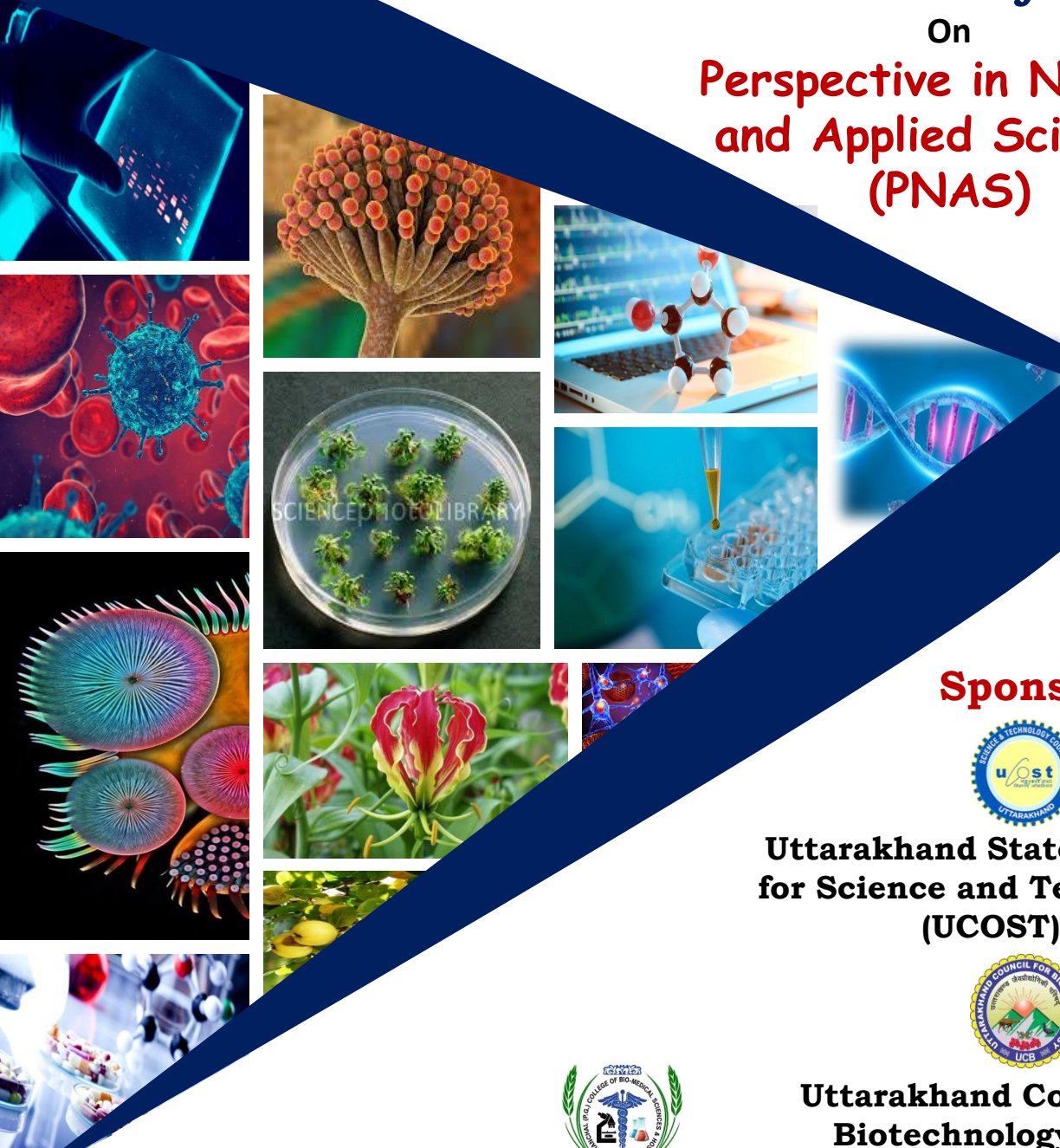


Uttara Biofest 2018

9th-10th March 2018

National Conference On Perspective in Natural and Applied Sciences (PNAS)



Sponsored by



**Uttarakhand State Council
for Science and Technology
(UCOST)**



**Uttarakhand Council for
Biotechnology (UCB)**



Organized By

Department of Life Sciences

**Uttaranchal (P.G.) College of Bio Medical Sciences & Hospital,
Dehradun, Uttarakhand**

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National Conference on Perspective in Natural and Applied Science (PNAS)

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उच्च शिक्षा, सहकारिता, प्रोटोकाल,
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उत्तराखण्ड सरकार

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Message

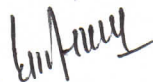


It is a great pleasure to know that the conference based on **“Perspective in Natural and Applied Sciences”** is being held at **Uttaranchal (PG) College of Biomedical Sciences and Hospital, Dehradun**. This Conference would offer a broad platform for exchange of ideas between eminent experts, young researchers and students of the nation. Being one of the descriptive, predictive and observative fields in nature, the context of natural and applied sciences can be well implicated by experimentation, further augmenting the continuum of research and achievements with scientific learning and practices.

Education is a revolutionary breakdown in learning the modern science. This symbolizes the globalization of this campus as well as standard being maintained. In addition, it also incorporates the body of evidence that includes quality, quantity and consistency to promote research minds. Being an educationalist, it is our moral duty to serve the society through various professional activities. I assume that the right approach to develop the scientific profession is required worldwide. To my mind, the scientific presentations, discussions and other activities to be held in this conference would be quite knowledgeable for the participants and would definitely create new milestones.

Organizing an event does not come without an effort. It requires vision, mission and hard work of various minds. I extend my heartfelt regards to the Head of institution, Organizing committee and students for their concerted and enthusiastic contribution towards the success of this prestigious event.

Congratulations and Best Wishes.


(Dr. Dhan Singh Rawat)



UTTARAKHAND STATE COUNCIL FOR SCIENCE & TECHNOLOGY

उत्तराखण्ड राज्य विज्ञान एवं प्रौद्योगिकी परिषद

Department of Science & Technology, Government of Uttarakhand | विज्ञान एवं प्रौद्योगिकी विभाग, उत्तराखण्ड शासन

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महानिदेशक

सचिव

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Message

It is a matter of great pleasure to know that Uttaranchal College of Biomedical Sciences and Hospital, Dehradun is organizing the National conference on "Perspective in Natural & Applied Sciences" (PNAS-18). Such an active initiative will help in growing and nurturing research in India. Natural science deals with the explanation, perceptive and prediction of natural phenomenon, based on experimentation and observation, whereas applied science is important for technology development. It is inspiring to note that the conference is being held at a national level, with many dignitaries, speakers and participants coming from all over India. I wish that research scholars, faculty members and industry experts will have an interactive and learning experience as part of this conference. I congratulate organizing team for their initiative and efforts.



Rajendra Dobhal

Director General



Dr. M.K. Nautiyal

Director



Message

It is a matter of immense pleasure for me that “**Uttaranchal College of Biomedical Sciences and Hospital, Dehradun**” is organising a two days National Conference on “**Perspective of Natural and Applied Sciences**” on 9th -10th March 2018.

This era of technology is in high demand of innovation in the field of Natural and Applied Sciences, hence widening the scope of applications of the subject. Natural and Applied Sciences include subjects like Medicine, Medical Engg., Oil and Petroleum, Food and Technology, Wildlife, Energy, natural resources etc. We are in need of ideas that would sync in and keep serenity and pristine character intact with nature. Hopefully this conference is going to provide a platform for bright minds, Scholars and Students to come up with their ideas/project/design/spirit of work to the world for better days ahead and in return learn something new equally.

I extend my sincere regards to the students, Scholars and fellow Participants of the conference and also hearty congratulations to the organising team members and faculty of UCBMSH, for organising this event in the national interest.

I wish the conference a great success.

(M.K. Nautiyal)
Director

Message from the Chair Person

It gives me immense pleasure to announce that Uttaranchal (P.G.) College of Bio-Medical Sciences and Hospital is organizing two day National conference on “**Perspective in Natural and Applied Sciences (PNAS-2018)**”. I presume that many veteran scientists of this field along with the faculty members and students from all over the country are expected to take part in the conference. This will be an opportunity for all experts and young researchers to have a close interaction and free discussion for the exchange of ideas. I am sure all the faculty members as well as students will be benefited through this attempt. It is a matter of proud for us that such important burning issue is being brought to the organizing committee. I wish the conference to be a big success and fruitful event.



Mrs. Pushpa Warne

(Chair Person)

Guru Nanak Dev Education Society

Message from Managing Director

It is my great pleasure to welcome all the participants in the National Conference on “**Perspective in Natural & Applied Sciences**” (PNAS-2018) at Uttaranchal (P.G.) College of Biomedical Sciences & Hospital, Dehradun, India. The conference offers a broad platform for the students, academicians and research scholars to share their thoughts, knowledge,



ideas and experience in the diverse fields of Natural and Applied Science. It is a venture for joining hands towards the recent discoveries in the fields of medical, biological, biotechnology, nano-technology, environmental and chemical sciences. With an overall objective of contributing towards health and human welfare, the conference will provide a major interdisciplinary opportunity for presenting new approaches from relevant areas of science, to encourage the latest developments in scientific research.

I firmly believe that the deliberation and interaction during conference will be beneficial, stimulating, productive and encouraging to the research scholars and participants. I would like to wish for a very successful conference, which, hopefully besides the hard work will be a fiesta of science, a celebration of knowledge and a cheerful forum of wisdom.

“It is owing to wonder that people began to philosophize, and wonder remains the beginning of knowledge”. -Aristotle, Metaphysics

A handwritten signature in black ink, appearing to read 'GDS Warne', written over a horizontal line.

Er. GDS Warne
Managing Director
UCBMSH, Dehradun

Message from Convener

I am extremely delighted to invite all the eminent speakers, invitees, delegates and dear students in the sprawling campus of Uttarakhand (PG) College of Biomedical Sciences and Hospital for the National conference on “Perspective in Natural & Applied Sciences” (PNAS-2018). This conference is exceptional in all respects because it is an effort to bring together the leading scientists and scholars in scientific disciplines to discuss the natural and applied sciences from the perspective of 21st century science. Natural science is a branch of science concerned with the understanding, description, and prediction of natural phenomena, based on empirical evidence from observation and experimentation. Applied science is important for technology development and knowledge of latest inventions. This conference will provide an open forum to have an opportunity to interact with the leading scientists from across the globe and to enrich their knowledge in the area of Natural and Applied Sciences. Let us join our hands together to share our knowledge and experience that will go a very long way in helping to build up the healthy, prosperous and developed nation. The main aim of this conference is to provide impetus, motivation, and to bring together research scholars, academicians and scientists to share cutting-edge developments and welcomed significant contributions to theoretical and practical aspects in all major fields of Natural and Applied Sciences. I, therefore, appeal to all the participants and readers of the proceedings to ponder upon it and take concrete steps to develop a good culture and create awareness about importance of the Natural and Applied sciences.



My heartfelt felicitations to all of you on this occasion.

A handwritten signature in cursive script, appearing to read 'Rashmi Dhingra'. The ink is dark and the signature is fluid and stylized.

Prof. Rashmi Dhingra
Principal
UCBMSH, Dehradun

Message from Chief Organizing Secretary

I am glad to announce that “Uttaranchal (PG) College of Biomedical Sciences and Hospital” Dehradun is organizing two days National conference on the topic **“Perspective in Natural & Applied Sciences” (PNAS)** on 9th - 10th March 2018. I am sure that interaction of expert speakers of renowned counterparts will go a long way in knowledge sharing to help our students to grow &



to compete globally. This event will provide a common platform for the bio-researchers of all specialties to share information, explore collaborations and to identify future needs of our country in different aspects of Natural and Applied sciences.

The scientific program will offer innovative and stimulating topics with a broad range of invited talks, oral presentations and poster sessions that will provide a unique opportunity to the participants.

The members of the organizing committee need special mention for their untiring efforts in this event. I extend my greetings & good wishes for the success of this conference

A handwritten signature in black ink, appearing to read 'Neha Saini', written over a horizontal line.

Dr. Neha Saini
Chief Organizing Secretary
Academic coordinator
UCBMSH, Dehradun

Message from Organizing Secretary

I on behalf of Organizing Committee welcome you all to this Conference. It is indeed an honor and privilege for me to write a message as an organizing Secretary of National Conference “**Perspective in Natural and Applied Sciences**”. I am very much sure that this conference is going to offer wonderful vistas for interaction and exchange of scientific initiatives and ideas as well as will provide a great platform to further explore the ever expanding horizons of natural and applied sciences. May this time of coming together will help us to identify the new trends in the natural and applied sciences so that our educational objectives can be modified according to the latest innovations and trends.

I wish the conference a great success!!



A blue ink handwritten signature of Dr. Seema Nainwal, written in a cursive style.

Dr. Seema Nainwal
Organizing Secretary

Message from Dean Academics

It is matter of immense pleasure to inform that the “Uttaranchal College of Bio-Medical Sciences and Hospital, Dehradun” is organizing two day national conference “**Perspective of Natural and Applied sciences**”. The present conference is to encourage the exchange of scientific information on various and interdisciplinary aspects of natural and applied sciences. I am happy to announce that the conference has attracted various eminent scientists, faculties, research scholars and students, and this will bring an opportunity of sharing research finding among all.



I also congratulate the team for their determined efforts for making this conference a success.

I extend my best wishes for a grand success of this event.

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

Dr. Pallavi Chauhan
Dean Academics
UCBMSH, Dehradun

Program Schedule at a Glance

National Conference on Perspective in Natural and Applied Science (PNAS 2018)	
9th March 2018 (Friday)	
9:00 AM – 10:15 AM	On the Spot registration <i>Venue: Reception Desk, Academic Block II</i>
INAUGURAL SESSION <i>Venue: Auditorium</i>	
10:15 AM - 10:17 AM	National Anthem
10:20 AM - 10:25 AM	Lamp Lightening
10:25 AM - 10:35 AM	Saraswati Vandana
10:35 AM - 10:40 AM	Bouquet Presentation
10:40 AM -10:45 AM	Welcome Address <i>Dr. Neha Saini, Chief Organizing Secretary</i>
10:45 AM - 10:47 AM	Release of Souvenir- cum-abstract Book
10:47 AM -10:55 AM	Inaugural address by Guest of Honor <i>Dr. Dhan Singh Rawat, Higher Education Minister, UK</i>
10:55 AM - 11:15 AM	High Tea
PLENARY LECTURES (Venue: Auditorium)	
11:15 AM - 11:45 AM	Prof. R. N. Kharwar <i>Fungal endophytes: A hidden treasure trove of structural and functional diversity</i>
11:45 AM - 12:15 PM	Prof. A. R. Nautiyal <i>Plant Eco-physiological aspects and bio-productivity</i>
12:15 PM - 12:45 PM	Prof. Sunil K. Deshmukh <i>Translating Research on endophytic fungi into pharmaceutical and food application</i>
01:00 PM - 02:00 PM	Lunch Break
02:00 PM - 03:30 PM	Young Scientist Presentation Session
03:30 PM – 04:30 PM	Poster Presentations (Session I and Session II)
4:30 PM - 5:00 PM	Tea Break
05:00 PM - 06:00 PM	Cultural Evening
10th March 2018 (Saturday)	
PLENARY LECTURES (Venue: Auditorium)	
09:30 AM – 10:00 AM	Prof. P. C. Joshi <i>Ecological studies on Oak Tasar Silk moth Antheraea Spp. (Lepidoptera:</i>

