*Platanthera edgeworthii* (Hook. f. ex Collett) R. K. Gupta], Jivak [*Malaxis muscifera* (Lindl.) Kuntze] and Rishbhak [*Crepidium acuminatum* (D. Don) Szlach.], and are distributed in mid hills (1500-3000 m) across the Himalayan range. 'Chyawanprash', which is one of the most popular herbal tonics in India, contains the tubers of one or more of these orchid species. They are reported to have blood purification and restorative properties, and therefore act as effective immune boosters against a variety of ailments. Because of high demand in Ayurveda based industry, their wild populations are facing over-collection pressure. Therefore, conservation strategies (*in situ* and *ex situ*) are immediately required to tap the therapeutic potential of these important herbs in a sustainable manner.

Submission 90

On the occurrence of two therapeutic orchids in Himachal Pradesh

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Himachal Pradesh is an Indian state located in Northwest part of the Himalayan range between 30°22'-33°12'N latitude and 75°47'-79°04'E longitude. Vast geographical expanse (55672 km²) and huge altitudinal variation (350-7000 m) make this state quite rich in biodiversity. Family Orchidaceae is represented by more than 85 species, majority of which are ground growing in habit. Two of these orchids i.e. Riddhi (*Habenaria intermedia*) and Vriddhi (*Platanthera*

edgeworthii) are reputed therapeutic herbs in the Ayurvedic system of medicine. They find wider distribution in the mid hills of the state between the altitudes 1500-3000 m mainly in districts Solan, Shimla, Kullu, Sirmaur, Mandi and Chamba. These plants are known to have several medicinal properties and are used as expectorant, aphrodisiac, blood purifier, rejuvenator, appetizer and anthelmintic. Their tuberous roots are used in the preparation of a general health tonic called 'Chyavanprash'. It is easy to differentiate between these species when they are in their vegetative and flowering state; however, merely observing their dried shriveled tubers makes it difficult to draw any sharp distinction. These orchids are threatened of existence and the collection of their plant parts from the wild is banned. However, owing to their high therapeutic value, they are still collected illegally from their natural homes. The populations are shrinking to such an extent that people are now extracting and selling the tubers of other allied species (*H. pectinata*, *H. latilabris*) in their place.

Submission 92

Threatned plants of Kotli Tehsil of District Mandi of Himachal Pradesh: Their diversity, distribution, indigenous uses and conservation

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Western Himalaya is rich store house of plant diversity, radially utilized as a source of food, fodder, fuel, timber, medicine and materials by local communities due to tremendous nutritive, medicinal and economic value of many plants. From recent few years with advancement in technology, changed food habits and life style of even a common man, there is outbreak of many serious diseases and medicinal plants, their utilization, marketing and research has gained attention round the world. Himachal Pradesh being top repositories of medicinal herbs among the states lying in Western Himalaya is also one of the major sources of raw material of important medicinal plants to the global market. But unsustainable extraction of these plants from wild has pushed them to the threatened category. Present study was undertaken to document such threatened plants of the Kotli Tehsil (31°75'70.3 " N latitudes and 76°87' 32.5" E longitudes) of Mandi district. It comprises of about 64 villages scattered within an altitudinal range of 1150 –

2100 m amsl. A total of fifteen threatened plant species (Herbs=6, Shrubs=3, Trees=6) belonging to 12 families and 14 genera were documented. To ensure sustainable harvesting of these plants, mass awareness and *ex situ* cultivation through community involvement is looked as probable solution to meet raw material market demand and diluting *in situ* extraction pressure.

Submission 99

Ethnoveterinary plants of Solan district, Himachal Pradesh

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The relationship shared by humans and plants dates back to the centuries. Even today, plants are being used to meet our basic necessities in addition to curing a number of diseases and ailments. In present study, an attempt has been made to document the ethnoveterinary uses of plants in Solan district of Himachal Pradesh. Agriculture and horticulture are one of the most preferred livelihood sources across this district, and people use modern methods to grow cash crops such as mushroom, vegetables, fruits and flowers. They are also actively involved in animal husbandry to supplement the income by producing milk, processed dairy products, wool and organic manure, etc. Questionnaire method was opted to document information on ethnoveterinary plants by interviewing rural inhabitants between the age groups of 30 and 80. It was observed that people engaged in animal husbandry possess sound knowledge of plants and procedures used in treating disorders such as fever, sterility, stomach ache, injury and infections, burns and wounds, sore feet, dysentery, etc. in their domesticated animals. A total of sixty plant species, belonging to thirty four families, were recorded to have such medicinal properties, and leaf is the most commonly used plant part in 48.30% cases. Fabaceae, Poaceae, Asteraceae and Rutaceae were the dominant families to which many of these species belong. Present survey indicates that people of Solan district possess rich traditional knowledge, and household remedies are widely practiced to treat various animal ailments. Such knowledge also reduces

their dependence on the expensive allopathic medicines during the pandemic or even normal times.

Submission 109

An updated review on phytochemistry and biological activity of *Skimmia laureola*

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Plants have been used worldwide as medicines to heal up many diseases and their valuable properties being identified for the development of novel drugs. The immense pharmaceutical application of plants inspires the present research in drug development; natural plant products may offer a new-fangled lead against different pharmacological targets. This work gives a broad and an reorganized literature assessment about recent status of research on *Skimmia laureola*, depicting the biological and chemical properties that are the mainly significant. The present script provides reorganized review on the majority of reported activities on *S. laureola* and its active chemical constituents.

Submission 120

An Account of Floristic wealth and ethnobotany of Sarahan in Shimla district, Himachal Pradesh

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India is renowned worldwide for possessing wealth of traditional knowledge and diverse floristic wealth. Himachal Pradesh, a mountainous state, is located in northern part of the country and is a repository of diverse plants and rich cultural traditions. Present study was undertaken in Sarahan and its adjoining areas including the Bashal peak. Sarahan is a medium sized hamlet located in Rampur Tehsil of district Shimla. A total of one hundred plant species were documented from the study area. These belong to 49 families with Rosaceae being the most dominant family with

11 species. As far as the habit is concerned, it included maximum herbaceous species (47) followed by trees (26), shrubs (23) and climbers (4). Some of the signature species of the region are *Angelica glauca*, *Dactylorhiza hatagirea*, *Delphinium denudatum*, *Prinsepia utilis*, *Trillium govanianum*, *Symplocos paniculata*, *Abies pindrow*, *Prunus cornuta*, *Aesculus indica*, *Thamnocalamus spathiflorus*, *Skimmia laureola*, *Rhododendron campanulatum*, *Rosa moschata* and *Polygonatum* spp. Such documentations will add up to a comprehensive database of the plants used by native communities and this information could be disseminated to the new generation for awareness and sustainable utilization of plants.

Submission 123

***In vitro* evaluation and assessment of anticancer activity of methanolic extracts of *Gracilaria corticata* against breast cancer cells**

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Cancer is characterized by uncontrolled division of abnormal cells that eventually invade other tissues and has become the leading cause of death, worldwide. Nowadays, discovery and development of anticancer agents are the major focus. Identification of cytotoxic compounds from natural resources led to the development of anticancer therapeutics. The aim of present study is to assess the methanol extract of *Gracilaria corticata* for anti-proliferative and anti-oxidant potency if any, against breast cancer cell MDA-MB-231 *in vitro*. Anti-tumor activity of GCME against MDA-MB-231 was assessed by 3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide (MTT) assay. The extract decreased cell viability of MDA-MB-231 with an estimated half-maximal inhibitory concentration (IC₅₀) of 0.116±1 and 0.107±1 (p< 0.0001). GCME significantly increased the ROS level with IC₅₀ of 0.107 µg/µL after 48 h of treatment and decreased the glutathione (GSH) level (p<0.01) in a dose-and time-response manner. The apoptosis induction in MDA-MB-231 cells was studied by staining with fluorogenic agents 2',7'-dichlorodihydrofluorescein diacetate (H2DCFDA). The mitochondrial

membrane potential (MMP) disruption of GCMEs -treated MDA-MB-231 cells were maximum at 0.107 $\mu\text{g}/\mu\text{L}$ ($P < 0.005$). *G. corticata* showed significantly higher 2, 2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity (68.35 %). This study also explores the phytochemical constituents of GCME such as hexadecanoic acid, methyl ester and cholesta-4,6-dien-3-ol, (3 Beta), which has received attention due to their antioxidant, anti-inflammatory, and anti-cancer activities.

Submission 130

***Salix* – A multipurpose arboreal taxon in the Cold Deserts of Spiti, North West Himalaya**

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The cold desert region of the country falls in the cold arid Trans Himalayan zone of Spiti in Himachal Pradesh and Ladakh. Due to the intense cold conditions representing many environmental challenges, trees are a very rare sight here, but *Salix* is among the few species that naturally grows here. The genus *Salix*, belonging to family Salicaceae, has a large number of species of which only a few are found in the cold desert region of Spiti, where they form an important element of agroforestry systems. The two most striking *Salix* species in the Spiti valley are *S. fragilis* and *S. alba*, which seem to thrive well in these areas. Their ability to grow through shoot-cuttings plantations under extreme and xeric climatic conditions of cold deserts makes them ecologically suited and socially acceptable among the communities besides playing an important role in combating desertification. In the Spiti valley, *Salix* is used as subsistence resources and for socio-religious purposes. Besides, it provides vegetation on barren landscape where some water and moisture is available and reduces soil erosion along rivers and their tributaries and act as a natural fence for check dams. *Salix* is also playing an important role in the livelihood of the people and is put to multiple usages across the Spiti valley. It is used for construction purposes; small twigs for basketry, leaves harvested as fodder, agricultural implements, and wooden racks and as timber. Given the contribution of the *Salix* species in the economy of the region, the commercial aspects of their cultivation need to be studied in depth and their plantation should be encouraged. Commercial aspects of *Salix* species need to be

investigated to encourage the farmers to plant them, which indirectly will also aid the mitigation of carbon.

Chemical Sciences

Submission 3

Monitoring of Physiochemical Qualities of Riverine of Baddi Area of Himachal Pradesh

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Abstract: This work has focused on the assessment of Physiochemical parameters of four riverine of Baddi at twelve different sampling stations and sources were collected and subjected to standard analytical techniques in M/S Eco Lab Mohali. A systematic study for water quality analysis is done for twenty one parameters i.e. evaluating pH, electrical conductivity, turbidity, TDS, total hardness, major ions (Cl⁻, F⁻, NO₃⁻, SO₄²⁻, Ca²⁺, Mg²⁺, Na⁺, K⁺), heavy metals like copper, lead, chromium, zinc, iron and cadmium, biological oxygen demand (BOD) and chemical oxygen demand (COD) which are found in the range of 5.63-7.73, 653-2159 μ mho/cm, 1.2-1360 NTU, 349-1472, 120-327, 55-399, 0.2-1.17, 3.4-11.2, 17- 188, 22-102, 17.3- 370, 2.1-49, 0.01-0.15, 0.01-0.12, 0- 0.09, 0.01-0.27, 0.19-2.3, 0-0.001, 3.8-522, 12-1600 mg/l, respectively. Many of the parameters are not within the desirable limit as per BIS (Bureau of Indian Standards).The Dense unplanned industrial establishment have negatively affected the surface water quality in the study area. The disposal of untreated effluents from various industries may be the main source of contamination of Riverine in the study area. This study recommended the appraisal of surface water quality in industrial belt and monitoring of unplanned industrialization.

Author Keywords: Riverine,Monitoring, Industrialization, Physiochemical parameters, Water pollution, Baddi.

Submission 4

Effect of Surface Modification of Silica Nanoparticles with Different Percentage Concentration of Thiol group on the Shear Thickening Behaviors of the Suspensions of Silica Nanoparticles in PEG

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ABSTRACT: The Fine-tuning of Shear Thickening Fluids (STFs) by surface modification of silica particles has fascinated scientist's interest worldwide as it results in performance enhancement of STF based on armor systems. In the present study, Silica nanoparticles with an average diameter of 600 nm were surface modified to exhibit thiol functional groups through reaction with 3- mercaptopropyl-trimethoxysilane ,with different concentration in absolute ethanol at 90 °C. Shear thickening fluid of Thiol functionalized Silica nanoparticles in Polyethylene Glycol (PEG200) were prepared by sonochemical method. The rheological parameters of STFs were explored and compared with unmodified silica particles using Rheometer MCR 52, Anton Par, Germany. The ST behavior of thiol-based STF was found to show shear thickening at a higher shear rate compared to only silica-based STF with the decrease in viscosity maximum.