Program Schedule at a Glance

	<i>Saturniidae</i> in the Garhwal Region of state of Uttarakhand (India)
10:00 AM – 10:30 AM	Prof. Sanjai Saxena <i>Tailoring Biodiversity in Development of New Therapeutics</i>
10:30 AM – 11:00 AM	Prof. R. C. Sharma <i>Global Warming: Environmental, Social Economic and Political Dimensions</i>
11:00 AM -11:30 AM	High Tea
11:30 AM - 01:30 PM	Oral/Poster Presentation (Session III & IV)
01:30 PM - 02:30 PM	Lunch
02:30 PM – 02:45 PM	Honor of Chief Guest <i>Dr. Rajendara Dobhal, Director General, UCOST, Dehradun</i> <i>Dr. M.K. Nautiyal, Director, UCB, Haldi, Uttarakhand</i>
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03:45 PM – 04:00 PM	VOTE OF THANKS
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2.	Tailoring Biodiversity in Development of New Therapeutics	Prof. Sanjai Saxena,	
3.	Fungal endophytes: A hidden treasure trove of structural and functional diversity	Prof. R N Kharwar	
4.	Translating Research on endophytic fungi into pharmaceutical and food application	Prof. Sunil Kumar Deshmukh	
5.	Ecological studies on Oak Tasar Silk moth <i>Antheraea Spp. (Lepidoptera: Saturniidae)</i> in the Garhwal Region of state of Uttarakhand (India)	Prof. P. C. Joshi	
6.	Plant eco-physiological aspects and Bio-productivity	Prof. A.R. Nautiyal	
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57.	Antioxidant property of <i>Withania somnifera</i> (Ashwagandha) in human erythrocytes	Maheshwar Singh Chouhan, Swarndeeep Chauhan, Neha Gaur and Mohd Abu Zaid	POSTER
58.	Quantitative characterization of IAA production and enhancement of in vitro growth of medicinal plants Co-cultured with PGPR	Mudit Bhatt, Aakashdeep Sengupta, Barkha Kamal and Vikash Singh Jadon	POSTER
59.	Optimization of protocol for conducting GC-MS studies on callus of <i>Podophyllum hexandrum</i> Royle	Kanika Aswal, Barkha Kamal and Vikash Singh Jadon	POSTER

60.	<i>In vitro</i> Rapid Mass Multiplication of F1 Hybrid of <i>Eucalyptus</i> FRI-6 (<i>E. tereticornis</i> x <i>E. grandis</i>) Through New Approach: Tissue Culture Technique	Lalita Joshi, Barkha Kamal and Vikash Singh Jadon	POSTER
61.	Effect of season on clonal propagation of interspecific F1 hybrid of <i>Eucalyptus</i>	Tejpal, Barkha Kamal and Vikash Singh Jadon	POSTER
62.	Microbial synthesis of Nanoparticles	Parwati	POSTER
63.	<i>In vivo</i> study on effect of organic manure spray over potato plant growth	N.Murugalatha, Anjali, Muralitharan R and Tanweer Hassan	POSTER
64.	Environmental stress and Morphological variations of Anopheline Mosquitoes	CP Singh	POSTER
65.	Effects of Climate Change on Flora and Fauna	Abhijit Pradhan	POSTER
66.	Toxic effect of mahua oil cake on protein profile of <i>clarias batrachus</i> (cat fish)	Lata Paliwal, Ahsanul Kareem Shah, Ankita Singh & Vishal Rajput	POSTER
67.	Extension of Suitable Farm Technologies for Mitigating the Adverse Effect of Climate Change: A Case from Garhwal Himalayan Region.	Rekha Dhanai	POSTER
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69.	Juvenile idiopathic arthritis in relation with atherosclerosis	Mouli Bose, Pooja Agarwal, Anil Bisht, Samar Ranjan Paul	POSTER
70.	Phytochemical analysis of aqueous and ethanolic extracts of citrus fruit peels- <i>Citrus limon</i> , <i>Citrus sinensis</i> and <i>Citrus aurantium</i>	Shivani Ghai, Shruti Goel, Saima Katoch, Hiteshi Mittal and Surabhi Vashisht	POSTER
71.	Recent advances in drug development against MDR strains of <i>Mycobacterium tuberculosis</i>	Pallavi Dheer and Lokesh Gambhir	POSTER
72.	Corrosion Resistance of Ni-P-Al ₂ O ₃ -SiC Electroless Nano-composite Coatings in 3.5% NaCl Solution	Munna Ram, Moh. Abdul Aleem Ansari, Neetu Sharma, Sulaxna Sharma and Awanish Sharma	POSTER
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74.	For Baskakov - Beta Stancu Type Summation Integral Operators	Rupa Sharma	POSTER
75.	The future adequacy of freshwater in uttrakhand	Lalit Kumar and Anuj Kumar	POSTER
76.	An Assessment of Indigenous Knowledge on Medicinal Plant of Srinagar Valley, Garhwal, Uttarakhand, India	Milan Kumar Rai, Shanker Karki, Rajendra Singh Negi.	POSTER

77.	Assessment of Physico-chemical Properties of Soil under Different Land use Pattern in Takoli Gad Watershed, Garhwal Himalaya, Uttarakhand.	Shanker Karki, Rajendra Singh Negi	POSTER
78.	Vegetational analysis of woody vegetation under burnt and unburnt oak forest at Pauri, Garhwal Himalaya, India	Sharesth Kumari, J.P Mehta, Snobar Shafi, Pooja Dhiman	POSTER
79.	Impact of fire on Phenological and Reproductive behaviour of <i>Anaphalis busua</i> (Buch.-Ham. ex D.Don) DC, a common weed under Pine dominated forest ecosystem	Snobar Shafi, J.P Mehta, Sharesth Kumari and Pooja Dhiman	POSTER
80.	Enzymatic potential of bacterial population after prescribe fire in Chilla forest Utrakhand	Pooja Dhiman, J.P. Mehta, Padma Singh	POSTER
81.	Synthesis of silver nano particle using aqueous extract of <i>phyllanthus fraternus</i> and their antimicrobial activity.	Neha Rawat, Diwakar Shukla, Versha Percha and Arun Kumar Mahato	POSTER
82.	Synthesis and Antibacterial Activity Of substituted Schiff's Base Derivative.	Pankaj Bhandari, Keshav Kakria and Versha Percha.	POSTER
83.	Evaluation of protein, carbohydrates, tannins and phenolics levels in fruit peels of pomegranate, lemon, orange, masami and banana.	Avneet kaur, Yashita Jain, Kashish Mittal, Rinki Ahlawat, Armin Kaur	POSTER
84.	Evaluation of the Potential of Thermophilic Bacteria for Bioremediation of Heavy Metals	Shailesh Kumar Vishwakarma and Mamta Arya	POSTER
85.	Is managing outside waste enough for well being?	Sharat Sharma	POSTER
86.	Agricultural waste management and its significance	Deepa Joshi, Girish Chandra	POSTER
87.	AIDS: the Most Dreadful Immunological Disorder	Roshni Chand	POSTER
88.	Hepatitis C Viral RNA and its genotypic determination in Clinical Isolates- Applications in Disease monitoring	Vijay Kumar, Dalel Singh, Baljeet Singh, Manish Dev Sharma, Narotam Sharma	POSTER
89.	Molecular characterization of HLA-B27 Sequence specific allele in Autoimmune Disorders	Puneet Rawa, Snehal Dube, Antara Maity, RN Singh, Narotam Sharma, Satish C Nautiyal	POSTER
90.	Human Papilloma Virus and its Association with Cervical Cancer	Snehal Dube, Puneet Rawat, Antara Maity, RN Singh, Narotam Sharma, Satish C Nautiyal	POSTER
91.	Type-Specific Human Papillomavirus detection in cervical specimens–Clinical Utility in Cervical Cancer Management	Soumya Bhatt, Ruchi Rajput, Himani Sati, Deepika Upadhya, Narotam Sharma	POSTER
92.	Studies on Anti-Inflammatory Potential of <i>Azadirachta</i>	Sushil K Chaudhary,	POSTER

	<i>Indica</i> Extract	Narendra P. Singh, Amit Sharad, Versha Parcha, Alok Maithani & Veeram Ram	
93.	Climate Change Impact on Indian Agriculture	Anshika Chauhan, Girish Chandra Tiwari	POSTER
94.	A study of Physico-Chemical parameters and Bacteriological analysis of some water springs in Uttarakhand.	Ankita Rawat, GK Joshi	POSTER
95.	Fly ash heavy metals as potential environment pollutant: Risk and management	Krishna Rawat	POSTER
96.	Municipal Solid Waste Management in Dehradun city	Kelevi I, Mohd. Muntazir, Ame Debbarma, and Sechongla Sangtam	POSTER
97.	Ionizing radiations: blessing and bane	Radha Upadhyay, Lokesh Gambhir and Girish Chandra	POSTER
98.	Structural and functional characterization of MarR family proteins from <i>Brucella abortus</i>	Kanchan Rauthan and Sudhir Kumar	POSTER
99.	In silico prediction of the probable drug targets from hypothetical proteins of <i>Brucella abortus</i>	Pooja Kushwaha and Sudhir Kumar	POSTER
100.	Effect of Temperature, Humidity and Moisture content on the Fungal Diversity in three different forest types of Pauri Garhwal District (Uttarakhand)	Neelam Negi & Namita Joshi	POSTER
101.	Fungal Approach for the Bioremediation of Toxic Synthetic Industrial Dyes	Babita Rana, Raj Kumar Pandey, Lakshmi Tewari	POSTER
102.	Clinical Utility of ADA levels, AFB and Nested PCR for CSF Specimens in Tuberculosis Meningitis Patients	Shweta Singh, Indra Rautela, Himanki Dabral, Narotam Sharma, Manish Dev Sharma	POSTER
103.	Altitudinal Variation in the Volatile Constituents of <i>Cymbopogon Flexuosus</i>	Anju Bhatnagar and Sarita Bhatnagar	POSTER
104.	Nitrogen and phosphorus removal from beverage effluents by bacteria isolated from farmland	Anne Bhambri and Santosh Kumar Karn	POSTER
105.	Fuzzy set and its applications	Shveta Goyal, Priyanka Gautam	POSTER
106.	Applications of Advanced Molecular Tools for the Characterization of Swine Flu (H ₁ N ₁)	Rupinder Kaur, Anjali Kuliyal, Ruchi Rajput, Deepika Upadhyay, Manish Dev Sharma, Narotam Sharma, Satish C Nautiyal	POSTER
107.	Cyanobacterial and microalgal diversity of Badrinath Hot Spring, Uttarakhand	Sana Fatima Ikram and Dhananjay Kumar	POSTER

108.	Deleterious effects of climate change on vegetation of Doon Valley	Onkar Singh and Avibu Medeo	POSTER
109.	Bio-fumigation potential of endophytes to increase the shelf life of fruits and vegetables	Md Abu Mushatque, Neha Kapoor	POSTER
110.	<i>Calotropis procera</i> : A Plant with Great Medicinal Values	Shadma Jilani, Harpreet Kaur, Taruna Bharti, Supriya Pandey	POSTER
111.	Graphene Membranes For Water Desalination	Sofia Parveen, Sadiya Ashraf & Seema Nainwal	POSTER
112.	Radiations and Health Hazards	Shefalee Singh	POSTER
113.	Waste Management In Delhi	Ashu Chaudhary	POSTER
114.	Waste Management	Nitu Kumari	POSTER
115.	Bio-prospecting fungal endophytes inhabiting medicinal plants of Dehradun	Pranchal Rajput, Neha Kapoor	POSTER
116.	Green synthesis of zinc oxide nanoparticles using leaf extract of <i>Hedera nepalensis</i> K. Koch and its biological activity	Deepak Patel, J.S. Jangwan and Harish Chandra	POSTER
117.	Effects of Vehicular Emission on Plant Pigments	Renu Sharma	POSTER
118.	Traditional Ecological Knowledge on Agriculture Practices	Neha Chilwal	POSTER
119.	Inhibition of Alpha Amylase and Alpha Glycosidase Enzymes by Various Earth Worm Extracts	Bilal Ahmad and Anil Bisht	POSTER
120.	Waste Management in India	Ruchika Verma	POSTER
121.	Haematological studies and ABO susceptibility among the patients of dengue in Dehradun, district Uttarakhand	Pooja Agarwal, Mouli Bose	POSTER
122.	Pancreatitis: Inflammation in pancreas	Priyanka Dutt, Nandita Mukherjee, Mouli Bose	POSTER
123.	Integrated Nutrient Management for food security and Environmental protection	Sachin Kumar, Himanshu Kaushik and J.P. Singh	POSTER

Plenary Lectures

Global Warming: Environmental, Social Economic and Political Dimensions

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Biographical Sketch-

Dr R. C. Sharma is the head, Department of environmental sciences. HNB Garhwal University, Srinagar- Garhwal, Uttarakhand Birla Campus. He has 41 years of teaching and research experience. His area of specialization includes Freshwater Biodiversity: Hyporheic Biodiversity, Natural resource management: High altitude Wetlands, Microbial Biodiversity, Ecotoxicology: Bioenergetics. Around 33 Ph.D. Degree awarded in his supervision .He completed more than 16 research Projects funded by different funding agencies such as ICAR, Govt of India, UGC, MoEF, DBT, MNES .



ABSTRACT

The global warming is one of the most important global environmental problems. Enhanced green house effect has contributed to the overall increased mean temperature of the Earth. Contributions made by all the green house gasses to the global warming have been made in great detail. Global warming is not a recent phenomenon. There are several instances of global warming during the pre industrial period including the ancient past. A history of global warming has also been traced. Thus, it is a debatable issue that the global warming is a natural process or anthropogenic in nature. Both the aspects have been explained. The process of global warming of the Earth eco- system has been explained with the positive and negative feedback (homeostasis). The global warming has environmental consequences in terms of melting of glaciers and ice caps, drying of fresh water resources, loss of biodiversity, extreme weather events, climate change, and rise in sea level. The global warming has socio economic consequences in terms of impact on agriculture, increased frequency of forest fire, and adaptations of the tribal human communities of the world. Impact of global warming on the Himalayan ecosystem has been explained in great detail. A sincere concerted international effort is required for combating this problem of global warming. There is a tussle between more industrialized and less industrialized countries in reducing the carbon space in the atmosphere. The causes of the failure of Kyoto Protocol have been explained. Thus a political dimension has also been added to this global environmental problem. A host of suggestions have been made to reduce the carbon space in the atmosphere by the individuals, communities and the nations, so that the global temperature should not exceed the maximum limit of temperature rise of two degree Celsius of the Earth.

Tailoring Biodiversity in Development of New Therapeutics

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Biographical Sketch-

Dr. Sanjai Saxena, currently is a Professor in Biotechnology Department at Thapar Institute of Engineering and Technology (TIET), Patiala. He has over 17 years of Leadership in the interface of Pharma and Biotechnology involving exploration and exploitation of novel biomolecules from different biological systems and their interaction in the nature. This is actually achieved by development of screening platforms for different biological activities such as anti-microbial, anti-oxidant, anti-cancer or finding novel molecules which interfere in the mechanism of development of diseases such as Alzheimer's Dementia (AD), Parkinson's disease (PD), Obesity, Anti-gout/arthritis and type II Diabetes. In the recent past I have ventured into the area of food security which predominantly involves the exploitation of plant- microbe interactions to combat abiotic stresses as well as in post-harvest preservation to enhance shelf life of crop/horticultural produce.



Prof. Saxena's research work has led him a research funding of over 15 million INR from different governmental agencies such as CSIR, DST and Department of Biotechnology (DBT). His scientific contributions include > 50 peer reviewed research publications; 06 book Chapters, 01 Book on Applied Microbiology published by Springer. He has given several invited talks in national as well as international forums. Prof. Saxena is credited with 02 Indian patents and 01 US Patent. Prof. Saxena has been an expert in several peer reviewed journals of national and international repute.

ABSTRACT

Biodiversity represents the sum total of all living organisms in a particular geographic area. Since times immemorial natural products isolated from these living organisms as admixtures which have been used in traditional medicines in different parts of the globe. Natural products have also been the sources for development of modern drugs and medicines. Hence biodiversity and interactions between the living organisms is a remarkable resource for deriving new chemical templates from nature for their possible use as novel drugs with novel mechanism of action. Thus my talk going to address now important drugs were explored and exploited from different organisms such as plants, animals, microorganisms as well new drugs under development which are being designed and developed based on their interrelationships in nature.