Keywords: Bullet Impact; Shear Thickening Fluid; Strain-Thickening; Particle Dispersion; Rheology.

Submission 21

Photo-degradation of hazardous aromatic pollutants from industrial effluents using carbon supported ZnFe₂O₄ magnetic nanocomposite

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Abstract: In present work, we describe the remediation of noxious naphthalene (NPN) and 2-naphthol (2-NP) from aqueous phase under visible irradiation. The activated carbon/ZnFe₂O₄ (AC/ZF) nanocomposite was synthesized by simple co-precipitation method. The various

instrumental techniques such as Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD) pattern, surface area analyzer Brunauer-Emmett-Teller (BET), vibrating sample magnetometer (VSM), field emission scanning electron microscopy (FESEM), high resolution transmission electron microscopy (HRTEM), small area diffraction (SAED) pattern, electron dispersive Xray (EDX) and photoluminescence spectra (PL) were used to study the detailed anatomy of prepared nanocomposite. The XRD, HRTEM and SAED results indicated that AC/ZF composite has been prepared in nano-phase. The degradation of organic pollutants were studied by high resolution mass spectrometry (HRMS), chemical oxygen demand (COD) and UVvisible (UV-vis) spectrophotometry. The degradation efficiency of 86.41% and 92.81% were recorded for NPN and 2-NP using AC/ZF nanocomposite under synergetic adsorptionphotocatalysis (AP) after 160 min of solar illumination, respectively. The augmented photocatalytic degradation of pollutants was mainly ensued due to mesoporous nature of nanocomposite and strongly improved charge separation efficiency of AC/ZF. Therefore, our investigations might expose a novel, economic and proficient photoactive material for the removal of highly noxious pollutants from water system.

Keywords: Nanocomposite, Pollutants, Photo degradation, Characterization, Mesoporous.

Submission 22

Enhancement of capacity and selectivity of oxyanion adsorptions by controlling mesostructure of adsorbent solids

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Abstract: The adsorption is a simple, versatile and cost-competitive method for the removal of toxic molecules and ions from the aqueous environment. The ideal adsorbents are featured by the selective adsorption sites distributed uniformly and densely on the surface. In addition, the easy accessibility to the solvated molecules and ions is required for adsorption sites. These characteristics are realized not only by the chemical nature of the adsorption sites but also by the mesostructures of framework or matrix of the "carrier" of the sites, which assures the rapid

diffusion of adsorbate molecules or ions to the sites and inhibition of interferences between the sites. We synthesized various silica-based or silicate-based mesostructured solids, whose framework is designed for optimizing the adsorption properties. The factors that were explored are the pore sizes of the solid "carrier," the density of adsorption sites, the distance between the adsorption sites, in addition to the specific surface area of the solid. Furthermore, we investigated, in the adsorption of certain types of aqueous ions, the cooperative mechanisms of adjacent sites that depend highly on the mesostructure of the framework. The results suggest that the adsorption properties of molecules and ions in aqueous media are determined largely by the structural factors of adsorbents beyond the apparent density of adsorption sites.

Author keywords: purification of water, adsorption, mesostructured solids, Oxyanions.

Submission 23

Zinc oxide nanoparticles-mediated delivery of quercetin for breast cancer therapy.

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Abstract: Naturally occurring bioactive compounds are gaining much importance as anti-tumor agents in recent times due to their high therapeutic potential and less systemic toxicity. However, different preclinical and clinical studies have noted significant shortcomings, such as nonspecific tumor targeting and low bioavailability which limit their usage in therapeutics. Therefore, a safe and compatible nanoparticle mediated controlled drug delivery system is in high demand to enable effective transport of the drug candidates in the tumor tissue. Herein, we have synthesized phenylboronic acid (PBA) conjugated Zinc oxide nanoparticles (PBA-ZnO), loaded with quercetin (a bioflavonoid widely found in plants), with zeta potential around -10.2 mV and diameter below 40 nm. Presence of PBA moieties over the nanoparticle surface facilitates targeted delivery of quercetin to the sialic acid over-expressed cancer cells. Moreover, Quercetin loaded PBA-ZnO nanoparticles (denoted as PBAZnO-Q) showed pH responsive drug release

behavior. Results suggested that PBA-ZnO-Q induced apoptotic cell death in human breast cancer cells (MCF-7) via enhanced oxidative stress and mitochondrial damage. In line with the in vitro results, PBA-ZnO-Q was found to be effective in reducing tumor growth in EAC tumor bearing mice. Most interestingly, PBA-ZnO-Q is found to reduce tumor associated toxicity in liver, kidney and spleen. The cytotoxic potential of the nanohybrid is attributed to the combinatorial cytotoxic effects of quercetin and ZnO in the cancer cells. Overall, the presented data highlighted the chemotherapeutic potential of the novel nanohybrid, PBA-ZnO-Q which can be considered for clinical cancer treatment.

Author keywords: Anticancer, Quercetin, Reactive oxygen species, ZnO nanoparticles, PBA conjugated nanoparticles.

Submission 24

Mesoporous silica nanoparticles as smart drug delivery system for targeted and controlled delivery of umbelliferone in cancer therapy.

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Abstract: Herein, a mesoporous silica nanoparticle (MSN) based biocompatible, targeted and controlled drug delivery system has been synthesized for tumor tissue-specific drug delivery. Umbelliferone, a natural coumarin derivative was loaded into the pores of MSN and capped with pH-sensitive poly acrylic acid (PAA). For targeted delivery of umbelliferone in tumor tissue, folic acid (FA) was grafted onto the surface of drug-loaded and PAA-coated MSN. The successful construction of the nanohybrid (Umbe@MSN-PAA-FA) was confirmed by performing a series of characterization. The synthesized pH-responsive nanohybrid showed diameter of around 50 nm with overall negative surface charge and drug loading content of 12.56 %. In vitro study showed that the nanohybrid caused significant cytotoxicity through the induction of both oxidative stress as well as mitochondrial damage in folate receptor over-

expressed in human breast cancer cell, MCF-7 compared with free umbelliferone. In vivo study also exhibited that the nanohybrid effectively reduced tumor growth in tumor-bearing mice compared with free umbelliferone due to the enlarged bioavailability of the drug in tumor tissue. Besides, the nanohybrid did not exhibit any significant sign of systemic toxicity in other vital organs. Together, the study denoted that PAA and FA functionalized MSN NPs controlled-drug delivery system could assist to increase the anticancer potential of umbelliferone.

Author keywords: Umbelliferone, Anticancer, Controlled-release, MSN nanoparticles, pH-responsive, Targeting.

Submission 25

Synthesis of ZnO nanorods as a drug delivery system for enhanced antibacterial and anticancer activity.

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Abstract: In the present study, we report the microwave-induced synthesis of fluorescent zinc oxide nanorods (ZnO) and their usage as a cargo material to carry hydrophobic drug, quercetin. TEM and SEM showed the rod-shape morphology of our synthesized ZnO. XRD showed several diffraction peaks correspond to a hexagonal wurtzite structure. The optical and chemical natures of these nanorods were also confirmed from the UV-VIS (showed a distinct absorption bands from 361-395 nm) and FTIR spectrum (showed absorption band specific to Zn-O stretching). The synthesized ZnO also showed fluorescence emission at around 550 nm when excited under UV irradiation. Quercetin was loaded onto ZnO surface via employing a metal ion ligand coordination bond, (ZnO/QR), which exhibit pH-sensitive release behavior. ZnO/QR displayed superior drug loading content (42%) and loading efficiency (72.4%). In vitro assays showed that ZnO/QR exhibited higher anticancer, as well as antibacterial activities compared with free quercetin and ZnO. All these results highlight the synthesis of ZnO nanorods under microwave irradiation, which can be used as a plausible therapeutic option for bioimaging and drug delivery purpose.

Author keywords: Anticancer, Antibacterial, Drug Delivery, Zinc Oxide Nanorods, Quercetin.

Submission 26

Enhancement of Podophyllotoxin concentration in the roots of Podophyllum hexandrum using precursors and elicitors: A new HPLCMS/MS Method

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Abstract: Podophyllum hexandrum is a well-known medicinal plant which demonstrates numerous therapeutic effects due to the presence of podophyllotoxin especially in oncology. In this study, after development and validation of a RP-HPLC-MS method, levels of podophyllotoxin in root samples of this plant collected from north of Himalayas were measured and environmental factors affecting its content were investigated. Five groups of plant populations from different spots of northern Himalayas were collected, and concentration levels of podophyllotoxin were measured applying a validated High Performance Liquid Chromatography- Diode Array Detector/Mass Spectrometry (HPLCAD/MS) method. The impact of geographical parameters encompassing altitude and average temperature on podophyllotoxin contents was assessed. The validated method was selective, with good resolution, excellent linearity ($r^2 > 0.9997$), high accuracy, sensitivity and precision. The results illustrated that there was a direct correlation between altitude with the content of podophyllotoxin in plant, which means that more the altitude, the more the content of podophyllotoxin. In an opposite manner, levels of the podophyllotoxin reversely correlated with the average temperature, in a way that decreasing this variable resulted in raising the amount of the podophyllotoxin. Treatments of cultured cells with fungal elicitors have been shown to induce the phenylpropanoid/flavonoid biosynthetic pathways and elicitors methyl jasmonate at 15 μM after 4 days resulted in higher HPLC content (8.606 %) and of isosafrole at 10 μM after 8 days shows 5.244%.

Key words: Podophyllotoxin; Podophyllum hexandrun; HPLC-MS/MS; Altitude; elicitors ; Precursors.

Submission 30

Targeted delivery of curcumin via pH-sensitive ZnO nanoparticles for breast cancer therapy.

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Abstract: Phenyl boronic acid (PBA)-conjugated and pH responsive ZnO nanoparticles (diameter ~ 40 nm) were synthesized for the tumor tissue-specific delivery of curcumin. PBA conjugation facilitates the targeted delivery of curcumin to the sialic acid overexpressed in breast cancer cell membranes. Curcumin-loaded ZnO nanoparticles (ZnO-PBA-Curcumin) caused apoptotic cell death in MCF-7 human breast cancer cells by inducing oxidative stress and mitochondrial damage. Further, in vivo intravenous (i.v.) administration of ZnO-PBA- Curcumin was found to effectively decrease tumor growth in Ehrlich ascites carcinoma (EAC) tumor-bearing mice via the enhanced accumulation of curcumin. Interestingly, ZnO-PBA-Curcumin did not show any signs of systemic toxicity. The cytotoxic potential of the nanohybrid ZnO-PBA-Curcumin is attributed to the combinatorial cytotoxic effects of curcumin and ZnO in cancer cells. Collectively, ZnO-PBA-Curcumin may represent a potential treatment modality for breast cancer therapy. This study provides insight into the tumor cell targeting mechanism using PBA functionalization, and the anticancer efficacy of curcumin-loaded pH-sensitive nanohybrids can be attributed to the differential oxidative stress-inducing properties of curcumin and Zn⁺² ions.

Author keywords: ZnO nanoparticles, Anticancer, Curcumin, MCF-7 cells.

Submission 33

Green synthesis of xyloglucan@ Zirconium (IV) Selenophosphate nanoparticles for photodegradation of Crystal Violet

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Abstract: The fabrication of nanoparticles using naturally occurring organic polymers has gain interest in the scientific community because of their easy availability, reusability and biodegradability. Present study includes, synthesis of xyloglucan@zirconium (IV) selenophosphate (XG@ZSPT) nanoparticles via sol-gel method. XG@ZSPT nanoparticles has been characterized using different techniques like X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier transform infrared spectroscopy (FTIR), energy dispersive X-ray analysis (EDX) and thermogravimetric analysis (TGA). TEM analysis confirmed the formation of nano sized particles. XRD analysis revealed the amorphous morphology of the composite. The photocatalytic activity of the nanoparticles was evaluated for the degradation of Crystal Violet (CV) under solar light. It has been found that 90% of CV was degraded by XG@ZSPT and 65% was observed for ZSPT. The photodegradation reaction of CV with XG@ZSPT followed pseudo first order kinetics with rate constant of 0.0014 min⁻¹.

Keywords: Photodegradation, Crystal Violet, Xyloglucan, zirconium(IV) selenophosphate.