Fungal endophytes: A hidden treasure trove of structural and functional diversity

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Biographical Sketch-

Dr R. N. Kharwar is the professor in the Department of Botany, BHU Varanasi. His area of specialization includes purification and characterization of bioactive natural products from fungal and actinobacterial endophytes along with their diversity and ecology. He is the member of State wild life board, Uttar Pradesh, Lucknow. He published 45 research papers in national and international journals



ABSTRACT

Fungal diversity is an important and alternative source that could be harnessed and used to modern biology and biotechnology, and has the potential to be developed as innovative and sustainable solutions to a wide range of problems. In animal systems, diseases such as cancer, malaria, multi drug resistant bacteria, parasitic protozoans, non-curative diseases, and pathogenic fungi are important problems. In plant systems, different stresses like drought, salt and temperature tolerance, as well as disease resistance are of concern. These ever growing threats require immediate serious efforts for the acquirement of new, more effective agents that have the potential to be developed into new industrial products. Natural products are often produced by microbes and may have specific functions in nature. The abundance of microbial biodiversity is as yet largely unknown, and the defined microbes representing but perhaps a small fraction of the potential, and as such, the search and identification of novel biotopes that may provide unique and useful products, will likely be a successful endeavor. Woody plants are found to harbor novel endophytic fungal biotopes. These endophytes reside within the living tissues of plants, and have been largely overlooked and unexplored for their potential to produce novel natural products to ultimately be developed for industry. However, the process from discovery to production is complex. The utilization of endophytic fungi and their functional metabolites on an industrial scale begins with intelligent screening of endophytes, and then requires growth of the microbe(s) and subsequent scaling up for fermentation, as well as optimization of many other necessary factors. The isolation and characterization of bioactive substances from culture filtrates is done using bioassay guided fractionation and spectroscopic methods. Some examples of novel natural products produced by endophytic microbes that have been successfully produced on an industrial levels includes taxol, jesteron, pestacin, isopestacin, pseudomycin, jasmonic acid, torryanic acid, javanicin and ambuic acid to name a few. The focus of this article is to discuss endophytic biodiversity, their role to protect plants against abiotic environmental stresses, potentiality for discovering novel natural products that are active against different diseases representing to both humans and plants. In addition to above, an updated comprehensive list of compounds that are active against severe diseases will be provided for the readers involved in research of endophytes. The mycosynthesis of metal nanoparticles using fungi is considered as a unique and eco-friendly method as it is free from any solvent or toxic chemical, capping agents and also easily amenable to large-scale production. The fungal isolates *Aspergillus clavatus*, *A. terreus*, *Phoma herbarum*, *Phomopsis helianthes*, *Chaetomium globosum* and *Trichoderma viride* were used for biosynthesis of silver and gold nanoparticles using aqueous solution of silver nitrate (AgNO_3), and tetra auro chlorate (HAuCl_4), respectively. *A. clavatus* and *C. globosum* induced AgNps were antimicrobial in nature while AuNps were non-toxic and stable with polymorphic shapes. UV-Vis spectroscopy, transmission electron microscopy (TEM), Atomic force microscopy (AFM), FTIR and X-ray diffraction (XRD) were used to characterize the NPs.

Translating Research on endophytic fungi into pharmaceutical and food application

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Biographical Sketch-

Dr S. K. Deshmukh is the Leading person responsible for establishing the microbial culture collection in Hoechst Marion Russel India Ltd. Mumbai and Piramal Enterprises Limited, Mumbai. He is a microbiologist with more than 34 years of Industrial experience in the area of bio-prospecting microbes especially towards development of anti-tumour, anti inflammatory, anti-diabetic, agrochemicals, nutraceuticals, and prebiotics, from microbial sources. He is President Mycological Society of India (2017). Currently, he is Fellow and Area Convenor, TERI Deakin Nano Biotechnology Centre. He has published 96 research papers/ review articles and book chapters, edited 8 books. His Current Research involvements Includes development of Natural colours, antioxidants and bio stimulants using Nano interventions.



ABSTRACT

Endophytic fungi are defined as fungi that live asymptotically within the tissue of higher plants. These fungi came to limelight after the discovery of Taxol and Taxane from an endophytic fungi *Taxomyces andreanae*, of Pacific yew. Later on, a large number of bioactive metabolites from endophytic fungi have been isolated from endophytic fungi from tropical countries. Still, there is a great opportunity to discover unexplored fungi with industrial potential. There is a need to discover these fungi from less explored ecosystems e.g. cold desert, hot desert, Antarctica, mangroves along with other sources like likens, bryophytes, orchids. Some of the strategies of cultivation of these fungi to stimulate the production of secondary metabolites under laboratory conditions are needed to explore the diversity of bioactive compounds. These strategies include variations in media composition, pH, temperature, aeration, or shape of culturing flask; biotic elicitation by co-culture of different strains; abiotic elicitation by physical or chemical stresses; and epigenetic modulation by chemical epigenetic modifiers. These fungi are also known to produce antioxidants, food colors and enzymes. Some of the work done in pharmaceutical and food industries and its aspect of translation of endophytic fungi research into industrial applications will be discussed.

Ecological studies on oak Tasar Silk moth *Antheraea Spp.* (Lepidoptera: Saturniidae) in the Garhwal Region of state of Uttarakhand (India)

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Biographical Sketch-

Dr P. C. Joshi is the Head, Dept. of Zoology and Environmental sciences, Gurukul Kangari University, Haridwar. He has 27 years of research experience. He has published 88 research papers in national and international journals. He is the member of many academic bodies such as Indian Academy of Environmental Science (IAES), Zoological Society of India (ZSI), International Society for Conservation of Natural Resources (ISCON) etc. His area of specialization includes Insect Ecology and biodiversity, Forest Ecology, Environmental Conservation and Management, Monitoring of Air Pollutants.



ABSTRACT:

In the Garhwal region of Uttarakhand, a good number of families were dependent for their livelihood on rearing of oak tasar silk. However during last two decades a decline in wild cocoons of **Oak Tasar Silk Moth (*Antheraea Spp.*)** has been recorded. This has affected the families dependent on Seri-practices of the species found in those areas for their livelihood. During a survey of two years only 489 cocoons were recorded in the wild from both the districts, while only 56 adults were found in the area. Threats *viz.* habitat destruction, pest and predators like insects, birds and mammals were also reported. These animals are responsible for a decline in the population of the oak tasar worm as well as host plant of this worm. Forest fires and natural calamities are the two other important reasons, which are responsible for the loss of habitat of the oak tasar worm. The excess cutting of food plants as fodder and fuel from oak forests is also affecting the sericulture industry. It seems that changing climatic conditions in the area are also responsible for this decline. The declining population and diversity of Oak Tasar Silk Moth *Antheraea Spp.*, is adversely affecting the Oak-Tasar culture in Garhwal Himalaya of Uttarakhand. The oak Tasar silk worm, therefore, needs to be conserved for its economic potential in terms of supplementary livelihood option for a number of rural families, as also an important link in ecological cycle. The large scale dispersal of the adult moth emerging from preserved cocoon in core zone area through active involvement of the local communities *i.e.* Mahila Mangal Dal, Van Vikas Samithi, Van Sangrakshan Samiti etc., and NGOs which play a vital role in conserving the flora and insect fauna, can go a long way in conserving the silk worm species, helping the growth of silk industry, and providing alternative livelihood to people.

Plant eco-physiological aspects and Bio-productivity**A.R. Nautiyal, Ph. D**

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Dr A. R. Nautiyal is the Professor in the Department of Plant Physiology , Srinagar , H.N. B. Garhwal University. He is currently Director of High Altitude Plant Physiology Research Center (HAPRC), HNB University. He has more than 35 years of teaching and Research experience. His field of specialization includes Seed physiology and reproductive Biology of plants, Plant eco-physiological aspects and bio-productivity. He is the member of many scientific organizations such as Academic council- FRI, Dehradun, Forest Tree and Shrub Seed Committee of international seed testing Association, Zurich, Switzerland. He is the Chairman of Research Advisory Committee, CAP, Govt of Uttarakhand, Dehradun. He has published more than 100 Research papers in national and international Journals. He has supervised more than 25 Doctoral students.



ORAL PRESENTATIONS

Biotechnological and Cultural Interventions in Potato Farming for Increasing Farmers Income

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Because of many problems in conventional method of potato cultivation, it is necessary to develop a suitable method of propagation through biotechnology, which is a better alternative. In all potato growing regions the availability of high quality tuber has been the most demanding over the conventional clonal propagation that favors disease build-up, which drastically reduces crop yield. However, the recent advances in tissue culture and the flexibility of organ development in potato, allows alternate methods of propagation through *in vitro* techniques. In the absence of chemical control of viral disease, meristem tip culture is the only effective method available till date to eliminate virus infections from potato cultivars. This technology has ensured greater availability of diseases free seed for cultivation, which ultimately helps in boosting overall potato production in the country. In view of the above, a protocol have developed for sterilization of explants and found the suitable hormonal combination with MS medium for *in vitro* shoot regeneration, multiplication and rooting in potato. For shoot proliferation and rooting the sterilized explants were cultured on MS medium, supplemented with different hormonal combinations of NAA, GA₃, and Kinetin and the observations were recorded after 10, 20 and 30 days to observe the non-growing cultures, infected cultures, healthy cultures, length of stem and number of nodules on stem. The lower concentration of auxin with Gibberelic Acid was found best for the development of complete plantlets and for multiplication from meristem tips. Apart from biotechnological interventions in the laboratory the cultural interference in the field has been done through seed treatment by using various concentrations of thiourea, urea and potash mobilizing bacteria (KMB), and found the significant result on yield of potato crop, which may increase the income of farmers by potato cultivation.

Radiation Protection and Health Hazards

Binoo

Assistant Professor, Department of Radiology, UCBMSH, Dehradun

The hazards of radiation were realized soon after the discovery of x-rays. X-rays can cause skin burns, cataracts, cancer, leukemia and other harmful effects. The benefits derived from diagnostic applications of x-rays are enormous. So it is the job of radiologic technologist, radiologists and medical physicists to produce high quality x-ray images with minimal radiation exposure. This approach results in the greatest benefit with lowest risk to patients and radiation workers and the practice is known as ALARA – “as low as reasonable and achievable”. The annual average per capita total effective dose equivalent is 3.0 mSv. There are many effects of radiation on human body like deterministic effects of radiation, stochastic effects of radiation and effects of fetal irradiation. To reduce the effects of radiation, radiation exposure limits were introduced by the International Commission on Radiological Protection (ICRP), which was founded in 1928. In India the Atomic Energy Regulatory Board (AERB) is the competent authority which control over the use of radiations in medicine and industry. The aim of radiation protection should be to prevent deterministic effects and to limit the probability of stochastic effects. The whole radiation protection philosophy is based on justification, optimization, and dose limits. The ICRP introduced the concept of permissible dose and given the effective dose limits for whole body parts for both occupational and public.

Water Pollution and its Effects on Fish Faunal Diversity of River Yamuna at Mathura

Praveen Ojha

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Yamuna River supports a rich diversity of fishes of commercial value. The present paper deals with the pollution of Yamuna water and its impact on native fish fauna. Domestic pollutions, Industrial pollutions,

Agricultural pollutions and Sand mining are the main responsible source in declining the native fauna and making the favorable ground for invaders. A preliminary record shows that 48-fish species belonging to 13-families were recorded in Mathura waters so far. Species of the family Cyprinidae were most dominant followed by Bagaridae, Schilbeidae, Clupeidae, Ophiocephalidae. In the present study recorded 14 -Species belonging to 12 genera and 8 families, of which reported 4- species as Alien. This means the decline in fish fauna due to one of the many other reason i.e. aquatic pollution.

Environmental Sustainability: Concern & Solutions

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Environment is the sum total of all surroundings of living organism, including natural forces and other living things, which provide conditions for development and growth. On the other hand; organisms react to differences or changes in their environment in several characteristics ways, either by trying to avoid harmful situations or by being able to adjust physiologically, within their genetic limits to adverse factors. The main cause of environmental changes is ever increasing human population. During the 20th century, global human population has increased by 3.7 fold (to 6 billion people) and consumption of resources has increased 20 fold world over. In the past 50 years the world has experienced an unprecedented increase in population growth. The global human population is estimated to be 7.066 billion in 2012 by the United States Census Bureau (US Census Bureau 2013). According to the United Nations world populations reached 6 billion at the end of 1999. In just 12 years, another one billion people have been added to the Earth, with global population reaching 7 billion in October 2011. Demographers project that the global population will reach eight billion by 2030, and will likely be around 09 billion by 2050. It is expected that global population will be more than 10 billion by 2100 (UN 2011). Sustainability development means improving the quality of human life while living within the capacity of supporting ecosystems. It is possible only through rational use of resources and by checking environmental degradation. Many activities like biodiversity enhancement, afforestation, watershed management, water resource development technology, reclamation of wasteland; use of renewable resources of energy including biomass- based technologies, promotion of fisheries to compact water pollution and so on. Because sustainability has become one of the core global concepts keeping in view the fat of the earth ecosystem and the diversity of organisms that exhibit it.

Detection of Aflatoxin contamination in raw medicinal plants used for the preparation of Herbal Drug

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The quality of raw material used for the preparation of various combinations of Ayurvedic drugs must follow the international quality standard to meet the export target of medicinal herbs. However increasing demand will led the production of inferior quality of raw medicinal plant material and the ignorance of regulation will defame the Indian product in the overseas markets. The present study was designed to investigate the microbiological quality of locally sold raw medicinal plant which was supplied to different manufacturing firms for the preparation of various types of Ayurvedic drug formulation. Twenty samples (n=20) of raw medicinal plant were collected from local market are subjected to microbiological evaluation and found that most of the samples i.e. Total aerobic bacterial count and Total fungal count are not comply with the FDA regulation. The presence of aflatoxin in some sample was also suggesting the presence of infection of Aflatoxin producing fungi i.e. *A. flavus* and *A. parasiticus*. So, there is urgent need of making strategy to control the microorganism during preharvest and post harvest.

Mesoporous Silica Nanoparticles: Synthesis and Application- An Overview

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Research in mesoporous materials is in limelight since it has been developed an exciting work in chemical synthesis responsible for an enormous amount of exciting practical applications for the welfare of society. If we discuss about the synthesis of MSNs (Mesoporous Silica Nanoparticles) , they have been synthesized with multiple dimensions pore sizes, pore structure and morphologies and can be synthesized by multiple adjustments in synthesis conditions like pH change, using different surfactants or co-polymers, and with different concentrations and sources of silica. Various methods synthesis of MSNs is, growth quench approach, in which to quench the growth of MSNs ethyl acetate is used. Next one is separation of nucleation and growth, sol-gel method, Stober method which is used to synthesis monodispersed silica particles and many more. MSNs have a number of potential applications depending upon the nature of pore, size, shape and connectivity of MSNs. The biological application of mesoporous silica nanoparticles includes imaging and diagnostic agents. This means these can target cancer cells more efficiently and the process of the therapy is observed well by direct method of imaging of MSNs. Next are target specificity, dispersibility and capability to load and delivery of high concentration of different molecules into the affected cells. Other applications include bio-sensing and cell tracing, used in opto-electronic devices like optical fiber LED or solar cell covers and light guide films. CdS nanoparticle-capped MSNs used for delivery of drug molecule/neurotransmitters. In conclusion, we can say that MSNs can be synthesized by different methods according to their field of application. But still there is a need to focus on developing biodegradable templates and organic templates to minimize the number of synthetic procedures.

Screening of Lignin Degrading Bacteria as Bio Bleaching Agent

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Colored effluents released from various pharmaceutical, textile and other dye-based industries contain mixture of remnants of dyes, which may be hazardous to various life forms. Lignin-degrading enzymes are group of oxidoreductive enzymes having practical applications in bioremediation of polluted environment. Lignin degrading enzymes viz., Lignin Peroxidase (LiP), Manganese- dependent Lignin peroxidase (MnP) and Laccase. These are extracellular enzymes having potential ligninolytic activity and also serve in biobleaching of effluents containing complex aromatic dyes. So, the present study was aimed to isolate lignin degrading bacteria and screen their potential as biobleaching agents. Soil and effluent samples from various pharmaceuticals and textile industries were used to isolate lignin degrading bacteria. Seventy five isolates from aforesaid samples were screened for ligninolytic activity. Of all the isolates, four bacterial isolates namely *Bacillus subtilis*, *Pseudomonas sp.*, *Bacillus megaterium* and *Arthobacter sp.* were found to have a potential dye-degrading activity. Percentage decolorization of dye due to enzymatic activity of these isolates was found to be 91.66%, 80.2%, 90.62% and 94.79% respectively.