Submission 36

Photodegradation of FSB and CV using psyllium husk mucilage@ZAP Nanoparticles

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Abstract: Now days, green synthesis of nanoparticles using plant extracts (seeds, leaves, roots etc.) are in prodigious trend. In this, sol-gel synthesis of psyllium husk mucilage@ Zirconium(IV) aluminophosphate (PHM@ZAP) nanoparticles has been designed at fixed temperature. PHM@ZAP nanoparticles were characterized through FTIR, SEM, TEM, XRD, UV-Vis and EDS techniques. TEM images showed cluster of nanoparticles with diameter of 50nm approximately which confirm it was nanomaterial. PHM@ZAP was explored for the photodegradation of CV and FSB. Effect of various parameters like effect of time, pH effect, effect of dye concentration and photocatlyst dosage has been studied. It was noticed that PHM@ZAP degraded both crystal violet (CV) and fast sulphon black (FSB) to large extent as compared to ZAP.

Keywords: psyllium husk mucilage, nanoparticles, photocatalysis, CV, FSB.

Submission 47

Green Extraction of Natural Products: Concept and Principles

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Abstract: The design of green and sustainable extraction methods of natural products is currently a hot research topic in the multidisciplinary area of applied chemistry, biology and technology. Herein we aimed to introduce the six principles of green-extraction, describing a multifaceted strategy to apply this concept at research and industrial level. The mainstay of this working protocol are new and innovative technologies, process intensification, agro-solvents and energy saving. The concept, principles and examples of green extraction here discussed, offer an

updated glimpse of the huge technological effort that is being made and the diverse applications that are being developed.

Author keywords: green extraction, alternative solvents, innovative process.

Submission 48

Corrosion protection studies of treated zinc surface in aqueous chloride–sulphate medium.

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Abstract: The surface of Zinc metal was treated with thiosemicarbozone formed reaction between benzaldehyde and thiosemicarbozide (BTSC). The treated zinc surface was subjected to corrosion protection studies in aqueous chloride–sulphate medium using galvanostatic polarization technique. Zinc samples treated in BTSC solution exhibited good corrosion resistance. The measured electrochemical data indicated a basic modification of the cathode reaction during corrosion of treated zinc. The corrosion protection may be explained on the basis of adsorption and formation of BTSC film on zinc surface. The film was binding strongly to the metal surface through nitrogen and sulphur atoms of the product. The formation of film on the zinc surface was established by surface analysis techniques such as scanning electron microscopy (SEM–EDS) and Fourier transform infrared spectroscopy (FTIR).

Author keywords: Corrosion inhibitors, electrochemical measurement, tafel plots, SEM-EDS.

Submission 52

**PHOTOSENSITIZATION OF RGO-MODIFIED BINARY HETEROJUNCTION
WITH CHLOROPHYLL FOR PHOTOCATALYTIC REMOVAL OF MALACHITE
GREEN**

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Abstract: Organic dyes are continuously eliminated into the atmosphere with wastewater from textile industries. These excluded dyes are highly poisonous to living organisms and carcinogenic to human beings. Photocatalytic degradation of organic pollutant has been considered as an effective treatment method for the removal of dyes in sewage. Herein, we report the laboratory scale fabrication of chlorophyll sensitized BiOI/BiOBr/RGO heteroassembly for the photocatalytic degradation of Malachite green. The synthesized nanocomposite has been characterized by the advanced techniques such as FE-SEM, HR-TEM, XRD, XPS and FTIR etc. The heterostructured nanocomposite exhibited extensive degradation efficiency towards Malachite green from water under simulated solar light irradiation. After 90 min of solar light irradiation, almost 94 % of malachite green have been degraded which justifies that photocatalytic system is a promising application for removal of dyes from water. This study constructs a new method to design a highly operative photocatalyst and provides a deep understanding of the heterojunction performance for photocatalytic organic dye degradation.

Keywords: Nanocomposite, degradation, malachite green, heterojunction, fabrication.

Submission 54

Expanding Horizon of Nanomedicine.

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Abstract: Many drugs with good in vitro results have failed to produce similar in vivo results owing to their properties such as low solubility, rapid clearance by reticuloendothelial system (RES), severe harmful side effects at therapeutic concentration and so on. Nanoscale drug delivery systems (diameter between 1-100nm) can overcome these limitations. Nanomedicine is the application of nanotechnology to medicine. In conventional therapies such as, surgery, radiation, and chemotherapy the basic approach is to remove diseased cells faster than healthy cells, whereas nanomedicine attempts to use sophisticated approaches to either kill specific cells or repair them one cell at a time by using a biosensor to detect when a drug should be released and in what quantity. Through targeted drug delivery of nanomedicine we can prevent killing of healthy cells unlike in chemotherapy. Nanomedicine has improved solubility, circulation half life and drug release characteristics. A number of nanoparticle based formulations have been developed for the treatment of cancer, diabetes, pain, asthma, allergy, infections, and so on. These formulations offer ease of administration, increased circulation life, reduced toxicity and cost reduction.

Author keywords: RES, therapeutic concentration, nanomedicine, chemotherapy, circulation half life.

Submission 55

Chemical and Electrochemical studies of imidazole derivative on corrosion of mild steel in hydrochloric acid medium.

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Abstract: The corrosion inhibition of imidazole derivative such as 2-(1-(4 butylphenyl)-4,5-diphenyl-1H-imidazol-2-yl)phenol [BDIP] on mild steel in presence of 1M HCl were carried out using Chemical and Electrochemical technique. The results showed that maximum 99.00% inhibition efficiency at 40ppm concentration was recorded. Further the inhibition efficiency was explained through adsorption process. FT-IR & AFM studies revealed the adsorption of the inhibitor and SEM images shows the surface morphology changes during corrosion & corrosion control process. Contact angle studies exhibited the hydrophobic nature of the layer formed on the surface of mild steel. The adsorption of BDIP on mild steel surface found to obey Freundlich adsorption isotherm. Experimental results show that developed inhibitor act as a mixed type inhibitor and its inhibition efficiency increase with increase in concentration.

Author keywords: Corrosion inhibition, Tafel plots, EIS studies, Adsorption isotherms.

Submission 59

Investigation on seed oil chemistry of *Bauhinia racemosa* for the production of liquid Biofuel

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Abstract: The biodiesel is produced from seed oil of *Bauhinia racemosa*. *Bauhinia racemosa* seeds yield 25% seed oil. The component fatty acids present in the seed oils is estimated via GC-FID technique. The seed oil has IV of 72.6 g of I₂/ 100 g of oil, SV of 202.0 mg of KOH/g oil, density of 0.898 g/cm³ and viscosity of 31.25 mm²/s. The synthesized biodiesel or liquid fuel is characterized by ¹H NMR, IR and TGA. It has the CN of 56.9, CFPP of 1.3oC, CP of 5.5oC, density of 0.856 g/cm³, HHV of 40.0 MJ/kg, FP of 144oC, KV of 3.2 mm²/s and PP of – 1.49oC. The biodiesel properties are evaluated experimentally and computationally, and results

are compared with those of existing biodiesels and other reported biodiesels. Thus investigated biodiesel is confirmed for its quality by comparison with ASTM, BIS, EN standards.

Keywords: Bauhinia racemosa, Seed oil, Transesterification, Biodiesel, Fuel properties

Submission 61

Acesulfame conjugates a potent anti TB drug like compounds linked with legendary Coumarin

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Abstract: A series of novel coumarin-acesulfame conjugates are synthesized and screened for their various pharmacological evaluations such as anti-tubercular activity against mycobacterium tuberculosis, cytotoxicity studies against Vero cells and anti-cancer activity against MDA-MB-231 (human adenocarcinoma mammary gland) and A-549 (human lung carcinoma) cancer cell lines. Among the screened compounds compound 1g exhibited significant anti-tubercular activity with MIC of 1.56µg/mL with low toxicity against Vero cells indicating good selectivity profile. To investigate the mechanism of anti-TB activity and detailed intermolecular interactions between the synthesized compounds, molecular docking studies were carried out against PDB IB: 4TZK enzyme of mycobacterium tuberculosis. The docking study revealed that all the compounds exhibited good hydrogen binding interactions with exceptional docking score against M. tuberculosis which is in agreement with the results.

Keywords: Coumarin, Acesulfame, Anti-TB, Cytotoxicity, Molecular docking.

Submission 66

Identification of fatty acids present in Nutraceuticals using ¹H NMR.

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Abstract: NMR spectroscopy is emerging as a powerful and robust analytical technique in profiling primary and secondary metabolites in different parts of the plant viz., root, stem, leaf and fruits etc. Identification of metabolites in nutraceuticals provides a crucial information about the biomolecules present. Since understanding of Phytoconstituents is very important to comprehend the therapeutically importance, the present study is based on the identification of fatty acids present in Nutraceuticals. The commonly available nutraceutical seeds of different species were extracted and the oil acquired was subjected to ¹H NMR analysis. The ¹H NMR technique reveals the presence of free fatty acids (FFA), monounsaturated fatty acids(MUFA), saturated fatty acids (SFA) and polyunsaturated fatty acids (PUFA) present in different proportion of the respective seed oils.

Key words: ¹H NMR spectroscopy, Fatty acids, Metabolites, Nutraceuticals.

Submission 67

Design and Synthesis of Novel Coumarin-Piperazine Conjugates as New Potent Anti-TB Chemotypes.

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Abstract: The most dreaded disease tuberculosis ranks as the second most threatening ailment caused millions of deaths throughout the globe. Currently, there is a need for discovery of new anti-TB drugs due to the inadequacy/side effects offered by existing drugs in the treatment of TB, due to acquired resistance and TB-HIV synergism. Herein, we report a series of 4-((4-(4-acetylpiperazin-1-yl)phenoxy)methyl)-2H-chromen-2-one derivatives as promising leads to treat tuberculosis. The synthesised compounds are confirmed by spectroscopic analytical techniques and further the compounds are evaluated in vitro for anti-tubercular activity against *M. tuberculosis* H37Rv strain. In addition, the compounds are subjected to a cytotoxicity assay on Vero cell lines. Results revealed that most of the tested compounds displayed potent antitubercular activity with MIC in the range of 0.78-12.5 µg/mL. Compound 6e and 6f exhibited excellent activity (MIC 0.78 µg/mL and 1.25 µg/mL) against *M.tb* H37Rv strain and possess low level of cytotoxicity against Vero cells. It indicates compound 6e and 6f are promising lead compounds in search of novel antitubercular drug like molecules. Molecular Docking studies were performed against 4DQU enzyme of *Mycobacterium tuberculosis* which showed appreciable binding interactions and also it is in agreement with the in vitro results.

Keywords: Coumarin, Piperazine, Anti-TB, Molecular Docking.

Submission 68

Saussurea obvallatta (Brahma Kamal) leaves extract as a potential source of bio-active eco-friendly corrosion inhibitor for mild steel in HCl solution

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Abstract: The extract of *Saussurea obvallatta* leaves have been investigated for corrosion inhibition studies for mild steel in 1M HCl solution by means of Potentiodynamic polarization, electrochemical impedance spectroscopy (EIS) and traditional weight loss measurements. The results indicating that, presence of *Saussurea obvallatta* extract decreases the corrosion rate of mild steel in acidic solution and best inhibition effect reported at 200 mg/L inhibitor concentration. The surface characteristics of inhibited mild steel were investigated by SEM, AFM, FT-IR, UV-Visible absorption spectroscopic techniques and by contact angle test which evidences the formation of a corrosion-protection film over the mild steel surface. Potentiodynamic measurement revealed *Saussurea obvallatta* extract acts as mixed type of inhibitor. Temperature studies of electrochemical and weight loss measurement revealed a decrease in efficiency with rise in temperature and corrosion activation energies increased in the presence of the extract. The negative values of ΔG_{ads} indicating adsorption of the inhibitor found to be spontaneous, exothermic and best fitted the Langmuir adsorption model.

Author Keywords: *Saussurea obvallatta* leaves ,Corrosion protection,Corrosion inhibitors Percentage , Inhibition efficiency adsorption

Submission 72

Application of 1H-Nuclear Magnetic Resonance Spectroscopy In Quality Measurement

Studies

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Abstract: NMR Spectroscopy is emerging as powerful robust technique in identification and quantification of small molecular metabolites in biological samples. Recently, NMR technique becomes unique tool in quality measurement studies. In the present study, ¹H-NMR technique is used in assessing the quality of the edible oil which is supplied by the Karnataka government and it is compared with the other edible oil which is available in the market viz., Olive oil, Mustard oil, Gingelly oil, were compared. It is found that in government supplied oil contains 48.74% of saturated fatty acids and 51.26% unsaturated fatty acids. The study also evidences the absence of cholesterol in the supplied edible oil. The study evidenced the high % of unsaturated fatty acids (10.85) in Mustard oil followed by Olive oil (19.72). Gingelly oil contains 23.87 % of saturated fatty acids and 76.13 % of unsaturated fatty acids.