Extraction of Orange Oil by Steam Distillation methods and its spectral Studies.

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The orange peel which is considered as a waste can be used for the extraction of essential oil which has many applications from food flavoring agent. The oils normally bear the name of the plant species from which they were derived. Orange oil can be extracted by various conventional methods like steam distillation and also solvent extraction has been employed. The modern methods are costly and laborious.

The conventional methods though the yield percentage is less. Where the orange peels are preheated before subjecting to distillation. The preheating enhances the oil yield and the water distillate can be used as such for further applications. Orange peel oil is the major oil produced worldwide and is used extensively in the food industry, primarily as a flavoring agent. This extraction procedure can also be used for the extraction of aromatic oils from other sources such as leaves, flowers, stem as well.

The Use of Medicinal Plants in Controlling Internal and External Parasites in Animals

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Medicinal plants play a major role in the primary healthcare of animals. Different parts of plant such as leaves, roots, tubers and bark are used for the treatment of various parasitic diseases. Moreover, various medicines are prepared by mixing of plant's extracts with non-plant materials such as Epsom salts, flour, butter, potassium permanganate, rock salt and oil cakes. However, only few plants have been investigated for their use in controlling parasitic diseases so far. There is also a significant lack of research data and standard technical know-how in this field. Currently, commercial drugs are mostly used to control parasites but they are very expensive and out of the reach for many resource-poor farmers. Moreover, these drugs have adverse effects on the health of animal and could also pollute the environment. This has led farmers to restore the alternative measures that include the use of medicinal plants to treat and control livestock parasites. However, in-depth investigations should be performed to validate the effectiveness of the plants to provide cheap alternative ways of controlling parasitic diseases. This effort will support the pharmacological study of these plants and in the development of therapeutic drugs that have fewer side effects than synthetic chemicals. Some chemicals in plant extracts are well known and characterized as Azadirachtin, Citronella, Nicotine, Linolool, and Pyrethrius. They can be considered as natural active ingredients, and known as biopesticides. Other chemicals are more repellents than insecticidal. Asphodelaceas was the most frequently used plant family in South Africa. *Aloe ferox*, *Acokanthera oppositifolia* and *Elephantorrhiza elephantia* were the plants holding the highest reliability level for their use to control parasites. Some plants, viz. *Albuca setose*, *Acacia*, *Auricularformis*, *Acoruscalamus*, *Actaea*, *Spicata*, *Allium*, *Sativum*, *Annona squamosa*, *Azadirachta Indica*, *Butea monosperma*, *Calotropis procera*, *Chenopodium lbum*, *Tanacetum vulgare*, *Trachyspermum ammi* are used in different part of the world to control on parasites. However, information of the most of such plants and their use in making medicines is mostly limited to older generation and thereby fetching a great risk of losing this knowledge to extend to the new generations. Therefore, it is an urgent need to document vital information of these plant species to make them beneficial for next generation.

Climate Change: Opportunities and Challenges For Young Scientists In North-Western Himalayas

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Climate change is one of the rising concerns in this globalized era of 21st century. All the nations are working on their strategies to combat climate change. In India, hilly regions are more vulnerable to this and have shown "above average warming" in the 20th century. Most agriculture in these areas is of the subsistence type and depends on suitable weather for good yields. Here, climate change poses both challenges as well as opportunities to the young scientists serving in North western Himalayan regions of India. Shifting pattern of cultivation zones of horticultural crops, fluctuations in flowering time, susceptibility of current cultivars to abiotic and biotic stresses, emergence of new pests, advanced

cropping seasons are the major challenges causing yield losses. Young scientists could grab this as an opportunity and think of developing and implementing innovative and sustainable strategies to combat these challenges. Identifying new areas for cultivation, where, shifting patterns could be taken as opportunity for developing and testing cultivars for the regions where cultivation was not possible earlier. Advanced cropping seasons provide opportunity for developing cultivars for year around production. Breeding for new cultivars (especially as per chilling requirement) for biotic and abiotic stresses is a big challenge. Here, modern biotechnological aspects in mapping the genetic determinism of chilling could play important role. Effects of climate change along with the possible adaptation/ mitigation strategies in north-western Himalayan states have been discussed in this paper which could act as a boon to young scientists for planning their research programmes.

Local Knowledge in assessment of Resource Sustainability: A Case Study of Kyunja Gad Watershed, District Rudraprayag, Uttarakhand

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The data of local resource users and managers about the biophysical, socioeconomic, and cultural-historical elements of their immediate environment plays a significant role in determining the long-term sustainability of those assets. This paper reports on the result of case study of Kyunja Gad Watershed of the India Garhwal Himalaya. Specifically, this paper describes sustainability indicators which were enumerated by local people. These indicators may be reflective of local, indigenous knowledge about the environment and therefore may be significance in impact assessment and monitoring environment change. Results from the Kyunja Gad Watershed reveal a highly profoundly set of indicators which may be grouped as: forest cover indicators; forest linked indicators; forest management indicators; agriculture livelihood indicators; and socioeconomic indicators. Local people demonstrated a very precise knowledge of the state of biophysical resources of their village use areas. Specific indicators identified include: forest cover area (decreasing), forest tree density (decreasing), consistency of water flow (decreasing) and frequency of slides (increasing). These are all indicators which can be measured and verified independently of local knowledge. In this case study, people mentioned a number of socioeconomic factors as being important indicators of sustainability.

Impact assessment of ultraviolet-b (UV-B) Radiation on different crops cultivars of Gujarat

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Depletion of stratospheric ozone layer which result insignificant increase in UV-B radiation at the earth's surface. Plants use sunlight as primary energy sources, therefore the small increase in UV-B radiation is recognized as harmful for plants. Study demonstrates that effect of UV-B radiation on various physiological, morphological and biochemical characteristic of different crops cultivars of Gujarat. There are several visible and micro morphological effects of enhanced UV-B radiation was also observed including visible injury and stomatal characteristics. UV B radiation increases the leaf thickness and cause alteration in canopy morphology, which indirectly affects whole plant photosynthesis. Photosynthetic efficiency also reduces due to ROS (reactive oxygen species) generation which stimulate by UV-B radiation. Increasing ultraviolet radiation has become one of the most important issues affecting photosynthesis and ultimately reduces the yield of crop plants. Studies of UV exclusion have opened up a new area of research towards increasing agricultural yield by protecting plant from solar UV-B radiation. In the absence of UV radiation enhance the photosynthetic efficiency and enhanced rapid fixation of atmospheric carbon dioxide that can reduce global warming.

Effect of soil salinity and role of exogenous protectants on two cultivars of soybean (*Glycine max* L.)

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Soil salinity is one of the most commonly encountered environmental stresses affecting plant growth and crop productivity. Pots experiment was conducted to assess the effects of soil salinity and role of exogenous protectant on two cultivars of soybean (*Glycine max* L.). In both cultivars, the whole-plant growth and yield were significantly reduced by soil salinity. Exogenous protectant improves growth, physiology and yield of plant. We concluded that the effects of soil salinity in two cultivars are not bettered but exogenous protectant increased whole plant growth and yield. Therefore, application of exogenous protectant is promising approach for salt stress management in the era of climatic change and plays an important role in developing salt tolerance in various crop plants.

Studies on Relationship between Genetic Diversity and Heterosis in Cucumber (*Cucumis sativus* L.) under subtropical condition of Garhwal Himalaya

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A research trail was conducted to assess the magnitude of heterosis and its relation to parental divergence in the diallel cross material involving 7 parents and 42 F₁ hybrids at Horticultural Research Centre, Chauras Campus, Department of Horticulture, H.N.B. Garhwal University, Srinagar (Garhwal) Uttarakhand during 2015. The results of genetic divergence revealed that there is a wide genetic diversity among the 13 genotypes of cucumber. The genotypes were grouped into 3 clusters based on Mahalanobis D² statistics using Tocher's method. The clustering pattern of strains showed that among the 3 clusters, maximum numbers of genotypes were found in cluster I and II which comprises of 3 genotypes each. The intra cluster distance was highest in cluster II (56.338) and lowest in cluster I (44.411). Cluster III and I were markedly diverse from rest of the clusters, the divergence between these two clusters was high as they had maximum inter cluster (108.216) D² value. The character wise mean were calculated for all the genotypes, which spread over three clusters and rank was assigned based on individual score. Cluster III secured first rank which observed maximum mean value for 17 characters followed by clusters II, indicating presence of most promising genotypes in them. Among the 34 characters studied, the most important contributing trait towards divergence was weight of fruit (10.00%) which showed maximum contributor followed by days taken to opening of first female flower (8.00%). The crosses PB-Naveen x SPP-63, SPP-63 x New Manipur-1, New Manipur-2 x New Manipur-1, PB-Naveen x Swarna Purna and New Manipur-1 x Swarna Purna which were heterotic for 24 characters respectively, out of the above crosses the first three crosses belonged to DC₂ and remaining two crosses in DC₃ and DC₁. The cross involving New Manipur-1 and New Manipur-2 as one of the parent resulted maximum heterosis for most of the characters. The basic consideration in the selection of parents for a breeding programme is the diversity and performance of the parents in hybrid combinations. So, on the basis of performance, these two parents could be used for future breeding programme of cucumber improvement under the subtropical conditions of Garhwal Himalaya.

Protective role of natural and synthetic ascorbic acid on soybean (*Glycine max* L.) cultivars under ozone stress

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Phytoextracts are being widely used these days as a source of bioactive compounds for mitigating the harmful effects of abiotic stresses including ozone stress. The Present study was conducted to compare the effects of pure synthetic ascorbic acid (AsA) and orange juice (OJ) on soybean cultivars under ozone

stress conditions. Various levels of ascorbic acid (100 ppm AsA, 25% OJ) and control applied as same amount of water. The results showed that under ozone stress cultivars reduced growth, photosynthetic and non-photosynthetic pigments and leaf metabolites, while it increased membrane permeability. Foliar-applied pure ascorbic acid and 25% Orange Juice were found to be very effective in improving plant growth, membrane permeability, photosynthetic & non-photosynthetic pigments, proline, ascorbic acid, MDA, SOD, POD, amino acids, carbohydrate, Reducing sugar, total soluble sugar, protein content and yield. It was observed that 25% OJ was more effective than 100 ppm AsA in reducing the adverse effects of ozone stress on soybean cultivars. So, it was concluded that OJ, a cheaper source of ascorbic acid, can be used as a mitigating agent for improving ozone tolerance in plants under ozone-prone environments.

Economic Empowerment of Women through MGNREGA: A Case Study of Pokhra Block of, Pauri Garhwal, Uttarakhand

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Empowerment of women is the most essential and crucial strategy in achieving the goal of gender quality. In India, the role of women is substantial and crucial. The need for economic empowerment of women hardly needs explanation. In a developing nation like India the Government has launched a lot of programmes for the development of rural livelihood and empowerment of the women. A major initiative taken by the Government of India to raise the level of socio-economic status of the rural people under the Ministry of Rural Development is the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). The implementation of MGNREGA has been positively affecting the rural life as well as empowering the women of India in various aspects. The Pokhra Development Block has also been benefitted by this programme, especially by helping to economically empower the women of the area. In this background, the focus of this paper is to find out the impact of MGNREGA on the economic empowerment of the women of Pokhra Block, Pauri Garhwal district, Uttarakhand.

Microalgal exploitation for Carbon Sequestration: A Sustainable approach towards climate change

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The increasing world population, improving quality of life is creating pressure on conventional energy resources and has caused intensive greenhouse gases emission responsible for global warming resulting in climate change. The perpetuating trend in carbon dioxide, one of the major greenhouse gas, has become a matter of concern worldwide. In order to address this issue worldwide, various protocols such as Kyoto Protocol, Paris agreement have been implemented globally. A range of physical, chemical and biological routes have also been applied to reduce or capture these emissions. Among these alternatives, the use of aquatic microalgae is considered to be very attractive and environmentally benign process for mitigation of CO₂ and is gaining attention worldwide. These sunlight-driven tiny green factories are beneficial due to their simple growing requirements, their potentially much higher productivities than aquatic plants or higher terrestrial plants, their ability to directly use fossil CO₂, their soaring nutrient contents, less multifarious structure, extremely rapid growth rates (1-3 doublings per day) and their use of resources such as brackish, saline, wastewaters etc. They are the most promising potential option for CO₂ capture and storage and can also be used for various other products like fertilizers and pharmaceuticals, biofuel production, electricity production. The present study exemplifies important relative mechanisms in the microalgal biofixation of carbon dioxide, novel photobioreactor cultivation systems as well as the outlook and limitations of microalgal cultivation in advance development. Thus, microalgae can be considered as a sustainable alternative to this elevating problem of climate change.

Effect of Different concentration of IBA on shooting and rooting of stem cutting of Karonda (*Carisa carandas L.*) Cv. Pant Manohar under mist condition

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The present investigation entitled Effect of Different Concentration of IBA on Shooting and Rooting of Stem Cutting of Karonda (*Carisa carandas L.*) Cv. Pant Manohar Under Mist Condition was carried out at the Horticultural Research Centre, Department of Horticulture, Chauras Campus, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand, India during the month from March 2016 to June 2016. The experiment was laid out in a Randomized Block Design with ten treatments and three replications. For uniform planting of cutting in each treatment, 10 cuttings were planted in each replication with accommodating 30 cuttings of a single treatment. Thus, there were 900 cuttings in the experimental field. The stem cuttings of Karonda (*Carisa carandas L.*) Cv. Pant Manohar were treated with IBA solution of different concentration *i.e.*, 4000 ppm, 5000 ppm, 6000 ppm, 7000 ppm, 8000 ppm, 9000 ppm, 10000 ppm, 11000 ppm, 12000 ppm and control by quick dip method. Among all the treatments, maximum percentage of sprouted cuttings (4.67%), minimum percentage of unsprouted cuttings (5.33%), maximum length of sprout per cutting (8.67cm), maximum average diameter of sprouts per cutting (3.0cm), maximum average number of sprout (2.33), maximum average number of leaves (9.33), maximum percentage of rooted cutting (40.67), average number of primary roots (11.67), average number of secondary roots (33.33), average length of root per cutting (8.97cm), diameter of root per cutting (2.33cm), fresh weight of roots per cutting (1.13g), dry weight of roots (0.71g) was noticed in 8000 ppm concentration IBA.

Effect of Different Organic Manures and Bio-fertilizers on Growth, Yield and Quality of Onion (*Allium cepa L.*) Cv. Pusa Red under Garhwal Himalaya Condition

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A research trial was conducted at Horticultural Research Centre, Chauras Campus, Department of Horticulture, H.N.B Garhwal University, Srinagar Garhwal, Uttarakhand, during *rabi* season 2014-15 to estimate the effect of various organic manures and bio-fertilizer on Growth, Yield and Quality parameters of onion Cv. Pusa Red. The entire experiment was carried out in three replications with the randomized block design. In this experiment work, the obtained data showed that the combined uses of organic manures with bio-fertilizers is more effective compression to single of any organic manure and bio-fertilizers. The results were very diverse, the different combinations showed their superiority in various parameters like, T₆ (CM+VAM) for fresh weight of roots and dry weight of roots, T₇ (CM+MOC) for number of leaves at harvest, T₉ (CM+FYM) for bulb diameter (cm), fresh weight of bulb (g), yield/plot (kg) and dry weight of bulb (g), T₁₆ (CM+VAM+MOC) for plant height at 30 days after transplanting and leaf diameter, T₁₇ (VAM+MOC+NC) found best for number of roots/ plant, plant height and number of leaves at 60 days after transplanting, 90 days after transplanting and plant height at the harvest, T₁₈ (MOC+NC+FYM) for fresh weight of leaves, T₁₉ (NC+FYM+CM) for neck diameter, number of scales/ bulbs and T₁₇ (VAM+MOC+NC) found best for plant height at harvesting and number of roots/plant organic manures and bio-fertilizer, T₂₁ (CM+VAM+MOC+NC+FYM) for dry weight of leaves, while for the quality parameters *viz.*, total soluble solids (⁰Brix), ascorbic acid (mg/100g) and total soluble sugar T₂₀ (CM+VAM+MOC+NC) gives the best results over all other treatments. The results showed that the combined use of organic and bio-fertilizer significantly effective on quality yield production of onion in Garhwal regions of Uttarakhand.