Author Keywords : NMR Spectroscopy, Edible Oil, Quality measurement study

Submission 73

Green synthesis of Silver Oxide Nanoparticles by Using Butea Monosperma Plant Extract

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Abstract: Plant-mediated synthesis of the nanoparticle is a green chemistry approach that interconnects nanotechnology and plant biotechnology. This approach is an eco-friendly, simple, economical, inexpensive, and repeatable process for producing metallic nanoparticles. Plant extracts enhance the rate of synthesis and stabilize the nanoparticles more in comparison to other organisms. Biological components in plant extract act both as capping and a reducing agent to minimize the generated wastes and implement a sustainable process to reduce the overall cost of synthesis. Among the various nanoparticles, Ag₂O nanoparticles have gained much attention due to their unique chemical, physical and biological properties. In the present work, a simple co-precipitation approach was applied for the biosynthesis of Ag₂O nanoparticles using plant extract *Butea monosperma* (BM) at different temperatures. The synthesized nanoparticles were confirmed by XRD (X-ray diffraction), SEM (Scanning electron microscope), EDS (Energy-dispersive X-ray spectroscopy), and UV- visible spectroscopy. XRD results revealed that the synthesized Ag₂O nanoparticles are highly crystalline and have a face-centered cubic structure with an average crystallite size of 59 nm. The calcination temperature has also a profound effect on the size of Ag₂O nanoparticles. SEM studies reveal that Ag₂O nanoparticles are spherical in shape whereas EDS confirm the elemental composition of a sample. The UV- Visible spectra have been used to determine the bandgap of the synthesized nanoparticles from Tauc's plot method. The Ag₂O nanoparticles also show little antibacterial activity against *Staphylococcus aureus* and *Bacillus cereus* pathogens.

Keywords: Ecofriendly, Nanoparticles, Co-precipitation, Biological components, Antibacterial

Submission 82

Ultrasound assisted amination of 1-aryltriazenes with nitrile to synthesize N-arylamides employing GIL promoter under mild and metal free conditions

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Abstract: Ultrasound assisted rapid and green synthesis of libraries of N-arylamides is afforded in good to better yields employing tetramethylguanidinium IL [TMG][CF₃COO] as an efficient promoter. Here, [TMG][CF₃COO] play a dual role as solvent and acid promoter as well. Under the influence of ultrasonication, the progress of reaction was found to be optimum in shorter reaction time. A parallel reaction also progressed under ordinary heating, but at relatively slower rate. Structurally diverse 1-aryltriazenes and aliphatic/aromatic nitriles are evaluated in this metal-free green approach and demonstrate the versatility of this protocol. A better functional group tolerance, mild reaction conditions, ultrasonic assistance, short reaction time makes this method more practical and efficient to the existing methods. The prospective for recovery and re-use of GIL employed is also demonstrated.

Keywords: 1-aryltriazenes, Amidation, Nitriles, Tetramethylguanidinium IL, Ultrasonication

Submission 85

Ultrasonic assisted copper catalyzed facile synthesis of highly functionalized arylsulphones using arylsulphonyl hydrazides and 1-aryltriazene as coupling partner in GIL

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Abstract: Ultrasonic assisted copper catalyzed facile synthesis of highly functionalized arylsulphones have been demonstrated employing arylsulphonyl hydrazides as a suitable

substrate with good product yield in optimum reaction time. Various 1-aryltriazene derivatives (surrogates of aryldiazonium salts) were utilized as the coupling precursor which is highly reactive, bench-stable and economically viable. This protocol proceeds in the presence of guanidinium based ionic liquid [TMG][CF₃COO] as a efficient promoter as well as solvent with no other additives. The potential for the recycling and reuse of GIL is also addressed.

Keywords: 1-aryltriazenes, arylsulphones, coupling reaction, Tetramethylguanidinium IL, Ultrasonication.

Submission 87

Polyvinyl Alcohol based Functional Nanogels for the Bioactive Finishing of Cotton Fabric

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Abstract: Functional designing of nanogels is the state of art to develop bioactive materials with innovative features for the human health care system. The present investigation aims at the preparation of functional nanosilver nanogels for antimicrobial finishing of the Khadi cotton fabric. These nanogels were synthesized by using Aloe vera (AV) as reducing agent for silver ions in the presence of polyvinyl alcohol (PVA). PVA stabilizes the growth of silver nanoparticles which is influenced by the variation in the reaction time and the temperature. Nanogels were characterized by transmission electron microscopy (TEM) and scanning electron microscopy (SEM) analysis. The nanogels exhibited strong antimicrobial behavior against both *S. aureus* and *E. coli* as confirmed by colony count method. Almost 100% antibacterial behavior was observed for nanosilver content of 10 mM. The nanogel finished khadi fabric showed bactericidal properties against both *S. aureus* and *E. coli*. The nanogel finished fabric exhibited

high hydrophilicity allowing complete water droplet penetration within 10 s as compared to 136 s in virgin fabric. Moreover, the skin irritation study of the fabric on Male Swiss albino mice did not show any appearance of dermal toxicity. These results demonstrated that bioactive finished khadi fabric is appropriate as skin contacting material in human healthcare.

Keywords: Nanogels, Bioactive fabric, antimicrobial

Submission 93

OXIDATION OF ORTHO AMINO BENZYL ALCOHOL: A CONCISE KINETIC STUDY

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Abstract: The foremost objective of the present work is to get a deep insight into the kinetics of o-amino benzyl alcohol (OABA) in order to develop a simple, efficient and a cost-effective method for its detection in contaminated water samples. OABA and its derivatives are important bifunctional compounds and had wide application in organic chemistry and drug synthesis. OABA is used as intermediate in pharmaceutical industry. OABAs are the compounds with the application ranging from being used in the production of benzaldehydes, dyes, polymers, Quinolines, and the synthesis of schiff bases. They are naturally occurring alkaloids present in the leaves of plants with its traditional medicinal activities. Consequently, establishing OABA as a key ingredient in the preparation of potentially important pharmaceutical preparations like anti-HIV and quinoline based prodrugs equipped with antiviral and antibiotic properties. It is also reported that PMEA is a therapeutically active antiviral prodrug used against human immunodeficiency virus (HIV) prepared from OABA. A range of benzyl alcohols have been thoroughly investigated as a self-immolative linkers for tumour-activated prodrug therapy

including o- and p- amino benzyl alcohols. Owing to its self-immolate potential, amino benzyl alcohol is used in medicinal chemistry encourage us yet again towards its comprehensive kinetic studies. In order to explore further application and importance of OABA, a study on various aspects of oxidation reaction is carried out in the presence of silver nitrate and a strong oxidant potassium persulphate to get a deep insight into its chemical aspects of the compound under study. In the present study, kinetic spectrophotometric method has been used to study the oxidation reaction at varying conditions. This work deals with the oxidation of OABA by potassium persulfate in the presence of silver ion in aqueous alkaline ammonia buffer medium. The rate of oxidative reaction was determined by kinetic spectrophotometric method with absorption maxima of reaction mixture at 440nm, at constant pH and temperature of solution. The effect of substrate, oxidant, catalyst, pH, temperature, ionic strength, and dielectric constant in this reaction has also been studied to frame a mechanism of the ongoing study.

Keywords:Oxidation,kinetics,o-aminobenzyl alcohol,potassium persulfate,absorption maxima thermodynamic parameters.

Submission 98

Antioxidant Contour of Green Solvent Extracts of Ficus subincisa Bark

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Abstract:The aim of this study is to develop new resources of antioxidants for improving the immune system during pandemic. Unexplored Ficus subincisa bark was evaluated for antioxidants potential by Green solvent extracts . In vitro assays of antioxidant capacity against

DPPH were performed to achieve the aim and variation in scavenging potential of the green extracts. Total phenolic and flavonoid contents were also determined which are responsible for antioxidant activity. In the chemical or pharmaceutical industry solvents have an important role. The usage of non-green solvents may cause deleterious effects during the processing, so environment friendly green solvents are encouraged to be utilized. For this study, the green solvents used in the extraction of *Ficus subincisa* bark was water and ethyl lactate. Folin-Ciocalteu and flavonoids methods were used for measuring the presence and amount of phenolic and flavonoid content in both the extracts. The results showed that ethyl lactate extract had the higher TPC and TFC (76.77 ± 1.23 mg GAE/g) and (79.117mg QE/g) respectively as compare to water extract. Determining the antioxidant activity of the extracts the lowest IC₅₀ value based on the graph of percentage inhibition against the concentration of the sample was shown by ethyl lactate extract which represents strong antioxidant activity. It can be concluded that the bark of *Ficus subincisa* can be used as an effective natural source of antioxidant, and as a commercial basis for the evolution of nutraceuticals.

Keywords:Antioxidant activity,Total phenolic content,Total flavonoid content

Submission 101

Molar volume, Acoustic and Conductance studies of anti-diabetic drug Metformin Hydrochloride (MH) in water and aqueous dulcitol as a function of temperature.

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Abstract:In the present study, the solution properties of anti-diabetic drug metformin hydrochloride (MH) in water and aqueous dulcitol solutions were studied to explore molecular interactions as a function of temperatures. The molar volume, acoustic and conductance studies were used to investigate the interactions of drug MH in water and aqueous dulcitol system. The density (ρ), ultrasonic velocity (u) and molar conductance of MH in water and in (2, 4 and 6 wt.%) aqueous solutions of dulcitol have been measured at 305.15, 310.15 and 315.15 K temperatures. The density data was analysed with the help of Masson's equation and (Φ_v^0) and Masson's coefficient, (S_v) were determined. The acoustic data of MH in water and water-dulcitol system were used to determine adiabatic compressibility (β), intermolecular free length (L_f), and specific acoustic impedance (Z). The results obtained from all these thermodynamic parameters were discussed in terms of solute-solute and solute-solvent interactions in these systems. The structure making/breaking behaviour of MH in water and water-dulcitol system was determined on the basis of Hepler's reasoning and from temperature dependence of Walden's product.

Keywords:Partial molar volume,adiabatic compressibility,specific acoustic impedance,Walden product

Submission 103

SYNTHESIS OF WATER MEDIATED SILVER SULPHIDE QUANTUM DOTS AND ITS ANTIBACTERIAL APPLICATIONS

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Abstract:Ag₂S (Silver Sulphide) quantum dots (QDs) are the QDs having narrow band gap, which is approximately 0.9-1.1eV. Ag₂S QDs are the non-toxic QDs, possess the potential to act

as antimicrobial agent. Properties of Silver Sulphide QDs attracted many researchers from different fields. Ag₂S QDs have recently appeared as new generation QDs. In this research work water mediated Ag₂S QDs have been synthesized successfully. Synthesized Ag₂S QDs were characterized by various techniques like XRD (X-Ray Diffractometer), HR-TEM (High Resolution Transmission Electron Microscopy), FTIR (Fourier Transform Infrared Spectroscopy), EDX (Energy-Dispersive X-Ray). Synthesized Ag₂S QDs were tested against bacterial strain. Gram positive (*S. aureus*) and Gram negative bacterial (*E. coli*) strains were used to see the action of prepared samples of Ag₂S QDs. The prepared samples of Silver Sulphide QDs exhibit good antibacterial applications. Further these can be used at large scale in biomedical field.

Keywords: band gap, non-toxic, hrtem, xrd, quantum dots, antibacterial

Submission 107

Synthesis and characterization of La₂FeTiO₆/g-C₃N₄/RGO heterojunction for degradation of Dichlophenac under visible light

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Abstract: La₂FeTiO₆/g-C₃N₄/RGO heterojunction were successfully synthesized by hydrothermal method. As-prepared composite were characterized by XRD, HR-SEM, EDS, TEM, and UV-Vis techniques. Thermal stability of the material was studied by thermal analysis. XRD studies confirm the ortho-rhombic and rutile phase for pure La₂FeTiO₆ and g-C₃N₄ particles. The La₂FeTiO₆/g-C₃N₄/RGO composite shows the coexistence of La₂FeTiO₆ and g-C₃N₄ phases with no extra peaks. Morphological analysis shows the spherical particles and the

average particle size of La₂FeTiO₆, g-C₃N₄ and La₂FeTiO₆/g-C₃N₄/RGO was around 60 nm. The La₂FeTiO₆/g-C₃N₄/RGO composites shows a significant shift in the UV–Vis absorption spectra in comparison with both g-C₃N₄ and La₂FeTiO₆ particles. The photocatalytic activity of the composite were tested for the degradation of dichlophenac in aqueous solutions under visible light irradiations for 180 min. The La₂FeTiO₆/g-C₃N₄/RGO composite exhibits improved visible light photocatalytic properties in comparison with that of LaFeO₃ particles.

Keywords:Dichlophenac,photocatalysts,hetrojunction

Submission 110

A Review on Study of Proline Organo-Catalysis and its Function

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Abstract : Proline organo-catalysis is the practice of proline as an organo-catalyst in organic chemistry. And this topic is often considered the starting point area of organo-catalysis. In this present time proline catalysts playing important role in organic chemistry. Proline can be used in numerous modes of organocatalysis, as it can behave both, like as a Bronsted base and acid. Also, it can produce the iminium or enamine intermediates very easily which are typically formed in covalent organocatalysis. It also plays a role in asymmetric aldol reactions and their mechanistic consideration. Asymmetric synthesis of the Mannich reaction, alpha halogenation reactions, and Michael's addition reaction is also based on the proline. When we discussed the Michael addition reaction we use the L- proline as a catalyst. We can also use l-proline in food industries and chemical industries. In this concept with the help of proline, we modify the

enantio-selectivity and regioselectivity of the reactions. In this review, we aim to acutely study and summarize the basis for proline organocatalysis, how it acts as a catalyst, the role it plays in asymmetric aldol reactions, the use of water in multi-component reactions as a reaction standard, and Black Mond's elucidation of the hastening result of water in the proline-catalyzed aldol reactions. We also discussed the synthesis of a five-member heterocyclic compound. Heterocycles are the most important class of agrochemical and pharmaceutical industries. In this review, we focused on the derivatives of proline as a catalyst and water as a solvent and synthesis methods leading to heterocycles.

Keywords: Organo catalyst, Asymmetric aldol reaction, Green catalyst, Heterocyclic compounds

Submission 113

In vitro antioxidant and photo catalytic activity of tragacanth gum -cl-p(lactic acid-co-Itaconic acid)/ZnO-Ag nanocomposite

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Abstract:In this paper, we report the microwave assisted in situ synthesis of Ag/ZnO nanocomposites of tragacanth gum-cl-poly (lactic acid-co-itaconic acid) [TG-cl-p(LA-co-IA)/ZnO-Ag]. In this work, lactic acid (LA) and itaconic acid (IA) (both monomers) were grafted onto tragacanth gum (TG) alongwith Ag and ZnO nanoparticles using potassium persulphate as initiator and N, N'-methylene-bis-acrylamide (MBA) as crosslinker at already optimised conditions. The formation of nanocomposite was confirmed by different techniques such as

Fourier transform infrared spectroscopy (FTIR), Field emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), X-ray diffraction (XRD), thermo gravimetric analysis (TGA) and Energy dispersive X-ray (EDX). Photocatalysis of congo red dye was also studied and maximum 90% of the dye degraded after 1 hour of adsorption in dark followed by 3 hours exposure to sunlight.

Keywords: tragacanth gum, itaconic acid, lactic acid, targeted drug release

Submission 117

La/Co/Zn trimetallic nanoparticles for adsorptional photodegradation of malachite green from water system

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Abstract: Trimetallic nanoparticles, La/Co/Zn are synthesized by microwave method. These are used as an effective adsorbent for the removal of Malachite Green (MG) dye from the aqueous solution. The prepared nanocomposite was characterized by FTIR, LC-MS, SEM and TEM. The experimental results showed that the prepared nanoparticles have high adsorption tendency for the removal of MG dye from the aqueous solution. The pseudo-second-order equation represented the better adsorption kinetics of the adsorption process. About 90% of the photocatalytic dye degradation has been observed. In addition to malachite green, it can also be used for the removal of other hazardous materials from the waste water.

Keywords: nanoparticles, photocatalysis, adsorbent

Submission 118

Robust and Sustainable Mg_{1-x}Ce_xNi_yFe_{2-y}O₄ magnetic nanophotocatalyst for the improved photocatalytic performance of crystal violet and rhodamine B pollutants

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Abstract: Sol-gel synthesized Ce³⁺/Ni²⁺ ions doped Mg nanoferrites is one of the finest catalysts for the photocatalytic degradation of rhodamine B and crystal violet pollutants under visible natural sunlight. The particle size calculated through XRD, Hall-William plots, and TEM analysis is in very good agreement with each other. The formation of spherical, cubic, and agglomerated magnetic nanoparticles of synthesized specimens were obtained. The existence of stretching vibrations of M-O (metal-oxygen) complexes at the tetrahedral (A-site) and octahedral site (B-site) was detected by FTIR investigation and in addition to this, the Raman spectra of synthesized nanophotocatalysts show the presence of four vibrational modes (E_g + 2T_{2g} + A_{1g}) providing suitable information of occupancy of Mg²⁺, Ce³⁺, Ni²⁺ and Fe³⁺ ions at the interstitial sites of undoped and Ce³⁺/Ni²⁺ doped MgFe₂O₄ crystal structure. The synthesized MGF3 nanophotocatalyst exhibits the superlative performance with 97.674 % crystal violet (CV) and 90.050 rhodamine B (RhB) degradation under the natural sunlight in 60 minutes. The experimental results showed that the prepared doped MgFe₂O₄ nanoferrites have a high tendency to photodegrade the RhB (Rhodamine B) and crystal violet (CV) dyes in aqueous form. The pseudo first-order equation reflects the best photocatalytic process kinetics and also, studied the feasibility of RhB (Rhodamine B) and crystal violet (CV) dyes adsorption on the doped and undoped MgFe₂O₄ nanoferrites. The results show support for adsorption by the spontaneous photodegradation process. Therefore, it was concluded from the present study that the synthesized nanoferrites show an excellent photocatalytic activity under natural sunlight and it

can be considered a suitable candidate for the photo-degradation of organic dyes in various applications. Finally, the antimicrobial activities were examined against the *Staphylococcus aureus* and *Escherichia coli* and it was observed to be effective against *Staphylococcus aureus*.

Keywords: Mg nanophotocatalysts, Sol-gel, Crystal violet and rhodamine B pollutants, Enhanced Photocatalysis

Submission 131

New and Novel La/Cu/Zr trimetallic nanoparticles as efficient photocatalyst for remediation of organic pollutants

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Abstract: In the present work, we synthesized La/Cu/Zr TNPs by microwave method. It is used as an effective adsorbent for the removal of Ampicillin antibiotic from the aqueous solution. The prepared nanocomposite was characterized by FTIR, XRD, SEM and TEM. The experimental results showed that the prepared nanoparticles have high adsorption tendency for the removal of Ampicillin antibiotic from the aqueous solution. The pseudo-first-order equation represented the better adsorption kinetics of the adsorption process. The feasibility of Ampicillin antibiotic adsorption onto La/Cu/Zr TNPs was also studied thermodynamically and the results showed that the adsorption was spontaneous and chemical in nature. About 86% of the photocatalytic antibiotic degradation has been observed. In addition to ampicillin, it can also be used for the removal of other hazardous materials from the waste water.

Keywords: Nanocomposite, Microwave method, Ampicillin, Adsorption, Antibiotic

Submission 133

Bioinspired green synthesis of zinc oxide nanoparticles from *Tinospora cordifolia* stem extract, characterizations and evaluation of its photo catalytic activity

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Abstract: The arena of nanoscience is gaining popularity day by day and it is now well proven field of interdisciplinary science. The phyto-mediated approach using numerous plant parts and extracts thereof is considered to be new, simple and inexpensive strategy to manufacture metal nanoparticles. Zinc oxide nanoparticles (ZnO NPs) are one of the protruding metal oxide nanoparticles with substantial applications in many industries and research institutes. A biomimetic method of zinc oxide nanoparticle (ZnO NPs) synthesis is offered which utilizes stem extract of *Tinospora cordifolia*, as the main bio agent. Different techniques like, UV-Visible spectroscopy (UV-Vis) for their absorbance pattern, X-ray diffraction (XRD), Field Emission Scanning electron microscopy (FE-SEM) and Energy Dispersive X-ray Analysis (EDX) were utilized to characterize the synthesized ZnO-NPs. The photocatalytic activity of biosynthesized ZnO NPs was assessed by carrying out the degradation of Methylene Blue dye under UV irradiation.

Keywords: *Tinospora cordifolia*, Nanotechnology, Biomimetic method.

Submission 135

CQDs decorated MnIn₂S₄/CdS/Bi₂S₃ heterojunction for enhanced photocatalytic degradation and bacterial disinfection under visible light: A tandem double Z-scheme mechanism

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Abstract: Seeking eco-friendly, highly effective and recyclable visible light active photocatalysts for evolving pollutants mineralization is imperative and considered necessary in wastewater purification. In present work, avant-grade dual Z-scheme CQDs-MnIn₂S₄/CdS/Bi₂S₃ heterojunction was prepared successfully by hydrothermal technique. The heterojunction showed flat fibre like morphology and surface of was not very smooth due to CQDs deposition on MIS/CdS/Bi₂S₃ surface. The fibrous texture of the heterojunction provided low density, excellent structural activity and large surface area for various photocatalytic reactions. Also it was observed that CQDs and CdS nanoparticles interlapped together in CQDs-MIS/CdS/Bi₂S₃. The hydrophilic functional groups on CQDs surface can be utilized as bridge, linking MIS, CdS and Bi₂S₃. The average diameter of the nanoparticles were calculated by plotting histogram and gaussian distribution function Besides, improved visible light absorption and photo-generated charge transferal efficiency make CQDs-MnIn₂S₄/CdS/Bi₂S₃ achieve best catalytic activity towards methyl orange (MO) removal, where 99% MO could be mineralized within 80 min under light irradiation. Moreover, h⁺, •O₂⁻ and •OH were active species in degradation process. A series of photoelectrochemical studies verified low charge recombination rate and high charge

transferal. This research indicates dual Z-scheme CQDs decorated MnIn₂S₄/CdS/Bi₂S₃ heterojunction will have wide potential in the wastewater remediation in the future.

Keywords: Photocatalysis, waste water purification, CQDs

Submission 136

CNTs mediated Ag-CuBi₂O₄/AgBiO₃ heterojunction with enhanced photocatalytic and antimicrobial activity

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Abstract: The present study reveals the fabrication of Ag-CuBi₂O₄/CNTs/AgBiO₃ semiconductor photocatalyst via an in-situ precipitation technique. Carbon nanotubes (CNTs) and AgBiO₃ nanoparticles were assembled over the surface of the Ag-doped CuBi₂O₄ where spherical shape non-uniform nanoparticles with a diameter ranging from 50–200 nm. As-prepared semiconductor photocatalyst was characterized via XRD, UV-DRS, SEM, EDAX, HR-TEM, FT-IR, and XPS. Methylene Blue and Rhodamine B were taken as objective organic pollutant to evaluate their photocatalytic degradation activity by fabricated samples in simulated-sunlight irradiation ($\lambda > 420$ nm). Results displayed that fabricated photocatalyst Ag-CuBi₂O₄/CNTs/AgBiO₃ exhibited much higher photocatalytic degradation than that of pristine CuBi₂O₄ and AgBiO₃, and also utilize the visible light efficiently. Enhancement in photocatalytic activity of fabricated composite can be attributed to the increased availability of photoinduced charges and their efficient charge separation efficacy for photocatalytic reactions.

The formation of intermediate during photo degradation process was studied by GC-MS and HPLC analysis. The adsorption experiments revealed that maximum adsorption of MB was at pH 13, whereas the maximum RhB adsorption was at pH 12. Owing to recycle experiments, Ag-CuBi₂O₄/CNTs/AgBiO₃ revealed 85% degradation efficiency, respectively, after 5 consecutive cycles. Later, the most possible photocatalytic mechanism involved was discussed. Hence, direct Z-scheme based Ag-CuBi₂O₄/CNTs/AgBiO₃ heterojunction as a visible light active semiconductor photocatalyst has great application future prospects for mitigation of contaminated wastewater with harmful dyes.