Assessment of water springs along NH58 in hilly region of Uttarakhand as halting point for travelers.

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Water springs can be considered as the lifeline of people particularly in the hilly region where they are the only source of water for drinking and irrigation use. Interestingly, some of the springs along the highways have emerged as ideal resting point to passerbys and thus generating employment to the local people. In the present investigation some of the water springs along NH58 have been studied for various geographical features as well as surveyed for the resting potential and employment generation.

Cross talk between Nrf2 and NF-kB as prime strategy to develop potent anti-inflammatory agents

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Perturbation of cellular redox status is known to induce an imperative immunoregulatory transcription factor, Nrf-2. Activation of Nrf2 induces the expression of its downstream genes including HO-1, which has potent anti-inflammatory activity. The present study was aimed to investigate the effect of oxidative stress, by using a prooxidant, on immune responses and delineate the underlying mechanism. Prooxidants including 1,4-naphthoquinone (NQ) inhibited mitogen induced proliferation of lymphocytes. NQ also inhibited mitogen (Concanavalin A) induced cytokine secretion by murine T cells and lipopolysaccharide induced release of cytokines, nitric oxide and cyclooxygenase-2 expression by macrophages. NQ induced perturbation in cellular redox and only thiol containing antioxidants were able to abrogate the anti-inflammatory effects. NQ induced modulation in redox status led to the activation of Nrf-2 pathway and inhibition of NF-kB. Interestingly, NQ induced glutathionylation of KEAP-1 protein, KEAP-1 mediated degradation of IKK β and a concurrent inhibition of NF-kB. Further, inhibitors of Nrf-2 and HO-1 ameliorated the anti-inflammatory effects of NQ. T cells isolated from spleen of NQ administered mice also showed hyporesponsiveness to mitogenic stimulation. These results highlighted the potential of redox modifiers as a potent repository of anti-inflammatory agents. Also, the results highlighted the cross talk between Nrf2 and NF-kB pathway as potent target for developing novel anti-inflammatory agent.

Efficient use of nitrogen fertilizer for yield, uptake and efficiency of potato varieties under tarai region of Uttarakhand

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Potato is highly responsive to nitrogen nutrition and it is usually the most limiting essential nutrient for activity of potato growth and development. Improved nitrogen fertilizer management will reduce the risk of NO₃ leaching and N₂O emissions during the growing season and will also reduce residual soil nitrate at harvest. In humid environments, where significant NO₃ leaching and N₂O emissions occur either before or after the crop growth period, reduced residual soil nitrate is an important factor in limiting environmental nitrogen losses. In order to know the marketable yield and nitrogen use efficiency of potato, five nitrogen levels and two potato varieties were replicated thrice in the experiment at Vegetable Research Station, GBPUAT Pantnagar. It was observed from the study that variety Kufri Surya performs better than Kufri Sadabahar in relation to marketable yield, nitrogen uptake, nitrogen use efficiency and nitrogen apparent recovery. Maximum marketable yield (43.87 t/ha), nitrogen content in tuber (1.17 %) and total nitrogen uptake (193.94 kg/ha) were recorded with application of 150 kg N/ha (N₂), while nitrogen use efficiency (141.60 kg tuber/kg N) and nitrogen apparent recovery (67 %) were observed maximum with application of 75 kg N/ha (N₁). Interaction effect of variety Kufri Surya and 150 kg N/ha

(V₂N₂) gave maximum marketable tuber yield (45.75 t/ha) and total nitrogen uptake (199.05 kg/ha) among all treatments. The maximum nitrogen use efficiency was recorded (152.80 kg tuber/kg N) with treatment combination V₂N₁. It can be concluded that the variety Kufri Surya with application of 150 kg/ha nitrogen was best among all other treatments for potato production.

Effect of Head Manipulation Techniques and Planting Distance on Seed Yield parameters in Cabbage (*Brassica oleracea* var. *capitata* L.)

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An experiment was carried out during late *Kharif* of 2014 and late *Rabi* of 2015 at the experimental farm of Department of Vegetable Science and Seed Testing Laboratory of Department of Seed Science and Technology, V.C.S.G. Uttarakhand University of Horticulture and Forestry, Ranichauri Campus, Tehri-Garhwal with Golden Acre cultivar of cabbage. The field experiment was laid out in Factorial Randomized Block Design with four replications. The factors comprised of combination of three head manipulation techniques *viz.*, stump method (T1), stump with central core intact method (T2) and head intact method (T3) and four planting distance *viz.*, 60x60 cm (S1), 60x45 cm (S2), 45x40 cm (S3) and 40x30 cm (S4). Observations recorded for field parameters were days to 50 per cent flowering (DAT), days to seed maturity (DAT), number of primary branches per plant, number of siliqua per primary branch, number of siliqua per plant, number of seeds per siliqua, seed yield per plant (g) and seed yield per hectare (q). Among the different head manipulation techniques, stump method (T1) exhibited earliest flowering (92.75 DAT) and seed maturity (140.56 DAT), maximum number of primary branches per plant (47.12), siliqua per primary branch and per plant (65.81 and 3121.00, respectively), seed yield per plant and per hectare (20.21 g and 9.01q, respectively). Among planting distance, 40x30 cm was found promising for days to 50 per cent flowering (102.0 DAT), seed maturity (154.0 DAT) and seed yield per hectare (9.99q). The interaction effect also revealed that higher seed yield per plant was observed in combination of stump method along with 60x60 cm (23.03 g) while maximum seed yield per hectare was obtained with stump method along with 40x30 cm (10.50 q). Therefore, stump method in combination with planting distance of 40x30 cm can be recommended for commercial seed production of cabbage in mid-hills of Uttarakhand.

Quantitative estimation of some secondary metabolites and enzymatic antioxidant potential of *Reinwardtia indica*

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Reinwardtia indica commonly known as yellow flax, is a low shrub of family Linaceae locally known as pyoli or basnati in the Garhwal region of Uttarakhand. The plant is well known for its ethanobotanical uses by the locals in the cure of various ailments like paralysis, backache, headache, boils and pimples. But well scientific study has not done on this plant so far. Therefore, the current study focuses on the phytochemical composition and antioxidant activity of the plant. The phytochemical screening, quantitative analysis of important secondary metabolites and enzymatic antioxidant activity was carried out on the leaf extract of the plant. Preliminary phytochemical screening revealed the presence of tannins, flavanoids, steroids, terpenoids, alkaloids, saponins and reducing sugars in different extracts. The quantitative analysis of the plant extract showed that the plant possessed high amount of alkaloids that is 11.81 g per 100 g of plant extract as compared to the other phytoconstituents. Quantification of flavanoids showed that it was present in amount 7.25g/100g while lipids were found in least quantity that is 3.2g/100g. The protein concentration in the sample was calculated using the BSA standard curve was found to be 5.8 mg/ml of *Reinwardtia indica* While, the enzymatic antioxidant activity was performed for

Catalase, Ascorbate peroxidase, Glutathione transferase, glutathione reductase, and polyphenol oxidase. Catalase, glutathione transferase and polyphenol oxidase showed the significant antioxidant potential.

Bacterial community structure analysis of a hot spring soil by Next Generation Sequencing of 16S ribosomal RNA gene

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In the present study the whole bacterial community structure of Tapovan hot spring soil located in the state of Uttarakhand, India was analyzed through Next generation sequencing. The hot spring soil is slightly alkaline in nature with abundance of sulphur. The spring soil was rich in various metallic and non-metallic elements required for bacterial survival. The community was found to comprise of 14 bacterial phyla with representation of members belonging to Firmicutes, Proteobacteria, Thermi, Bacteroidetes, Aquificae, Actinobacteria, chloroflexi, TM7, Fusobacteria etc.

Variation in Carbon Stock Inventory Along Elevational Transect in Garhwal Himalaya

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Forests are the natural storehouse of biomass and carbon, hence for accurate estimation of carbon sink accumulated in the forests a precise mapping of forest biomass is required. Various environmental factors e.g., temperature, precipitation, atmospheric pressure, solar and UV radiation etc. changed systematically along altitudes. The higher altitudes of Bhagirathi Catchment Area are extensively occupied by mature and old growth tree species like brown Oak (*Quercus semecarpifolia*), Silver fir (*Abies pindrow* and *A. spectabilis*), Himalayan blue pine (*Pinus wallichiana*) and Himalayan Cedar (*Cedrus deodara*) which constitute the structure of the forests dominantly. The north-facing slopes are relatively cooler as they receive less sunlight, while the south-facing slopes are considered as warmer and drier due to higher insolation (longer exposure) period during the day and forms better growing conditions on the northern aspects than on the southern aspects. The carbon stock values in this study were ranged from 85.22 ± 6.46 Mg C ha⁻¹ to 234.32 ± 51.56 Mg C ha⁻¹. The old growth forest stands have reflected high amount of biomass production and carbon stock. Such species with high carbon accumulation potential will be helpful in reducing the concentration of carbon in atmosphere and should be used for afforestation purpose. The proper management of terrestrial carbon (C) is required either by creating new sinks or by preserving the existing ones in relation to climate change mitigation.

Nutritional potential of some wild edible fruits of Garhwal Himalaya

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Wild edible fruiting plants sustain numerous organic phytochemicals and significantly contribute to the nutritional security of mankind that has been linked to the promotion of good health. However, the detailed analysis of health promoting organic compounds and nutritive minerals present in these fruits were explored very little in the Himalayan region. In the present investigation, nutritional potential of some wild edible fruits of the plant species like *Benthamidia capitata* Willd. ex Roxb., *Coriaria nepalensis* Willd., *Myrica esculenta* Buch-Ham. ex D Don, *Pyracantha crenulata* D. don. and *Ziziphus mauritiana* Lam. were evaluated by determining proximate nutrient and mineral analysis. This study indicated that highest total carbohydrate (80.71g/100g) was recorded in *P. crenulata* and lowest (76.86g/100g) in *Z. mauritiana*, however total sugar (37.48g/100g), reducing sugar (5.36g/100g) and energy value (365.78 Cal/100g) were recorded maximum in *M. esculenta*. The value of total fat was found maximum in *Z. mauritiana* (2.4g/100g) and lowest in (0.54g/100g) in *P. crenulata*. Contrary to this the minerals

composition in all fruits varied greatly and maximum nitrogen value (1.67%) was found in *C. nepalensis*, whereas minimum (0.99%) in *M. esculenta*. The Phosphorous was recorded highest (49.41%) in *B. capitata* and lowest (30.55%) in *C. nepalensis*. However, the Calcium was found greater (75.11mg/100g) in *Z. mauritiana* while lower (50.59mg/100g) in *M. esculenta* fruit. The study revealed that these wild fruits exhibited high nutritional composition therefore, could be used as supplementary diet in mountain region and should be promoted to conserve and enhance their genetic diversity.

Evaluation of Allelopathic potential of *Lantana camara* L. on germination and seedling growth of Soybean (*Glycin max* L.)

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Allelopathy has been considered not only as an environmentally friendly approach for weed control but also a potential reason causing autotoxicity in crop production. An investigation was conducted to assess the allelopathic potential of weed, *Lantana camara* L. family verbenaceae, on seed germination and seedling growth of the crop *Glycine max* (soybean). The allelopathic potential of aqueous and ethanolic extracts of two parts leaf and root of *Lantana camara* was evaluated. For this, aqueous and ethanolic extracts of 2.5%, 5%, 7.5%, and 10% were prepared from Fresh Leaves (FL), Dry Leaves (DL), Fresh roots (FR), Dry roots (DR). The experiment was conducted in sterilized petridishes at temperature 25°C. The effect of different concentration was compared to distilled water (control). Six germination indices viz, Percent germination (%G), Speed of germination (SG), Mean Germination Time (MGT), Mean Daily Germination (MDG), Germination Index (GI), and Seedling Vigour Index (SVI) were worked out. It was found that both leaf and root extracts of *Lantana camara* caused a general phytotoxic effect on seed germination and seedling growth of *Glycin max*. The inhibitory effect was pronounced at higher concentrations, whereas a little stimulatory effect was seen at lower concentrations in some cases. The inhibitory effect was more pronounced in root and lateral root development of the seedling than the seed germination and shoot development of the receptor crop. Thus, the overall result indicated that the allelopathic activity of *Lantana camara* depended on whether the extract was derived from the leaf or root parts of plant. The maximum allelopathic effect occurred with leaf extracts. The result demonstrates that the aqueous and ethanolic extracts of *Lantana camara* have allelopathic potential and should be evaluated as a allelopathic species, presenting a risk or advantage to seed germination and seedling growth of crop.

Plant growth enhancing efficacy of ACC deaminase producing rhizobacteria through lowering of ethylene level

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Plant health and productivity are rooted in the soil, and the quality of soil depends on the diversity and viability of biota. Various microorganisms found in healthy soils that either directly or indirectly improves plant growth. ACC deaminase containing soil bacteria decreases a significant portion of the physiological damage of plants caused by environmental stresses. Thus the present study was conducted to screen 1-aminocyclopropane-1-carboxylate (ACC) deaminase producing rhizobacteria indigenous to soils of leguminous plants. Screening of ACC deaminase producing rhizobacteria with ACC as a sole source of Nitrogen has been done by comparison of colony diameter between experimental and control. The enzyme catalysing this reaction, ACC deaminase, hydrolyses ACC to α -ketobutyrate and ammonia. On the basis of ability of ACC utilization, isolates were characterized as strong strains. It was observed that 14 strains have exhibited better growth on plates with NH_4Cl and ACC. Hence these strains were found positive to ACC deaminase activity assay. ACC deaminase activity was also estimated, and RhStrE3MS, RhStr96, RhStr13 and RhStr85B strains exhibited 2.031mmol h^{-1} , 0.930mmol h^{-1} , 0.432mmol h^{-1} , 0.889mmol h^{-1} activity respectively. The morphological and biochemical characterization of all

the 14 isolates were performed on the basis of colony morphology, Gram's staining, and catalase test. In view of molecular characterization of these isolates DNA was isolated and amplified by using 16SrRNA primers. The obtained amplified products are of 1.2 Kbp. The amplified products were sent for sequencing for further analysis.

A Study On Diversity Of Medicinal Trees In Karwapani Forest Area Of Doon Valley

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The present study deals with the diversity of medicinal trees at Karwapani forest area which is situated in the Dehradun district of Uttarakhand. Based on the extensive survey 49 species of trees belonging to 22 families were found. The trees were identified with the help of available literature and local people. The families such as Fabaceae, Moraceae, Combretaceae were represented by higher number of species. The trees are extensively used by local inhabitants for various health ailments such as stomachache, fever, cold and cough, bleeding wounds, rheumatic pains and insect bite.

Diversity of Aquatic Macrophytes And Water Birds Of River Asan, Dehradun

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Rivers are complex flowing water systems of draining specific land surfaces which are defined as river basins or watersheds. The characteristics of the river, or rivers, within the total basin system are related to a number of features. Macrophytes are considered as important component of the aquatic ecosystem not only as food source for aquatic invertebrates, but also act as an efficient accumulator of heavy metals. They can be used as bio-indicators of watershed health because they respond to water nutrients at a community level regarding species diversity, structure and cover density. Water birds are one of the key attributes of biodiversity of many wetlands and water bird counts form one of several elements which are used to identify important wetlands. During the present study (02 sampling stations) of river Asan, a total 08 species of aquatic macrophytes were recorded. These macrophytic species were categorized as free floating macrophytes, submerged macrophytes and emergent macrophytes. Free floating macrophytes recorded during the study period were *Lemna minor*. The submerged macrophytes constitutes *Hydrilla verticillata*, *Najas flexilis*, *Egeria densa*, *Vallisneria americana*, *Eldoea sps*, *Chara vulgaris* and *Ranunculus longirostris*. Whereas, emergent macrophytes were not recorded. Majority of the plant species collected during the survey are indicators of eutrophic conditions. During the present study, a total 14 species of water birds were also recorded. Order Anseriformes (05 sp) is the most dominant order followed by Pelecaniformes (04 sp) and Suliformes (02 sps). Most dominant winter migratory birds that dotted the watershed of Asan Barrage include Ruddy Shelduck (*Tadorna ferruginea*) followed by Common Coot (*Fulica atra*), Common Pochards (*Aythya ferina*), and Tufted Pochards (*Aythya fuligula* L.) The Ruddy Shelduck is the most dominant winter visitor of Asan Barrage. Birds like Northern Shoveler (*Anas clypeata*) were seen in small number at Asan barrage wetland during the study period. Little Egrets (*Egretta garzetta*) was found to have been prodigal abundance in winter season in Asan Barrage.