Keywords:Z-scheme heterojunction,Semiconductor photocatalysts,Environmental mitigation,Ag-CuBi₂O₄/CNTs/AgBiO₃,CuBi₂O₄,AgBiO₃

Submission 137

Volumetric and acoustic methods for investigating molecular interactions of the drug Streptomycin sulphate in aqueous Sorbitol solutions at different temperatures

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Abstract:The experimental Density (ρ), speed of sound (u) and viscosity (η) values have been used to examine the drug (streptomycin sulphate)-carbohydrate (sorbitol) interactions in aqueous medium. The experimental values of densities (ρ), speeds of sound (u) and relative viscosities (η) of streptomycin sulphate (SMS) in water and in (2, 4 and 6)mm aqueous sorbitol have been obtained at different temperatures (300.15, 305.15, 310.15 ad 315.15)K and at 0.1MPa pressure. These interactions have been interpreted on the basis of various thermodynamic parameters such

as apparent molar volume $[(\Phi)]_V$, apparent molar isentropic compression $[(\Phi)]_K$, partial molar volume (Φ_{V^o}) , partial molar isentropic compression (Φ_{K^o}) , partial molar expansibility (Φ_{E^o}) of solute, thermal expansion coefficient (α), partial molar volume of transfer $(\Delta_{tr}\Phi_{V^o})$ and partial molar isentropic compression of transfer $(\Delta_{tr}\Phi_{K^o})$ calculated for SMS in water and aqueous sorbitol solutions. A comprehensive discernment into the various possible molecular interactions in the drug-carbohydrate system together with the structure-maker/structure-breaker ability of drug have been obtained through the study of above calculated parameters.

Keywords: Partial molar volume, Partial molar isentropic compression, Molecular interactions

Submission 140

Sodium alginate cross-linked acrylic acid/graphite hydrogel composite synthesis and application in malachite green dye removal

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Abstract: In this study, we fabricated sodium alginate based cross-linked hydrogel composite, composed of graphite embedded in biocompatible hydrogel matrix, for removal of organic pollutant. The fabricated sodium alginate cross-linked acrylic acid/graphite (NaA-cl-AAc/GP) hydrogel composite was investigated by infrared spectroscopy, scanning electron microscopy, thermo-gravimetric analysis and raman spectroscopy. Using batch adsorption technique fabricated hydrogel composite was utilized for the adsorption of malachite green dye from

aqueous solution. A highest adsorption tendency 628.93 mg g⁻¹ was achieved for malachite green dye under controlled experimental parameters. Furthermore, the adsorption experiment could be well explained by the Langmuir isotherm and pseudo-second-order kinetic models. After five successive dye adsorption-desorption cycles, the synthesized hydrogel composite demonstrated excellent adsorption. Therefore, due to its high adsorption capacity, regeneration capability, high swelling percentage, environmental friendliness, the NaA-cl-AAc/GP hydrogel composite is a reasonably favorable product for remediation of organic pollutant.

Keywords: Graphite, sodium alginate, malachite green, water pollution, dye removal

Submission 141

Structural and optical properties of Zn-doped chromium oxide nanoparticles synthesized by Co-precipitation method

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Abstract: In the present work, Zn-doped chromium oxide nanoparticles were successfully synthesized by co-precipitation method. The product obtained was further subjected to calcination process at 450°C temperature. The synthesized nanoparticles were characterized by spectroscopic techniques like: UV-Visible and infrared spectroscopy. Morphology of the Zn-doped chromium oxide nanoparticles were determined by FESEM. Sphere shaped Zn-doped chromium nanoparticles exhibited 40-30 nm average particle size. The optical studies showed band gap 1.2 eV.

Keywords: Co-precipitation, Zn-doped, band gap.

Submission 142

Sonochemical synthesis, characterization, of tris(1,3 diamminopropane) cobalt(III) azide.

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Abstract: Crystalline and nanostructure of a new cobalt(III) coordination complex salt of tris(1,3 diamminopropane) cobalt(III) azide were synthesized by classical and sonochemical method. The newly synthesized cobalt(III) coordination complex salt was characterized by IR, UV-Visible and ¹³CNMR spectroscopy. Morphology and particle size of the nanostructure was determined by transmission electron microscopy (TEM) and zeta sizer. Rod shaped cobalt(III) complex salt exhibited 200 nm average particle size. This study demonstrates the sonochemical is suitable method for the synthesis of microstructure of cobalt(III) complex salt.

Keyword: Nanostructure, Sonochemical method, coordination complex salt

MATHEMATICAL SCIENCES

Submission No - 001

A Study of Three-Phase-Lag Model for frequency of non local void material with Electro-Magneto effect

Jai Chand Mehalwal and Sita Ram Sharma

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Abstract:

For a transversally isotropic nonlocal void material of the shape of sphere taken into consideration and variations in frequency have been presented here for spherical material when the conditions isotropic under electro-magneto effect, material is thermoelastic , shape of material is spherical. The results so obtained analyzed numerically using computational techniques and presented graphically.

keywords: Solid material , Void, sphere, isotropic, Magnetic Field

Submission No - 015

Seasonality in Milk Yield of Crossbred Cattle

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Abstract:

Thirty seven years secondary data (1978-2014) for milk yield of crossbred cattle were collected from monthly data on monthly milk yield from January to December. Data were used on seasonal variation of milk yield of crossbred cattle to find out seasonality in monthly milk yield by using different time-series methods. Monthly maximum seasonal index was obtained in May month and minimum in November month. The detail will be discussed.

Submission No - 019

Flow Shop Scheduling Problem With The Objective Of Minimizing Tct And Resource Idleness

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Abstract:

Scheduling of n-job m-machine is a tedious task for research scholar to obtain the desired objective that of minimizing the TCT and resource idleness. In this flow shop scheduling Jayakumar and Vasudevan developed an algorithm with the objective of total elapsed time (makespan) and resource idleness which not only minimises their total completion time(TCT) but also resources idleness is minimized. The purpose of calculating the resource idleness means when total completion time (TCT) minimized means, it does not meant that resource idle time also minimized that is the purpose of scheduling completion time means not only the total completion time but also the resource idleness is minimized or not. That we have to check for the near optimal solution. Comparisons have been made with the algorithm available in the literature. It has been found that Jayakumar vasudevan heuristic approach performs better than existing algorithm available in the literature.

Submission No - 049

An heuristic approach for solving three machine FSSP with the objective of minimizing total completion time

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Abstract:

Scheduling is the allocation of resources over a period of time to perform a collection of tasks. In this paper, we extended our earlier work for three machine flow shop scheduling problem (FSSP) and investigated three heuristic algorithms for the objective of total completion time of all the jobs (TCT). Experimental results had shown that one of our algorithms gives better results than the other two when the machine order is reversed.

Submission No - 050

A novel objective for two machine flow shop scheduling problems

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Abstract:

This paper studies a scheduling problem of two-machine flow shop (FSSP). Minimization of maximum completion time always leads to the improvement of all the relevant measures of flow lines. Minimization of total completion time is also more important in the production environment. In our earlier work we had developed two new heuristics based on Johnson's rule for solving FSSP with makespan objective which reduces the total completion time criteria also. In this paper we extended the investigation of our algorithms to the objective which combines both the objectives. Through case studies, we showed that one of our algorithm performed well than the other two.

Submission No - 051

A Comprehensive Review on Lattice Boltzmann Method for Cavity Flow with Nanofluids

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Abstract:

Purpose: The aim of this review paper is to provide recent developments of Lattice Boltzmann Method (LBM) for Natural/Mixed Convection flows within cavities mediated nanoparticles.

Introduction: Cavities or enclosures are being used to study Fluid Dynamics problems as they exhibit almost all the thermal behavior of many industrial and engineering applications such as cooling of electronics equipment, solar collectors, thermal storage systems, food processing, solar ponds, crystal growth, lubrication technologies and cooling of electrical and mechanical components. The mechanism of these devices is based on the principles of Natural/Mixed Convection flow. These systems are to be so designed that they occupy minimum space with maximum thermal efficiency.

Since long, researchers have been trying to improve the thermal efficiency of the conventional fluids like oil, water and ethylene glycol and one way to do this is to use nanofluids which are suspension of nano-particles in the traditional fluids. They have been working with different nanofluids in order to improve the thermal efficiencies. With the invention of high-speed computers, various technologically advanced numerical methods have been developed in order to study fluid flows and heat transfer characteristics.

Over the past two decades or so Lattice Boltzmann Method(LBM) has developed into an important tool for simulating and modelling complex fluid flows. It is centered on microscopic models and mesoscopic kinetic equations or in other words one can say that it is a finite difference method for solving Lattice Boltzmann equation.

Observations/Conclusion: The comprehensive review of latest studies on nanofluids inside different types of cavities using LBM was provided. Moreover, some tables are presented summarizing numerical studies into cavities containing nanofluids and their significant findings. This review paper summarizes the recent progress that have been made in predicting the influence of several parameters such as type of nanoparticles, particle volume concentration, particle size and shape on hydrodynamic and thermal characteristics of Natural/Mixed Convective flow within a cavity with nanofluid by solving the governing equations by LBM.

Submission No - 056

CS-LBP Descriptor for Extraction of Texture Features of Underwater Images

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Abstract:

In this paper, we present an approach for extraction of texture features of underwater images using the Centre Symmetric Local Binary Pattern (CS-LBP) descriptor. The literature survey reveals that the texture parameters that remain constant for the scene patch for the whole underwater image sequence. Therefore, we proposed a technique to extract the texture features and these features can be used for object recognition and tracking. The underwater images suffer from image blurring and low contrast and performance of feature extractors is very less if we employ them directly. Thus, we propose a novel image enhancement technique which is a combination of different individual filters such as homomorphic filtering, curvelet denoising and LBP based Diffusion. We employ DoG based feature detector, for each detected interest point, the texture description is extracted using the CS-LBP feature descriptor. The proposed feature extraction technique is compared and evaluated extensively with well known feature extractors using datasets acquired in underwater environment.

Submission No - 065

Characteristics of Circular Waves in Coupled Poro-Thermoelastic Solid with Liquid Half-space

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Abstract:

This paper investigates the study on the characteristics of circular waves in poro-thermoelastic solid half-space in contact with liquid half-space using the coupled theory of thermoelasticity. After developing the mathematical model, the problem is studied in cylindrical polar coordinates. Helmholtz's decomposition principle is employed to simplify the problem. The time-harmonic solution with the help of Bessel functions is used to solve the wave propagation characteristics. There exist five waves in the considered entire system. The transverse wave propagation mode gets decoupled from the rest of the equations in solid half-space and remains unaffected by the thermal and void parameters. Apart from solid half-space, one mechanical wave is observed in liquid half-space. By invoking appropriate boundary conditions on the solid-liquid interface, the secular equations and their particular cases for circularly crested waves have been derived for thermally insulated and

isothermal cases respectively. The exactness of the method is evaluated by comparing the analytical solutions with numerical findings.

Submission No - 074

Influence of Thermal Jump and Inclined Magnetic Field on Peristaltic Transport of Jefferey Fluid with Silver Nanoparticle in The Eccentric Annuls

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Abstract:

This study investigates the impacts of thermal jump and inclined magnetic field on the peristaltic transport of Jefferey fluid containing silver nanoparticles in the eccentric annuls under the long wavelength and low Reynolds number assumption. Impact on the public health of thermal jumps and tilted magnetic fields is a significant subject in medical research. The heat transmission and magnetic field results with peristaltic motion have numerous applications such as biomedical and bioengineering, oxygen, hypothermia, hemodialysis therapy, cancer tumor, blockage removal of arteries, and reduced bleeding throughout the surgery. The non-Newtonian Jefferey fluid with silver nanoparticles is considered in the space between two eccentric cylindrical tubes. This analysis provides a better evaluation of the injection speed and the fluid flow properties of the syringe. The partial differential equations for modelling and non-linear equations have a semi-analytical method are called the homotopic perturbation method (HPM). We were able to arrive at analytical solutions for velocity, pressure gradient, and pressure rise. In the end, the impact of various physical parameters on temperature, nanoparticle concentration, velocity, pressure rise, and frictional force of inner and outer tubes was graphically depicted. The significant outcome of the present study is that the impact of Hartmann number and thermophoresis number declines the velocity profile, but Jefferey fluid parameter and inclination angle of magnetic field enhances velocity. The thermal jump enhances the temperature of the nanofluid. one more significant outcome is Jefferey nanofluid attains higher momentum as well as temperature as compared to the Jefferey fluid.

Submission No - 083

Some New Classes of Generalized Sets in Hereditary Spaces

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Abstract:

In this paper a few new classes of generalized sets in generalized topological spaces via hereditary classes, are introduced and studied. Also their various properties and characterizations are investigated in hereditary spaces. Many properties of ideal topological spaces are extended in hereditary spaces and counter examples are provided for the properties which are not true in hereditary spaces, in general.

Submission No - 100

Role Of India In The Field Of Research And Innovation During Its Fight Against Covid -19 Pandemic.