Floral Biology of Monocot Families In A Swamp Forest, Dehradun, Uttarakhand

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Present work emphasize on enumeration of floral diversity of reported eight families of monocotyledons. A total 49 species of monocots belonging to 40 genera, 8 different families, 13 sub families and 20 tribes were found from study site. Poaceae and Cyperaceae are the dominating monocot families with important species like *Oplismenus compositus*, *Cynodon dactylon*, *Bambusa tulda*, *Cyperus rotundas*, *Cyperus distans* and *Kyllinga nemoralis*. Poaceae observed as dominant family and is represented by 27 species

while sedge family is the second dominant monocot family within study area. From each family, flower of one species examined for its floral biology and diagrammed as representative member of the family in laboratory.

Morpho-Physiological variations between Medicinal Plant Populations with respect to variation in Active Constituents

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Variation in medicinal plants is often noticed at chemical level which is due to the synthesis and accumulation of a wide variety of active constituents that are often plant-specific. The active ingredients produced by plants are controlled by the various physiological (metabolic) processes. Biosynthesis begins with photosynthesis. Living plants are solar-powered biochemical and biosynthetic laboratory which manufactures both primary and secondary metabolites from air, water, minerals and sunlight. These organic compounds are the starting point for all other biosynthetic pathways. Most natural products are compounds derived from primary metabolites such as amino acids, carbohydrates and fatty acids and are generally categorized as secondary metabolites. The secondary metabolites such as alkaloids, glycosides, flavonoids, volatile oils etc. are biosynthetically derived from primary metabolites via shikimic acid pathway or mevalonic acid pathway etc. The carbon skeleton of all the compounds is derived from carbohydrates synthesized by photosynthesis. The synthesis of secondary compounds is costly to the plants because it requires continuous flow of precursors from primary metabolism to drive their biosynthetic pathways. Therefore it may be assumed that there may exist a relationship between variation in a/i content with that in morpho-physiological traits. The populations varying in a/i content may also differ in morpho-physiological attributes. There are several studies regarding population variations with respect to change in genetic structure, morphology, active ingredients and physiology etc. but scanty information is available on population variation in a/i content in association with morpho-physiological attributes of the plants. The connecting link between active constituent formation and physiological processes in plants is still to be explored. If there exist a relationship then it may be possible to select the elite population on the basis of morpho-physiological traits which could be used as a marker for superior genotype with respect to a/i content. It is possible that population with higher active constituent content also perform well at morpho-physiological level. Therefore, the hypothesis could be useful in deriving relationship between morpho-physiological traits and a/i content which could make possible the development of non-destructive method to select the elite population on the basis of morphological and/or physiological traits, which could be used as a marker for superior genotype with respect to a/i content.

Isolation and identification of common Respiratory Tract Pathogens form clinical sample

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Air play dual role i.e. vital for health as well as create diseased condition. Most airborne diseases are caused by bacteria involving the respiratory system. Other airborne bacteria can cause skin diseases. Air contains a mixture of natural or artificial particles of biological like microbial, plant or animal origin. The present study was carried out to isolate and identify on the bases of biochemical characterization of common bacteria causing respiratory tract infections among patients attending from August, 2014 to January, 2015, total 150 patient's sputum samples were collected and tested for bacterial infection of the respiratory tract. The samples were collected from OPD, Base Hospital Srikot, Srinagar (Garhwal). The bacterial pathogens were isolated and identified by culturing on selective media and through specific biochemical tests. The results exhibited total thirty two (32) bacterial strains were isolated from one hundred fifty (150) collected sputum samples. *Staphylococcus aureus*, (16.3%), *Klebsiella pneumoniae*

(20.9%), *Pseudomonas aeruginosa* (7.1%), *Streptococcus pneumoniae* (25.6%) has the highest percentage of occurrence followed by *Streptococcus pyogenes* (4.7%) respectively. The highest percentage of pathogens isolated from age range 20 to 39 years. All the isolated pathogens showed sensitivity against the broad spectrum antibiotic erythromycin.

Isolation of *Rhizobium* from root nodules of *Pisum sativum* and its use as biofertilizer

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Biofertilizers are substances which contain living microorganisms which when applied to a soil promotes the growth by increasing the supply or availability of primary nutrients to the host plant. Biofertilizers are usually prepared as a carrier based inoculants containing effective microorganism which would show a good relationship with the host plant. This makes it easy to handle with wide range of acceptance by the host. Rhizobia are a special type of bacteria which live in root nodules in Symbiotic association and fix atmospheric free nitrogen and make it available to the plants. In this study *Rhizobium* is isolated and cultured from the root nodules of *Pisum sativum* (pea plant) in a selective media i.e. YEMA (Yeast Extract Mannitol Agar medium with Congo Red). The isolate was found with poor absorption of Congo red and appeared as whitish gummy colony which was biochemically tested. The isolated strain was then mixed with carrier and applied on pea. Uninoculated soil was used as control. The growth of plants was observed at regular time intervals. The growth parameters observed were germination of seed, shoot initiation, root initiation, root length and shoot length. The seed started to germinate by day 2. After 20 days the plant with the biofertilizer showed a shoot length of 11.5cm and root length of 18cm while control showed 7cm and 9cm respectively. This report showed that application of isolated Rhizobial strain enhanced the growth of plant. The isolated strain can be used as biofertilizer.

Evaluation and estimation of antioxidants in Broccoli, Parsley, Red cabbage (Kraut) and Lettuce in various solvents such as acetone, methanol, ethanol and water

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Broccoli, Parsley, Broccoli, Red cabbage (Kraut) and Lettuce are recognized as a “super-food” because of the numerous healthy effects exerted by its high content of bioactive compounds such as glucosinolates, sulforaphanes, polyphenols, ascorbic acid, and minerals. In the present study, the antioxidant activity was studied using various solvents (acetone, ethanol, methanol, 30% water, 100% water) as extraction medium. The Parsley had the significantly higher ($p < 0.05$) antioxidant levels than Broccoli, lettuce and Red kraut. High antioxidant levels in acetone as solvent medium could be contributed to the significantly high phenolics and flavonoid levels in the Parsley ($p < 0.05$). The α -amylase activity was found to be higher in parsley in methanol extracts. Thus, the present study concludes that significantly higher flavonoid, phenolics and antioxidant are present in organic solvents (ethanol, acetone), making it a better extraction media than the aqueous medias (30% water, 100% water).

Sustainable Agroforestry Systems: An adaptation to climate change and biodiversity conservation

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Sustainable Agroforestry Systems (SAS) is crucial to maximize the productivity of land and farm income. It has great contribution to increase the farm income due to improved and sustained productivity. Hence, SAS is an initiative to feed the increasing population of the globe, particularly developing countries. SAS, creates the jobs, rural being development, enhances the livelihoods and food security of the millions. To foster the SAS for the sustainability of land and nature conservation, for instance, India is a first country to adopt agroforestry policy in 2014. It provides various ecosystem services, soil and water conservation

and reduces the pressure on forest resources resulting in the biodiversity and nature conservation. Hence, this system is an adaptation to climate change and sustainable biodiversity conservation.

Speciation of *Muscodor* based on ITS phylogeny and secondary structure prediction

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Muscodor genus comprised of predominantly sterile, volatile organic compounds producing endophytic fungi which is being explored as a bio-fumigant, bio-preservative and as producer of volatile antibiotics. Novel species of this genus have been predominantly identified using ITS sequences. However, the hyper-variability of ITS sequences possess difficulty in creating reproducible alignments and stable phylogenetic trees. Conserved structural data of the ITS rRNA appears as an auxiliary information for accurate speciation of fungi. In the present study, secondary structural data of ITS1, 5.8S and ITS2 region of all *Muscodor* species was generated using LocaRNA web server. The predicted secondary structural data displayed greater variability in ITS1 region in comparison to ITS2. The structural data of all sequences exhibited characteristic conserved features of eukaryotic rRNA. Evolutionary conserved motifs were found among all 5.8S and ITS2 sequences. Further, the groupings of *Muscodor* species based on secondary structure of ITS1 region also clubbed them geographically. Profile neighbor joining tree based on combined sequence-structural information of ITS region was generated in ProfDist. PNJ tree resolved into four major groups whereby *M. fengyangensis* and *M. albus* species formed monophyletic clades. However, three *M. albus* species along with other *Muscodor* species emerged as sister branches to the existing clades, thereby, improving the precision of phylogenetic analysis for identification of novel member species of *Muscodor* genus. Hence, the results indicated that structural analysis along with primary sequence information can provide new insights for precise identification of *Muscodor* species.

Role of Fungi in the Biodeterioration of Historical Monuments of Doon Valley

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Fungi are one of the most important biodeteriogens that grow on old building of historical and religious importance and damage a lot. During this study biodeterioration caused by fungi on the historical monument of Doon Valley was conducted on two monuments of Virbhadr Temple of Rishikesh and Kalsi monument. The study was conducted in various seasons i.e. rainy, winter and summer. A total number of thirty-three fungi were isolated in Virbhadr Temple and twenty-nine in Kalsi Monument. Maximum numbers of fungi were isolated during rainy season in both the monuments. Mainly genera of Zygomycetes and Deuteromycetes have isolated in which *Aspergillus*, *Fusarium*, *Rhizopus* and *Penicillium* are more common. The chemical secreted by fungi helpful in biodeterioration are also studied.

Algal Diversity in the Fresh water Streams of Dehradun

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Algae are widely present in the fresh water environments such as lakes, rivers, ponds, etc. They have a major importance in the fresh water environment both in terms of fundamental ecology and in relation to human use of natural resources. Present paper deals algal diversity of Sahastradhara, Maldevta and Robbers Cave. Overall 15 genera were reported. It was found that members of Chlorophyceae were dominant and represented by 8 genera (53.3%). The genus *Spirogyra* was recorded from all the three localities. Members of *Cyanophyceae* were reported by 4 genera (26.6%). Classes *Bacillariophyceae* and

Rhodophyceae were poor in assemblage and represented by 1 genus for each class (6.6%). Algae are important primary producers in both fresh water and marine systems. In many water streams they generate biomass which is the foundation of diverse food chains. Although algae have beneficial impacts on aquatic ecosystems, they can also have adverse effects.

Seed Quality Enhancement through Seed Coating and Pelleting

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Seed is a basic and most important input for agriculture. There are several attributes of seed quality such as physical and genetic purity, high germination, high vigour and viability, optimum moisture content and free from insect-pest and diseases, which can be done through seed coating, seed pelleting and seed priming. In seed coating, single seed is coated with inert material to increase the size of seed to facilitate the planting. Seed pelleting is the process of enclosing a seed with small quantity of inert materials just large enough to produce globular unit of standard size to provide small nutrient to young seedling. Several types of pelleting techniques such as inoculants, protective, herbicide, nutrient, hydrophilic and oxygen supplier used to enhance seed quality parameters. Film coating is the deposition of thin uniform layer of polymer over seed without significant increment in size to forms a flexible film which protect the dusting off and loss of fungicide during handling. The successful crop production depends upon the high germination and seedling growth, which can be ensured by seed enhancement techniques such as coating and pelleting. These treatments provide micro environment of each seed which supplies not only micro and macro nutrients, but also protects the crop from pests and disease from the earlier stages due to inclusion of pesticides. So, seed enhancement technique is an important process to improve seed germination and better seedling establishment under normal and stress conditions.

Survey on House Sparrow Population Decline in Doon Valley, Uttarakhand

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The Sparrow is most lovable, small and harmless social bird. According to the latest sparrow census reported by various environmental organizations, there has been 80 percent decline in their numbers during the past decades in India. It is a warning signal to all, that population of house sparrow decline shows the health of the environment and its ecological balance. The present study deals with survey on house sparrow population, in two different habitats urban and rural area in Doon valley. During the study time, in the urban and rural area the average and standard deviation valuation of total house sparrow population was observed 137.7 ± 18.6 and 168.87 ± 5.111 respectively. The abundance population of house sparrows was found in rural area was due to abundant food supply (cereal grains), greenery and relatively quiet and unpolluted environment. Whereas urban area house sparrow population was declining may be due to loss of nesting sites owing to high-intensity urban development i.e. an increase in the building density and a reduction in the amount of wastelands, other feeding habitats, criss-cross cable wires around houses and mobile towers electromagnetic radiations. Rural area helps to conserve house sparrow population because of its suitable environmental conditions

Community composition, Regeneration status and Utilization pattern of Woody species in Dandachali forest of Tehri Forest Division, North-West Himalaya

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Studies on forest vegetation pertaining to diversity, composition, structural pattern, natural regeneration status and economic importance of plant communities are prerequisite in view of conservation and

sustainable utilization of bio-resources. The present investigation was conducted in Dandachali forest of Tehri Forest Division, North-Western part of Himalaya. Surveys and sampling of the vegetation were done using standard ecological assessment methods with an aim to study plant species composition and natural regeneration status at community level. Besides, utilization pattern of the species was assessed through interviews and interactions with local people of nearby villages. Forty seven woody species (26 trees; 21 shrubs) belonging to 25 families and 33 genera, and 6 forest communities viz., *Pinus roxburghii-Quercus leucotrichophora* mixed, *Pinus roxburghii*, *Pinus roxburghii- Rhododendron arboreum* mixed, *Cedrus deodara- Pinus wallichiana* mixed, *Cedrus deodara- Rhododendron arboreum* mixed and *Rhododendron arboreum- Quercus leucotrichophora* mixed, have been recorded in 16 sites between 1482- 2200 m asl. Among the communities, total tree density ranged from 263.34-1493.33 Ind ha⁻¹, TBA 260.2- 310.7 m² ha⁻¹ and total shrub density 488.3- 4250 Ind ha⁻¹. All the communities showed optimum regeneration of dominant species. Total seedlings density ranged from 280-2470.0 Ind ha⁻¹ and saplings density 140-446.7 Ind ha⁻¹. *R. arboreum* – *C. deodara* showed maximum regeneration in terms of higher seedling and sapling density in this community. Species diversity (H') for trees ranged from 0.58-1.89, saplings 0.65-2.10, seedlings 0.15-2.24 and shrubs 1.09-2.10. Concentration of dominance (cd) of trees ranged from 0.20-0.76, saplings 0.14-0.54, seedlings 0.13-0.93 and shrubs 0.15-0.43. Soil moisture per cent ranged from 15.14-27.44%, pH 6.3- 6.6, organic carbon from 1.09- 1.39%, nitrogen from 937.43 - 1202.49 kg/ha, phosphorus from 16.43- 31.36 kg/ha and potassium from 238.5- 351.00 kg/ha. Utilization pattern showed that all the recorded species have high economic importance for the local inhabitants. 23 species were used commonly for medicine, 22 as wild edible, 17 for fuel, 23 for fodder etc. Among all the species, leaves (33 spp.) were most usable parts of the species. Maximum medicinal plant and fodder species were found in *C. deodara- Rhododendron arboreum* mixed and edible species in *Pinus roxburghii* community. Considerable number (32 species) of Himalayan native and endemic (endemic: 01 & near endemic: 09) species were recorded from the area showing its conservation value. Maximum native (n=23) and near endemic species (n=7) were found in *C. deodara- R. arboreum* mixed community. In a nutshell, the study provides information on floristic inventory, compositional and structural diversity at community level, regeneration status, indigenous uses and diversity of native and endemic species for the very first time in the selected area. Based on the results, it can be concluded that the area has high potential in terms of high number of native, endemic and economically important species. Results of the present study can be used for development of conservation management and micro planning of this areas and thus, socio-economic development of the inhabitants in particular and biodiversity of the Himalaya, in general.

Direction interaction of prooxidants with immunoregulatory transcription factors: Mechanism of anti-inflammatory effects

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Chronic inflammation is a central cause of multiple disorders including arthritis, cancer etc. Cellular redox status plays a decisive role in onset and severity of inflammation by modulating redox dependent immunoregulatory transcription factors that are key regulators of inflammation. Multiple strategies have been adopted to investigate novel mechanisms for developing anti-inflammatory agents. Employing prooxidants to modulate cellular redox status and thereby regulating immune responses has been embroiled as prime strategy. Thus, the present study was undertaken to identify the mechanism of prooxidant mediated regulation of immunoregulatory transcription factors based on in silico docking. Based on earlier findings, 1,4 naphthoquinone (NQ) and plumbagin (PG) showed promising anti-inflammatory effects by activating Nrf2 and suppressing NF-κB, NFAT pathways. Interestingly, we observed that NQ and PG binds to the KEAP1 binding domain on Nrf2 thereby abrogating the KEAP mediated inhibition of Nrf2. The binding of NQ and PG in the pocket also permits the formation of bond

with cysteine residues to render strong interaction. Interestingly, NQ was also able to bind with NFAT and p65 subunit of NF- κ B to confer inhibition. Thus, activation of Nrf2 and suppressing NF- κ B, NFAT transcription factors by direct interaction may be the underlining mechanism of prooxidant mediated inhibition of inflammatory responses.

Natural Product as Source of Potential Leads for Drug Discovery

Versha Parcha

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Plants containing pharmacologically active constituents have been used by man since the dawn of History. Earliest mention is found in Rigveda and Yajurveda-2000 BC, Atharvaveda-1600-1000B, Charak Samhita-900BC, Sushruta Samhita-600BC. Plant drugs offer cure for many diseases which do not find lasting remedies in modern medicine. If used judiciously, drugs of plant origin have better compatibility with human system as the compounds occurring in plants already have biological functions and may have more biologically relevant chemistry to human system, hence lesser side effects. Remarkable diversity in chemical structures and biological activities of the naturally occurring secondary metabolites which make them important in many ways: Direct use as therapeutic agents, Utility as biochemical and molecular probes and Utility as prototype lead compounds for the development of new synthetic or semi synthetic drugs. The initial step in the discovery of a new drug is the lead identification. Few examples Synthetic Δ^9 -tetrahydrocannabinol (originally derived from *Cannabis sativa* L) and some analogues (e.g. nabilone) for treatment of nausea associated with cancer chemotherapy. Currently approved drugs e.g. artemisinin from *Artemisia annua*, ellagic acid, β – carotenes, vitamin E as anti mutagenic and cancer preventing,. In addition to biologically active plant derived secondary metabolites, many other bioactive compounds have proven useful as “Leads” or templates for drug synthesis or semi-synthesis e.g Belladonna alkaloids, atropine, physostigmine, quinine, cocaine, gramine, codeine, morphine, papavarine and salicylic acid, Design & synthesis of anti-cholinergics, anti-malarial and anti-cholinesterases, synthetic analogs of Khellin, a furanochromine derived from the fruits of *Ammi visnaga* as bronchodilator led to the preparation and development of disodium chromoglycate, a major drug as bronchodilator with anti-allergic property. Eribulin is a natural product derived tubulin inhibitor that is now in Phase III clinical trials for breast cancer is derived from Halochondrin B isolated from the sponge *Halichondria okadai* also Actinonin a natural product derived from the actinomycete *Streptomyces* .It has antibiotic properties against *S. aureus*, *Klebsiella pneumoniae*, and other strains of bacteria .It was believed to inhibit the RNA biosynthesis. Chen *et al.* discovered that actinonin is a potent peptide deformylase inhibitor. Peptide deformylase occurs exclusively in prokaryotes but not in mammalian cells. Later, more Actinonin analogues were synthesized and screened and finally, LBM-415 emerged as the most promising compound. Pfizer, in collaboration with Novartis & Vicuron is currently testing the compound in Phase I clinical trials. LBM-415 could be the first compound of the novel class of deformylase inhibitors. The World Bank estimate world trade in medicinal plants and related products \cong \$ 5 trillion by 2050 A.D. Global Herbal market including Nutraceuticals \cong \$ 70.4 Billion with an average growth rate of about 12% a year. However, exclusive herbal drug market is estimated to be around \$ 25 Billion. Worldwide phytopharmaceuticals market is growing @ 12%. Novel biologically active natural products will continue to serve as lead compounds for drug development and is biochemical probes for the discovery of pharmacological and biochemical process by combining the strengths of the knowledge base of traditional systems such as ayurveda with the dramatic power of combinatorial chemistry.

Suitability of labeling methods using ^{32}P radiotracer for plant pest interaction studies: An innovative approach in agriculture research

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Nuclear scientists and technologists are unlocking the secrets of many agricultural problems, which could not have been possible with conventional methods. Our current research is based on a similar innovative technique to determine the suitability of labeling the host plant (rapeseed mustard) for susceptibility against its potential hemipteran pest (mustard aphid). Two labeling methods viz. Hydroponic culture technique and Injection technique were used using ^{32}P radiotracer. Four doses of radiotracer namely 5 microcurie (μCi), 10 μCi , 15 μCi and 20 μCi were used for the given study. Variation of radiotracer uptake was observed in the given two labeling methods. No major difference in percentage distribution of ^{32}P in stem and leaves was observed in hydroponic culture technique while in injection technique a higher percentage distribution of ^{32}P was found in stems in both the varieties. The hydroponic culture method of labeling the host plant was found better for uptake & distribution studies, as more of the activity was transferred in stem and leaves (preferred site of insect infestation) and there was no wastage of activity.

POSTER PRESENTATIONS

Altitudinal Variation in anti oxidant activity of different extracts of *Coleus forskohlii* from Uttarakhand

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Coleus forskohlii (pashanbehd) is an important medicinal plant, indigenous to India. Roots of the plant are widely used by tribes in the different areas of Uttarakhand for the treatment of various ailments. The plant has wide growth range of altitude from 600-2300. Keeping in mind both, its wide growth range and medicinal value; in the present study we investigated the effect of change of altitude on its antioxidant potential. For this, the plant samples were collected from three different locations of Uttarakhand viz. Srinagar (580 amsl), Rudraprayag (895 amsl) and Gopeshwar (1300 amsl). The powdered plant roots were extracted with five different solvents viz. Petroleum ether, Chloroform, acetone, methanol and aqueous. All the extracts were tested for radical scavenging activity by DPPH, and superoxide scavenging activity etc. A significant increase in the IC₅₀ values were observed among all the extracts with the increase in altitude viz. IC₅₀ value of petroleum ether of Srinagar 78.77 mg/ml (50% inhibition) while same for that from gopeshwar was 56.59 mg/ml (50% inhibition). This may be an adaptive strategy towards the harsh conditions and high UV radiation exposure at the higher altitude.

Antioxidant effect of Mineral Pitch (Shilajit) on human erythrocytes

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Long-established systems of traditional medicines have evolved from systematic recordings of human experience over several millennia. Mineral Pitch has been reported to have anti-inflammatory, anti-tumor, anti-stress, immunomodulatory properties, hemopoietic and rejuvenating effect. The present study was undertaken to evaluate the antioxidant and free radicals scavenging activities of mineral pitch on RBC *in-vitro*. We studied the effect of Mineral Pitch on oxidative/antioxidative status (MDA, GSH) and anti oxidative enzymes (CAT, SOD) of erythrocytes. Our study shows that Mineral Pitch at a concentration of 0.001-1 µg/ml showed a dose dependent increase in FRAP. A decrease in lipid per-oxidation (MDA content) and increase in antioxidant status (GSH level) of erythrocyte was observed at concentration of (0.001-1 µg/ml) as compared to normal. A dose dependent decrease in SOD and CAT activity was also observed, probably due to decrease in per oxidant levels of RBC mediated by antioxidant property of Mineral Pitch. Incubation of RBCs with higher concentration of Mineral Pitch (10µg/ml) showed adverse effect on erythrocytes in all the parameters studied. From our study, we can conclude that the Mineral Pitch can act as a potential antioxidant and protect the erythrocytes from oxidative damage by either directly scavenging the oxidant radical or activating other processes. This property of Mineral Pitch may be due to the presence of various antioxidant compounds in Mineral Pitch. But its indiscriminate use especially at higher concentrations should be avoided as Mineral Pitch at higher concentration itself can cause generation of free radicals. Further studies are needed to elucidate its mechanism of action and its cytotoxic properties.

Assessment of antimicrobial activities by using plant secondary metabolites

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Plants are rich in a wide variety of secondary metabolites such as tannins, terpenoids, alkaloids and flavonoids etc. which have been shown antimicrobial properties. Currently medicinal plants in therapeutic use have made great contributions and acceptable all over the world. Several plants have therapeutic and

pharmaceutical effects, for antimicrobial, antioxidant, anti-infectious and anti-tumor activities. In the current work three plants such as *Hibiscus rosa sinensis* (an ornamental plant), *Datura stramonium* and *Acacia nilotica* (are wild plants) were selected. Results shown that the petroleum ether extract of *Hibiscus* contains moderate amount of carbohydrate, alkaloids, saponins and higher amount of tannins. Further, we observed that the petroleum ether extract of hibiscus shows the clear zone of inhibition (17mm) against *pseudomonas aeruginosa*, acetone extract against *staphylococcus aureus* (zone of inhibition ,15 mm), methane extract against *E. coli* (zone of inhibition, 18mm), *Pseudomonas aeruginosa* (15 mm) and against *Klebsiella pneumonia* (11 mm). For *Datura*, we observed that the petroleum ether extract contains a reasonable amount of carbohydrate, alkaloids, saponins, terpenoids and steroids. Next it was also extracted using methanol, which contains moderate amounts of saponins. Methane extract of *Datura* shows zone of inhibition against *E.coli* (18 mm) and *S. aureus* (14 mm) and Acetone extract of *Datura* shows zone of against *Klebsella pneumonia* (19 mm) and *E. coli* (15 mm), petroleum ether extract shows zone of inhibition against *P. aeruginosa* (15 mm). Acetone extract of *Acacia nilotica* plant show zone of inhibition against *Pseudomonas aeruginosa* (15 mm), methane extract show zone of inhibition against *Staphalococcus aureus* (12 mm), *Klebsiella pneumonia* (11mm), Petroleum ether extract show zone of inhibition against *Klebsiella pneumonia* (13 mm). *Accacia nilotica* extract of petroleum ether contains carbohydrate, alkaloids & saponins. Methanol extract contain moderate amounts of saponins. By observing the above results of three different extracts by three different plants we found that these plants extracts have potential antimicrobial capabilities against the pathogenic organism. For deeper observation there is a need for further study.

Usage of Manganese Oxide Waste in Manufacturing Building Products

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The use of manganese oxide in the development of cement results in the saving of energy and reduction in carbon dioxide and sulphur dioxide emissions. Other factors prompting use of manganese oxide waste are the dwindling resources steadily increasing volume of manganese oxide waste and the ecological and environmental problems associated with quarrying and exploitation of cement raw materials. The uses of manganese oxide waste material and untreated micro fillers in the development of building products have received maximum attention over the last decade. In the manufacturing manganese oxide waste due to their pozzolanic nature, partial replacement of cement (in concrete) by manganese oxide waste is very beneficial in terms of mechanical and durability characteristics of concrete. Lime stone dust poses disposal and environmental problems and has been suggested as a Portland cement. The present study is about the usage of manganese oxide waste because manganese oxide is present in fly ash waste material when manganese oxide is reacted with sulphuric acid to form manganese sulphate solution. The aqueous solution is extracted leaving behind the cake which is non hazardous in nature. The usage of manganese oxide waste has been done in the manufacturing building products. The usage of manganese oxide waste in the manufacturing building products like flooring tiles, bricks, blocks and partial replacement of cement have been highlighted in this study.

Effect of Aloe Vera on Antioxidant status in Human Erythrocytes.

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Treatment based on natural products is rapidly increasing worldwide due to the affordability and fewer side effect of such treatment. Indian folk medicine is replete with drugs purported to have anti-oxidative properties. Aloe Vera, a succulent species, has been shown to possess antioxidant and free radical scavenging activities. The present study was undertaken to evaluate the potential of Aloe Vera extract as

free radical's scavengers in RBC *in-vitro*. In the present study Aloe Vera extract (3-30,000 µg/ml) dose dependently showed H₂O₂ decomposing activity and inhibition of hydroxylation properties. Further our study showed that *in-vitro*, treatment of RBCs with Aloe Vera extract (30-300 µg/ml) protects RBC from oxidative damage as evident from a dose dependent decrease in Osmotic fragility and MDA and an increase in GSH levels of erythrocytes. At a higher concentration Aloe Vera extract increased the oxidative stress as evident from increased MDA and decreased GSH levels of erythrocytes. A decrease in SOD and catalase activity was observed at concentration of 30-300 µg/ml extract, probably due to decrease in per oxidant levels of RBC, whereas at higher concentration resulted in an increase in both SOD and CAT activity, which suggest that it showed effective protective mechanism against free radicals. From the above findings our study suggests that, optimum concentration of Aloe Vera possess potent anti-oxidative property and protect erythrocytes from oxidative damage by either scavenging the free radicals directly, or activating other process, but at higher concentration, induces oxidative stress and may be cytotoxic and its indiscriminate use, especially at higher concentration should be avoided. Further study is needed to elucidate its mechanism of action and its cytotoxic properties.

Antimicrobial effects of leaf extracts from *Oxalis corymbosa* against pathogenic bacterial and fungal isolates

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Various medicinal plants are known to possess repertoire of bioactive compounds having antimicrobial, anti-inflammatory, anti-cancer and antioxidant activity. One such well known medicinal plant family-Oxalidaceae from India has the versatile tendency to show encompass potential of multitude bioactive ingredients. Much more emphasis has been given to *Oxalis Corniculata*. Along with this there are other species in the genus which may serve as a source of various bioactive metabolites. *Oxalis Corymbosa*, is an important medicinal plant. The present study was done to explore the potent inhibitory activity of the leaf extract against various bacterial and pathogenic isolates. This specie has the maximum antibacterial activity with maximum inhibition in acetone and ethyl acetate extract. Along with this, phytochemical analysis provides detail of the probable presence of phytochemical constituents in leaf extract. These observations and findings highlights the prospective of leaf extract of the specie against pathogenic fungi and bacteria. Further studies are warranted to pave the path of exploring the synergistic effects with antibiotics as treatment modality.

Sodium Fluoride induced toxicity in Testes albino mice and its reversal by ascorbic acid

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Increasing in Fertility has become a serious issue, Sodium Fluoride is wide spread natural pollutant and large number of the world population is exposed to high doses of fluoride. So it is of special concern to investigate the role of the vitamin-C on effect of sodium fluoride on male reproduction. Male albino mice were treated with 20mg/1body weight of sodium fluoride for 30 & 60 days. After stipulated period testes was isolated and histological work was done. Many changes were observed in the testes of the treated mice like severe degenerative changes in seminiferous tubules, reduced spermatozoa, and necrotic changes in spermatids. The administration of ascorbic acid to NaF-treated mice revealed marked recovery from fluoride toxicity. Histological changes of testes show that fluoride toxicity is reversible and transient with ameliorative effects of ascorbic acid.