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Abstract:

Research and innovation is a vital piece of advanced education and it is quickly developing in India. The nature of research and its significance are significant components with regards to the dependable exploration plan. There is a need of an imaginative thought as the pandemic is spreading in a significant number of the creating nations and administering bodies are thinking that its hard to control. In spite of the fact that, a lot of overall exploration distributions is 5.1% that of licenses stays simply 1.3%. There are only four researchers for each 10,000 representatives in non-scholarly fields. Of the 36.3 million understudies, 160,000 are selected for a PhD. In this paper a study on current research and innovation in India is made in the context of responsible research policy and innovation framework. Researchers and innovators have reacted across India have reacted instantly to control the challenge of Covid-19 epidemic. Several innovations, some emerging tools that have been implemented by the institutions have been seen in the recent weeks. There several reason why there is the need to implement tools and measures in place, including the insistence of the caring situation and a positive approach to crowdsourcing thoughts from the government.

Submission No - 104

Introduction to Group Theory and Permutations involved in the Rubik's Cube

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Abstract:

Almost everyone has tried to solve a widely popular classic mechanical puzzle known as Rubik's cube. It is the world's most famous and iconic puzzle, well known to have a rich underlying mathematical structure. The first attempt often ends in vain with only a jumbled mess of colored cubies. There are many types of Rubik's cube, learning of certain core set of algorithms, permutations and group theory helps to solve this puzzle. Rubik's cube was originally called "Buvos Kocka" meaning "magic cube". This Rubik's cube is a 3-D combination puzzle invented by Hungarian sculptor and architect Erno Rubik in 1974 and quickly it was among the world's best-selling toys in 1980s. In this paper the systematic introduction of the origin, history, research status and development of various types of Rubik's cubes available worldwide has been presented followed by introduction of "God's Number". The number of possible Mechanical permutations and basics of group theory involved in this magic cube has also been discussed in this paper. Mathematically Rubik's cube is a permutation group. The research in the mechanism of Rubik's cube is in its initial stage. The sophisticated design of the Rubik's cube draws the attention of scientists and technical workers from the different fields including physics, computers and mathematics. Scientific research in the field of Rubik's cube mechanism is of great significance to promote the development of the cube structure.

Submsision No - 108

To study Compressible Viscoelastic Fluid in Porous Medium

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Abstract:

In this paper an analysis of stability of viscoelastic fluid have been made under the impact of magnetic field in a porous medium. Here the fluid density depends on two components heat and solute concentrations. Different parameters have been studied in detail by using the normal mode analysis method. For stationary convection, it has been observed that the viscoelastic fluid behaves like an ordinary Newtonian fluid. The effects of various parameters like magnetic field, stable solute gradient, medium permeability and compressibility have been reflected graphically. The analysis reveals that the results obtained here are in good agreement with the earlier developed results.

Submission No - 111

Bounds Involving Standard Deviation And Moments

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Abstract:

In this article we obtain some bounds which provides refinements of the Brunk's inequality. An upper bound for the maximum deviation in terms of the standard deviation and range is obtained. The derived inequalities give relations between moments and also provide alternative and simple proofs of the results which exist in the literature. We also obtain similar inequalities which involve harmonic mean. This helps us to provide the refinements of Brunk's inequality. The application of these results to the field of theory of polynomial equations. We obtain the bounds on the roots of the nth degree polynomial equation when they are all real. We also obtain bounds for the span of roots in terms of the coefficients of the nth degree polynomial equation.

Submission No - 119

A Robust decision making technique for the selection of photovoltaic technology using novel Pythagorean fuzzy information measure based on TOPSIS Approach: A Case Study

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Abstract:

The consumption of non-renewable resources is increasing dramatically which will make a change towards the growth of renewable energy. The infinite availability of sunlight on the earth makes solar energy, one of the auspicious renewable energies, and in modern times, photovoltaic technology (PV) works as one of the developing renewable energy technologies as it can directly convert solar energy into electricity. Therefore, in the recent scenario, the feasibility concerning the financial productivity, technology, and control of environmental pollution led to the selection of photovoltaic technology as a novel category of renewable energy source. The selection of the best PV technology can be termed as the MCDM issue where the accessible inter-conflicting traits can be examined. Therefore, in the present study, we introduced a novel pythagorean fuzzy information measure based multi-criteria decision making TOPSIS approach for their utilization in a case study of selection of best PV technology. Moreover, a case study along with comparative investigation of selection of PV technology is applied to validate the feasibility and effectiveness of MCDM based TOPSIS approach.

Submission No - 134

Advances of E-learning practices in India: A bibliometric assessment

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Abstract:

The COVID-19 pandemic has proved the importance of digital technology in the futuristic world. The use of digital technology, computers, tablets, smartphones and internet has revolutionized the education system in India. The National Education Policy (NEP) 2020 of India has also emphasized the role of electronic resources or e-learning technologies in the learning system. Thus, it is very important that advanced e-learning practices should be adopted to deal with the challenging education scenarios. This paper presents the bibliometric outlook of research publication trends in the field of e-learning during 1996-2020. The SCOPUS linked with electronic database SCImago is used to extract publication related data. To compare the progresses made globally and in India particularly, different bibliometric indicators such as total research publications, citable documents and number of citations have been computed and evaluated. Out of the total publications (n=70587) produced worldwide in e-learning during 1996-2020, the contribution of India was 1.89% with n=1339 documents. Also, the total citations of research documents in e-learning stands at 885268 during 1996-2020 with more number of external citations than self-citations. At the end, the e-learning practices adopted globally is compared with India and suggestive measures are also recommended for India to achieve the goal of education for all.

Submission No - 138

**Effect of Dual phase lag Model on the Vibration Analysis of non local generalized thermoelastic diffusive
Hollow Sphere**

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Abstract:

The aim of this paper to investigate the nonlocal Eringen's elasticity model for free vibrations of generalized thermoelastic diffusive hollow sphere with dual-phase-lag effect model. The effect of non-locality and different models of generalized thermo-elasticity in presence and absence of diffusion have been taken under investigation. Due to time harmonic vibrations the governing equations are transformed into ordinary differential equations. By applying the stress free thermal boundary conditions, the frequency equation has been taken under investigation for possible modes in compact form. To discover free vibration analysis from frequency equations, we apply numerical iteration technique for generating numerical data by taking help of software tools such as MATLAB. The analytical results obtained from the solution of governing equations have been presented graphically from numerical computations and simulations. The check the effect of generalized Thermoelasticity for different modes and effect of non-locality for frequency shift, natural frequencies and thermoelastic damping with and without nonlocal elasticity have been represented for various cases of interest.

Submission No - 139

Free Vibrations of nonlocal thermo-elastic cylinder with voids

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Abstract:

Here, the investigation of the free vibrations of a homogeneous isotropic nonlocal thermo-elastic cylinder with void has been addressed. Time-harmonic variations are used to reduce the governing partial differential equations to a system of ordinary differential equations. The frequency equation for the continuation of vibrations for the mode numbers in the considered cylinder is deduced in closed form for traction-free and isothermal/thermally insulated boundary conditions. To observe the free vibration, the frequency equation is further studied by using the numerical iteration method with the help of MATLAB software. The numerically

simulated results from the analytical solutions are shown graphically for the natural frequency, thermo-elastic damping and the frequency shift against mode numbers for the nonlocal as well as the local thermo-elastic cylinders in the presence and absence of the void.

Physical Sciences

Submission 11

Antimicrobial Evaluation of Cotton Fabric Immobilised with Nano Silver Loaded Carboxymethylcellulose Nanogels

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Abstract: A finish with antimicrobial properties is an ideal way to avoid the adverse effects of microbial infection, which, with continuous proliferation of microbes, may cause organ amputation. Silver nanoparticles (AgNPs) are emerging as the conspicuous alternative due to their wide spectrum antimicrobial activity. Stabilization of AgNPs within biopolymeric network is essential to prevent particle agglomeration and to maintain a sustained release. The term biopolymer refers to naturally occurring biodegradable materials characterized by a high absorption capacity and biocompatibility. Among various biopolymers, carboxymethylcellulose (CMC) is promising polymer as it can act as the stabilizing agent for nanoparticles and restrict their agglomeration. Therefore, in the current study, CMC stabilized AgNPs were prepared by reducing silver nitrate. Size and morphological study of prepared nanogels was carried out by the UV-vis spectrophotometry and TEM analysis. Further, these nanogels were coated on the cotton fabric and their antimicrobial potential was evaluated by zone of inhibition and colony count method. These studies clearly indicated the potential antimicrobial activity of the developed material with more than 90% microbial reduction. In light of these findings, we can conclude that such formulations have tremendous potential for the development of antimicrobial dressings in the foreseeable future’

Author keywords: Carboxymethylcellulose (CMC), Silver nanoparticles (AgNPs), Antimicrobial finishing

Submission 12

Smart and Functional Silver Nanogel for Human Healthcare System

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Abstract: The field of functional metallic nanogels is relatively new in nanotechnology. These nanogels have metal nanoparticles in the core and functional hydrogel in the sheath. The hydrogel acts as a stabilizing agent and imparts functionality to the nanoparticle, thus it can easily be immobilized. An important aspect of these nanogels is their large surface area, their outstanding stimulus response and their dynamic functionality, making them well suited for healthcare applications. A new sustainable route has been developed to design silver nanogels using oxidized carboxymethyl cellulose (OCMC). The OCMC polymer acts as a reducing and stabilizing agent. The reduction of silver nanoparticles is confirmed by a change in the optical property and an emerging new peak in UV spectrophotometer due to surface plasmon resonance. The morphology and particle size of the synthesized nanogels are being investigated by using transmission electron microscopy, and dynamic light scattering. By optimizing the reaction conditions, monodispersed OCMC-Ag nanogels are being developed having core and shell structures. The designed nanogel shows good antibacterial activity against both types of bacterial strain, confirmed using bacterial reduction by colony count method and kill time assay.

Author keywords: Nanogel, Nanosilver, green synthesis.

Submission 16

Development of thyme oil loaded carrageenan-based hydrogels as an antimicrobial wound care system

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Abstract: The healing of wounds in patients who suffer from grave tissue damage due to burns or severe medical conditions such as diabetes or ischemia continues to pose a serious challenge in healthcare. Thus, rapid wound closure with dressings is required for an effective wound management which facilitates wound healing and prevents bacterial invasion. Polysaccharides based hydrogels are considered as promising biomaterials in accelerating wound healing process due to its adequate flexibility, biocompatibility, biodegradability, structure diversity, water swellability, and antimicrobial nature. In the present study, we have developed thyme oil loaded κ -carrageenan-polyethylene glycol- based hydrogel membrane for protecting bacterial invasion and accelerating wound healing. Physicochemical properties and microstructures of fabricated hydrogel membranes were investigated adopting fourier transform infrared (FT-IR) spectroscopy, mechanical studies and scanning electron microscopy (SEM). The addition of PEG to κ -CG polymeric network resulted in mechanically flexible hydrogel network. Furthermore, introduction of TO within the CG-PEG based hydrogel membrane enhanced antimicrobial properties. The antimicrobial behavior of the obtained membranes has been investigated with zone of inhibition, colony counting and bacterial adherence test. These obtained membranes exhibited good antimicrobial activity and holds huge potential in the fields of biomedical science.

Author keywords: Hydrogels, Thyme oil, Carrageenan, Antibacterial.

Submission 18

Fabrication of Electrospun Polycaprolactone Hybrid for Wound Healing Applications

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Abstract: The traditional wound care materials include dressings made up of cotton cloth and bandages. Their lifespan is low, they're allergic, and they're painful to remove. One of the attractive biocompatible and biodegradable polymers used for such applications is Polycaprolactone (PCL). Hydrophobic synthetic materials result in minimal adhesion to wounds, limiting tissue damage. The electrospun fiber provides an excellent surface area to volume ratio along with a high aspect ratio that helps in better interaction between damaged cells and dressing. In order to enhance its property, a biopolymer kappa-carrageenan (kC) is added. This work aims to electrospun a blend of PCL- kC to fabricate PCL hybrid nanofiber. Initially, different parameters of electrospinning were optimised. The developed fiber morphology has been further investigated using SEM. The developed nanofiber showed the potential of being developed into the antimicrobial wound dressing.

Submission 20

Band gap engineering of Cd_{1-x}Mn_xO crystalline thin films

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Abstract: Transparent and crystalline conducting thin films of pristine and Mn doped cadmium oxide (CdO) were deposited on MgO (100) substrate by laser deposition method at a partial pressure of 10 μ Torr to develop alternate transparent conducting electrode for optoelectronic

devices. The effect of Mn doping on physical properties of the as deposited CdO films were examined. The films showed cubic structure (fm3m space group) with predominant orientation along (200) plane. The four-fold symmetry showed the epitaxial growth of the deposited films w.r.t substrate. The morphology showed that surface of deposited film was smooth and homogeneous with RMS roughness 57.79 nm and kurtosis of 1.289. Pristine CdO film showed peculiar morphology of nano pyramidal shaped grains on the surface. The average transmittance of the films increased from 79% to 85% with the doping of Mn and optical band gap is in range of 2.49-2.62eV. Moreover, nonlinear refractive index (n) and extinction coefficient (k) were also calculated and found to be in the range of 1.96 - 1.78 and 0.02 - 0.013 with Mn doping. The refractive index of pristine and Mn doped CdO crystalline films decrease with wavelength. This result indicates that the Mn doped CdO crystalline thin film can be used as an alternative for the high performance TCO in various optoelectronic devices.

Author keywords: TCO , MgO, optical band gap, extinction coefficient, morphology.

Submission 21

Photo-degradation of hazardous aromatic pollutants from industrial effluents using carbon supported ZnFe₂O₄ magnetic nanocomposite

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Abstract: In present work, we describe the remediation of noxious naphthalene (NPN) and 2-naphthol (2-NP) from aqueous phase under visible irradiation. The activated carbon/ZnFe₂O₄ (AC/ZF) nanocomposite was synthesized by simple co-precipitation method. The various instrumental techniques such as Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD) pattern, surface area analyzer Brunauer-Emmett-Teller (BET), vibrating

sample magnetometer (VSM), field emission scanning electron microscopy (FESEM), high resolution transmission electron microscopy (HRTEM), small area diffraction (SAED) pattern, electron dispersive Xray (EDX) and photoluminescence spectra (PL) were used to study the detailed anatomy of prepared nanocomposite. The XRD, HRTEM and SAED results indicated that AC/ZF composite has been prepared in nano-phase. The degradation of organic pollutants were studied by high resolution mass spectrometry (HRMS), chemical oxygen demand (COD) and UVvisible (UV-vis) spectrophotometry. The degradation efficiency of 86.41% and 92.81% were recorded for NPN and 2-NP using AC/ZF nanocomposite under synergetic adsorptionphotocatalysis (AP) after 160 min of solar illumination, respectively. The augmented photocatalytic degradation of pollutants was mainly ensued due to mesoporous nature of nanocomposite and strongly improved charge separation efficiency of AC/ZF. Therefore, our investigations might expose a novel, economic and proficient photoactive material for the removal of highly noxious pollutants from water system.

Keywords: Nanocomposite, Pollutants, Photo degradation, Characterization, Mesoporous.

Submission 25

Synthesis of ZnO nanorods as a drug delivery system for enhanced antibacterial and anticancer activity

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Abstract: In the present study, we report the microwave-induced synthesis of fluorescent zinc oxide nanorods (ZnO) and their usage as a cargo material to carry hydrophobic drug, quercetin. TEM and SEM showed the rod-shape morphology of our synthesized ZnO. XRD showed several diffraction peaks correspond to a hexagonal wurtzite structure. The optical and chemical natures of these nanorods were also confirmed from the UV-VIS (showed a distinct absorption bands

from 361-395 nm) and FTIR spectrum (showed absorption band specific to Zn-O stretching). The synthesized ZnO also showed fluorescence emission at around 550 nm when excited under UV irradiation. Quercetin was loaded onto ZnO surface via employing a metal ion ligand coordination bond, (ZnO/QR), which exhibit pH-sensitive release behavior. ZnO/QR displayed superior drug loading content (42%) and loading efficiency (72.4%). In vitro assays showed that ZnO/QR exhibited higher anticancer, as well as antibacterial activities compared with free quercetin and ZnO. All these results highlight the synthesis of ZnO nanorods under microwave irradiation, which can be used as a plausible therapeutic option for bioimaging and drug delivery purpose.

Author Keywords: Anticancer, Antibacterial, Drug Delivery, Zinc Oxide Nanorods, Quercetin.

Submission 46

Solid-State synthesis of Strontium doped lead-free BCZT nano ceramics

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Abstract: We have reported Sr²⁺ synthesis doped by traditional technique of solid-state reactions using Ba_{0.9-x}Ca_{0.1}Sr_xTi_{0.8}Zr_{0.2}O₃. X-ray diffraction confirming the orthorhombic ABO₃ structure in single phase with P2mm group. space group. With increased doping levels from 25.46 nm to 52.96 nm, the size of crystallite rises by Scherrer, but the lattice parameter falls with the exception of the composition of doping, $x = 0.05$. FESEM displays samples with structure-like flakes. The XPS examination confirmed that Sr-ions have been $x = 0.05$ at the Ca site, and that they have Ca ions to take the Ti-site. While no more forced substitution is observed for the greater concentration of sr, i.e. $x = 0.15$, and sr-ions occupy the site exclusively, which lowers the vacancies of oxygen. The diffused ring showing strong crystalline order in the samples in selective electron diffraction area (SAED) patterns. The results in FTIR reveal a

significant peak around 543cm⁻¹ with an increase of Sr²⁺ in the clean sample to 564cm⁻¹. The Raman range indicates a shift of around 517 cm⁻¹ in the main peak.

Keywords: Nano-ceramics, Solid-state reaction, X-ray diffraction, Rietveld refinement, FTIR, Raman spectroscopy

Submission 53

Synthesis and Thermal Properties of Silver Nanoparticles doped Poly(vinyl alcohol)/ Guar gum/ Gum ghatti nanocomposite.

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Abstract: The development of polymer nanocomposites received importance in recent years because of the special properties achieved with the incorporation of nanoparticles into the polymer matrix. Present work contributes synthesis of Gum ghatti assisted colloidal silver nanoparticles (AgNPs) from silver nitrate solution. The nanocomposites of Poly(vinyl alcohol) (PVA)/ Guar gum (GG)/ Gum ghatti (GGh)/ silver nanoparticles (PGGA) has been fabricated by solvent casting technique. Effect of AgNPs on the physical, thermal and structural properties of the PGGA nanocomposite films were analyzed. DSC and TGA analysis witnessed improved thermal stability of the PGGA nanocomposite films. FTIR study suggested the presence of interactions among the PVA, GG, GGh and AgNPs. Improvement in the hydrophobicity and decrease in moisture adsorption was observed with an increase in AgNPs content in the polymer

matrix. These facts suggested the use of environmental friendly PGGA nanocomposite films for various applications.

Keywords: Silver nanoparticles, Nanocomposites, Thermal properties

Submission 57

Copper oxide nanoparticle structural and optical properties: structural variation and antibacterial activity investigation

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Abstract: The structural, optical, and antibacterial characteristics of copper oxide nanoparticles produced utilizing microwave irradiation CuO(M), co-precipitation CuO(P), and hydrothermal CuO(H) methods are investigated in this research. The XRD, SEM, TEM and SAED methods were used for the analysis of structural and morphological characteristics. Studies using the XPS have verified that copper ions exist in Cu²⁺ oxidation and the presence of nanostructured phases in the samples has been confirmed by Raman spectroscopy. The antibacterial activity of the CuO(M), CuO(P), and CuO(H) nanoparticles was tested against a variety of harmful microorganisms, including methicillin-resistant Staphylococcus aureus. CuO(M) nanoparticles had the highest inhibitory zone against Gram negative bacteria, such as Klebsiella pneumoniae, according to the findings (20 mm). Against K. pneumoniae and S. aureus, CuO(H) and CuO(P) nanoparticles had antibacterial inhibition zones of 17 mm and 13 mm, respectively. In comparison to the CuO(M) nanoparticles, the CuO(P) and CuO(H) nanoparticles had only modest antibacterial activity.

Keywords: Copper oxide nanoparticles,Hydrothermal method,antimicrobial activity

Submission 64

Anticorrosive performance of *Garcinia livingstonei* leaves extract as an effective green corrosion inhibitor for mild steel in 1M HCl solution

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Abstract: *Garcinia livingstonei* plant species include several bioactive components. In the following research, phytochemicals have been screened with Hager's test, Salkowaski's test, etc for ethanolic *Garcinia livingstonei* leaves extract (GLLE). Mass-loss measurement, electrochemical impedance spectroscopy (EIS), Tafel polarization approaches were used to evaluate the inhibition action of the environmentally friendly inhibitor GLLE for corrosion control of mild steel in 1M HCl solution. The results showed that the studied green inhibitor possessed good interaction on the metal surface and, control both anodic and cathodic reactions. The GLLE adsorption on mild steel matched the Langmuir isotherm, exhibiting the inhibitor's inhibitory potential. According to the findings, GLLE is a mixed kind of inhibitor. Studies related to the determination of corrosion rate, inhibition performance with varying the inhibitor concentration and temperature for the corrosion control processes were analyzed. Thermodynamic parameters for the adsorption process were calculated and interpreted. Adsorption of GLLE on the mild steel surface was confirmed by FT-IR spectra. The surface morphology of the mild steel was examined using SEM, AFM, and contact angle studies.

Keywords: *Garcinia livingstonei*,Tafel polarization,Mild steel,adsorption,FT-IR

Submission 114

Anticorrosive performance of *Garcinia livingstonei* leaves extract as an effective green corrosion inhibitor for mild steel in 1M HCl solution

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Abstract: In this work we report the fabrication of novel magnetic ternary LaFeO₃/CoFe₂O₄-PANI (LCP) photocatalyst. The synthesized catalysts has been characterized by FT-IR, XRD, XPS, SEM and TEM. The optical activities have been investigated by UV-Vis and photoluminescence spectroscopy. The synthesized catalysts were used for the removal of pharmaceutical pollutant clozapine (CZP) under solar light irradiation. In comparison with sole counterpart photo catalysts PANI, LaFeO₃ and CoFe₂O₄, LCP demonstrated superior photo-activity, LCP able to degrade 92.2% of CZP over 60 min photo degradation experiment.

Author keywords: clozapine, solar light, photodegradation, mineralization.

Submission 118

Robust and Sustainable Mg_{1-x}Ce_xNi_yFe_{2-y}O₄ magnetic nanophotocatalyst for the improved photocatalytic performance of crystal violet and rhodamine B pollutants.

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Abstract: Sol-gel synthesized $\text{Ce}^{3+}/\text{Ni}^{2+}$ ions doped Mg nanoferrites is one of the finest catalysts for the photocatalytic degradation of rhodamine B and crystal violet pollutants under visible natural sunlight. The particle size calculated through XRD, Hall-William plots, and TEM analysis is in very good agreement with each other. The formation of spherical, cubic, and agglomerated magnetic nanoparticles of synthesized specimens were obtained. The existence of stretching vibrations of M-O (metal-oxygen) complexes at the tetrahedral (A-site) and octahedral site (B-site) was detected by FTIR investigation and in addition to this, the Raman spectra of synthesized nanophotocatalysts show the presence of four vibrational modes ($E_g + 2T_{2g} + A_{1g}$) providing suitable information of occupancy of Mg^{2+} , Ce^{3+} , Ni^{2+} and Fe^{3+} ions at the interstitial sites of undoped and $\text{Ce}^{3+}/\text{Ni}^{2+}$ doped MgFe_2O_4 crystal structure. The synthesized MGF3 nanophotocatalyst exhibits the superlative performance with 97.674 % crystal violet (CV) and 90.050 rhodamine B (RhB) degradation under the natural sunlight in 60 minutes. The experimental results showed that the prepared doped MgFe_2O_4 nanoferrites have a high tendency to photodegrade the RhB (Rhodamine B) and crystal violet (CV) dyes in aqueous form. The pseudo first-order equation reflects the best photocatalytic process kinetics and also, studied the feasibility of RhB (Rhodamine B) and crystal violet (CV) dyes adsorption on the doped and undoped MgFe_2O_4 nanoferrites. The results show support for adsorption by the spontaneous photodegradation process. Therefore, it was concluded from the present study that the synthesized nanoferrites show an excellent photocatalytic activity under natural sunlight and it can be considered a suitable candidate for the photo-degradation of organic dyes in various applications. Finally, the antimicrobial activities were examined against the *Staphylococcus aureus* and *Escherichia coli* and it was observed to be effective against *Staphylococcus aureus*.

Author keywords: Mg nanophotocatalysts , Sol-gel, Crystal violet and rhodamine B pollutants

Enhanced Photocatalysis.