Optimization of Medium for efficient pollen germination of Pepper

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In the present study efficiency of pollen germination of pepper in different media was optimized. To check the viability of pollen in short span of time, in vitro pollen germination becomes necessary. There are different stains like acetocarmine, iodoacetate etc which have been reported to check the viability, but they are not reliable as sometimes dead pollen takes the stain too. So in this regard, three liquid media - NLN, MS and boric acid were used. Mature buds ready to open were collected and crushed in vials containing 1 ml media with the help of micropipette. Debris was removed by sieving through 40µm mesh. The filtrate was transferred to petriplates and 10 ml fresh media was added to petriplates. Plates were shifted to incubator shaker at 25°C and 120 rpm under dark conditions. Plates were visualized under compound microscope after every one hour for any pollen germination. Boric acid media containing 0.1 M boric acid and 20% sucrose was found to be best as swelling and small protrusions from pollen was observed after one hour of incubation under shaking conditions. After 2-3 h, well germinated pollen tubes were observed. While in NLN and MS media, germination was poor and delayed too much. This is an efficient method to determine pollen viability in shortest span of time, especially when flowering season is going on and we need to cross our best cultivars with healthy pollen in limited time period.

KAP (Knowledge, Awareness and Practice) towards Bio-Medical waste among the nursing professionals in Haldwani

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Everyday relatively large amount of potentially infectious and hazardous waste are generated in hospitals/health care facilities around the world. Nursing, a profession within the health care sector focuses on attending maintaining and improving the health and quality of life. The study was done to assess the knowledge, awareness and practice about BMW (Bio-Medical Waste) among the nurses of different institutions. The methodology adopted was the use of semi-structured questionnaire on Bio-Medical Waste management. It was found that though the professionals had good knowledge of segregation of waste but still rigorous training programme is needed for the nursing professionals.

Waste Management

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Waste management has become an issue of growing global concern as urban populations continue to increase and consumption patterns change. The health and environmental implications associated with garbage disposal are mounting in urgency, particularly in developing countries. However, the growth of the solid-waste market, increasing resource scarcity and the availability of new technologies are offering opportunities for turning waste into a resource. Firms decisions over how to manage waste impact on their profitability; where the benefits outweigh the costs; firms can reduce their overall costs and improve productivity by reducing the use of expensive raw material. Costs can be reduced by optimizing the management of waste which arise. Recycling is the process of converting waste products into new products to prevent energy usage and consumption of fresh raw materials. Recycling is the third component of Reduce, Reuse and Recycle waste hierarchy. The idea behind recycling is to reduce energy usage, reduce volume of landfills, reduce air and water pollution, reduce greenhouse gas

emissions and preserve natural resources for future use. Composting is a easy and natural bio-degradation process that takes organic wastes i.e. remains of plants and garden and kitchen waste and turns into nutrient rich food for your plants. Composting, normally used for organic farming, occurs by allowing organic materials to sit in one place for months until microbes decompose it. Composting is one of the best method of waste disposal as it can turn unsafe organic products into safe compost. On the other side, it is slow process and takes lot of space.

Antioxidant property of *Withania somnifera* (Ashwagandha) in human erythrocytes

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Traditional medicine has been gaining increasing importance over the past decades due to their increased use as a source for the preparation of herbal drugs. *Withania somnifera* has many antioxidant compounds including (Somniferine, Somnine, Withanaine, Somniferinine, Withanolides etc.) which are known antioxidants. The present study was undertaken to evaluate the antioxidant effect of *Withania somnifera*. Antioxidant and free radicals scavenging activities in extract of *Withania somnifera* on RBC was studied *in-vitro*. Our study shows that aqueous-alcoholic extract of *Withania somnifera* (1-1000 µg/ml) shows dose dependent effect on decomposition of H₂O₂ and inhibition of hydroxylation (OH). Furthermore, *Withania somnifera* extract (1-1000µg/ml) dose dependently protects RBCs from oxidative damage as evident from a decrease in osmotic fragility. A dose dependent decrease in MDA and increase in GSH level of erythrocyte was also observed up to a concentration of 1000µg/ml. A decrease in SOD and catalase activity was also observed. At higher concentration of *Withania somnifera* extract (10000µg/ml) the oxidative status of RBCs increased as evident from increased MDA and decreased GSH level of erythrocytes. Both SOD and catalase activity also showed an increasing trend which suggests that it shows effective protective mechanism. From our study we can conclude that the *Withania somnifera* extract upto a concentration of 1000 µg/ml act as a potential antioxidant and protect the erythrocytes from oxidative damage by either directly scavenging the free radical or activating other enzymatic processes. This property of *Withania somnifera* may be due to its antioxidant features. At higher concentration *Withania somnifera* itself seems to induce oxidative stress and may be cytotoxic and its indiscriminate use especially at higher concentrations should be avoided.

Quantitative characterization of IAA production and enhancement of *in vitro* growth of medicinal plants Co-cultured with PGPR

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Micropropagated plants usually show high mortality rate when transferred to the field that depends upon various biotic and abiotic factors and weak root system in the absence of rhizospheric microflora. *In vitro* co-culturing of *in vitro* grown shoots of medicinal plants with the plant growth promoting rhizobacteria isolated from the indigenous rhizospheric soil samples was investigated. *In vitro* biotization in plant tissue culture was devised that helps in screening of positive plant- microbe interaction under *in vitro* conditions which can be suitably be used under the field condition for plant growth promotion. Rhizospheric isolates of fluorescent *Pseudomonas* and *Azotobacter* isolated from soils of different high altitude regions of Uttarakhand showed a significant production of IAA. The strains of both the *Azotobacter* and *Pseudomonas* showed the tryptophan dependent synthesis of IAA. Among the selected strains (Azo6, Azo7, PS-1, PS-2, PS-4) time course study of IAA revealed that PS-4 produced maximum IAA i.e. 17µg/ml after 96 hours, while the minimum production was found to be 7.2 µg/ml by PS-2 after 96 hours in LB broth. The maximum IAA production in the basal MS medium supplemented 200µM L-tryptophan was found with *Azotobacter* Azo 6 after 96 hrs (5.1µg/ml). A significant plant growth promotion which not only increased the multiplication rate at low auxin concentration but also made them more hardy and

vigorous when compared to non-inoculated plantlets was observed. Azo 6 gave the best multiplication and length of shoots i.e. 2.44cm shoot length and 21.51 shoots/clump on MS supplemented with 0.25 mg/L BAP as compared to the other concentrations as well as control. The co-culturing of PGPRs in the present study not only reduced the use of commercial plant growth hormones, but at the same time resulted in 7-8 fold shoot multiplication and pronounced degree of vigour in the plantlets.

Optimization of protocol for conducting GC-MS studies on callus of *Podophyllum hexandrum* Royle

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Callus induction in *Podophyllum hexandrum* Royle was attempted and the preparation of callus extract for conducting GC-MS studies was optimized. In this study it was observed that callus initiated from juvenile and meristematic region of nodal segments and from basal portion and whole of leaves (part that covers node) though entire lamina remained intact. In *P. hexandrum* the whole leaf tissue has shown embryogenic response as it is the zone of meristematic cells. Of the various concentrations of 2,4-D tried, 2.0 mg/L was found to be the best for induction that had resulted in 65% callus development with a maximum fresh weight of 40 mg (0.1% significance level). Of all the combinations the best response was observed in MS medium fortified with 2,4-D (2.0mg/L) and 0.2 mg/L GA₃ with a maximum average response of 73% and a maximum flesh weight of 49 mg with a creamish white texture. For initiation of callus darkness was preferred over illumination. 2.0mg/L 2, 4-D gave the maximum embryogenic response of 39% with fresh callus weight of 95 mg. Best embryogenic response of 76% was observed in the combination of 2.0 mg/L 2,4-D with 2.0 mg/L BAP. The obtained callus was subjected to the preparation of extracts for further analysis. The callus refluxed in methanol and partitioned using chloroform was analyzed by GC-MS. The result showed the presence of ten known compounds including long chain hydrocarbons (Ocetadecane, n- Eicosane, 17- pentatriacontene, Phenol, 2,4-di-tert-butyl, Docosane, Glycerol behenate and Glyceryl behenate) and organic acids (Oleic acids and Palmitic acids).

In vitro Rapid Mass Multiplication of F1 Hybrid of Eucalyptus FRI-6 (*E. tereticornis* x *E. grandis*) Through New Approach: Tissue Culture Technique

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Micropropagation technique was developed for 20-25 years old f1 hybrid of Eucalyptus FR1-6, an economically important hybrid for paper and pharmaceuticals industries. This hybrid combines the high adaptability and drought tolerance of *E. tereticornis* with excellent stem form and technological qualities of the wood of *E. grandis* which would be of obvious economic value for extended cultivation in intermediary zones (hybrid habitats) where *E. grandis* itself cannot be grown. This hybrid has show 3-5 times more volume of food as compared to parental combination. Axillary buds were collected from mature F1 hybrid of Eucalyptus FR1-6 and surface sterilization with 0.1% mercuric chloride solution for 20 minutes followed by 3-5 times washing with sterilized distilled water. Maximum bud break response was obtained on MS medium supplemented with 35 sucrose and cytokinin -6 benzyl amino purine (BAP). In vitro multiple shoots were obtained on MS medium supplemented with cytokinin 6-benzyl amino purine (BAP) and 3% sucrose. These in-vitro multiplied shoots were elongated on basal (hormone free) MS medium. *in vitro* shoots were rooted on half MS medium containing auxin indole-3-butyric acid (IBA). The plantlets were transferred to the field after hardening and acclimatization.

Effect of season on clonal propagation of interspecific F1 hybrid of *Eucalyptus*

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The present investigation, explants collected during the month of July-Sept were the best for *in vitro* studies for micropropagation. The axillary buds were surface sterilized with 0.1% Mercuric chloride solution for 10-15 minutes, followed by 0.1% Bavistin treatment for 1 minute and subsequently washed 3-4 times with sterilized distilled water. These surface sterilized axillary buds were cultured on MS medium supplemented with cytokinin and auxin (BAP + NAA). Axillary bud break was achieved in MS medium supplemented with 1.5mg/l BAP + 0.1mg/l NAA proved to be the best hormonal combination for induction of axillary bud which resulted in the development of 1-3 axillary shoots. The axillary bud proliferation was influenced by the cytokinin and auxin concentration in the MS medium.

Microbial synthesis of Nanoparticles

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Nanoscience and nanotechnology has attracted a great interest over the last few years due to its potential impact on many scientific areas such as energy, medicine, pharmaceutical industries, electronics, and space industries. Nanoparticles—particles having one or more dimensions of the order of 100 nm or less—(NPs) show unique and considerably changed chemical, physical, and biological properties compared to bulk of the same chemical composition. The development of eco-friendly technologies in material synthesis is of considerable importance to expand their biological applications. One of the options to achieve this objective is to use natural processes such as use of enzymes, microbial enzymes, vitamins, polysaccharides, biodegradable polymers, microorganisms, and biological systems for synthesis of NPs. One approach that shows immense potential is based on the biosynthesis of NPs using microorganisms. Microorganisms are considered as a potential biofactory for the synthesis of NPs like gold, silver, platinum, palladium, titanium, titanium dioxide, magnetite, cadmium sulphide, and so forth. The poster will focus on the gold and silver nanoparticles obtained from the microbes and their applications in the various scientific fields along with the current state and future prospects of the above mentioned bio-based technique.

In vivo study on effect of organic manure spray over potato plant growth

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Artificially made fertilizers though enhancing the production level in crops slowly is turning into toxic resulting in degrading the soil fertility. It has set an alarming situation for farmers and other sectors in the field of agriculture. Agriculture now is been directed towards natural fertilizers which can maintain the soil fertility and get rid of chemical fertilizers. Natural products as fertilizers play a major role in sustainable development of agriculture. It promotes the biodiversity enhancing the biological activities supporting the biological cycles. Panchagavya, an organic starting solution prepared by fermenting cow dung and cow urine contains natural NPK fertilizer. The carbon sources present in the manure enhances the growth of microorganisms which on application on the plants enhances their growth. It also helps to establish useful microorganisms in soil whose activity will continuously generate nutrients needed by plants. Panchagavya was applied on growing potato. Different concentrations of the organic solution (3%, 5% & 7%) were sprayed instead of chemical fertilizer at 15 days interval. 5% concentration solution of organic manure – Panchagavya provided a better yield than the other two concentrations.

Environmental stress and Morphological variations of Anopheline Mosquitoes

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Insect are cold-blooded and therefore all metabolic process and entire vital cycle depends on the environmental temperature. Humidity and rainfall also act as a limiting factor in distribution and longevity. Nature of vegetation such as thick vegetation, moderate vegetation, and thin vegetation also influenced the morphological variations among selected species of Anopheline mosquitoes. Morphological variations have also been found to differ as per nature of habitat *i.e.*, industrial, riverine and plain area. Effects of certain environmental factors such as seasons, kinds of habitat and vegetation have been studied on the morphological variations among the following species *viz.* *An. fluviatilis*, *An. culicifacies* and *An. aconitus* from the selected localities. It was noticed that the maximum variation have been recorded in summer season then monsoon and post monsoon season. In winter season less variation have been recorded. On the basis of above statement it can be conclusively mentioned here that before taking up studies to prevent endemics of vector borne disease, it is a must to study the faunal composition of mosquitoes along with detail of their biological studies including breeding habitat, feeding contact with man, resting behaviour and relative abundance.

Effects of Climate Change on Flora and Fauna

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Climate change is the global threat for the existence of all the living beings on the planet. Pollution caused due to over population and industrial revolution has led to the increase of CO₂, which is the major cause of global warming. Human encroachment and deforestation has led to habitat and biodiversity loss. Industries and development activities, and construction of dams without detail surveying with regard to the effect that will bring on the ecosystem and the organisms living on that particular region leading to extinction and endangerment of many species. Advantages of using renewable resources and effective counter measures that can be undertaken to decrease the effect of pollution are discussed. Innovative adaptation mechanisms needs to be initiated to mitigate the impact climate change on biodiversity.

Toxic effect of mahua oil cake on protein profile of *clarias batrachus* (cat fish)

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Clarias batrachus is the largest genus in the old world cat fish family clariidae. It is a species widely utilise in aqua culture, has appeared in the aquarium fish trade, and has been the subject of numerous studies on its biochemistry, behaviour, culture, toxicology among others. Commonly known as “magur” has declined drastically from natural habitat in India during the last decade. The health of fish can be affected by environmental factors (stress), nutrition as well as pathogens. This study is on process to evaluate the biochemical changes and the effect of toxicants *i.e* mahua oil cake (used in Garhwal region as piscicide and as fertilizer in agricultural practices). The fishes are to be treated with mahua oil cake to evaluate the lethal and sub lethal concentration of toxicant.

Extension of Suitable Farm Technologies for Mitigating the Adverse Effect of Climate Change: A Case from Garhwal Himalayan Region

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A considerable change in climate on a global scale will impact agriculture as a whole; consequently affect the world's food supply. Climate change is not necessarily harmful; the problems arise from extreme events that are difficult to predict. More erratic rainfall patterns and unpredictable high temperature spells consequently reduce crop productivity. Latitudinal and altitudinal shifts in ecological and agro-economic zones, land degradation, extreme geophysical events and reduced water availability, make it difficult to cultivate the traditional crops in Garhwal Himalayan region. Unless measures are undertaken to mitigate the effects of climate change, food security in developing countries will be under threat and jeopardize the future of the traditional crops. Technology transfer playing a significant role in the global response to the challenges of climate change. The government shall take all practicable steps to promote, facilitate and finance the transfer or access of appropriate, environmentally sound technologies and know-how to the farmers. Therefore, this paper highlights technological and institutional innovations required to meet these challenges, the constraints to their development, transfer and dissemination and importantly suggests ways to overcome such constraints. Although there are no panaceas or silver bullets, the solutions are certainly not beyond our grasp. Indeed, policy recommendations on technology transfer to facilitate climate change adaptation and mitigation largely mirror those proposed as effective ways of promoting agricultural development. In this sense, climate change perhaps presents us with an opportunity: it reinforces the need to make greater progress on the transfer and dissemination of existing knowledge and technologies and to speed up the development and transfer of new innovations.

Food and feeding analysis of *Torchilinoiles* (Mc. Clelland) in the river western nayar of Garhwal Himalaya.

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The study of food and feeding habit is an important aspect in fish biology investigation. Growth attain by a fish is naturally derived from the food consumed. The natural habitat of fish offers a great variety of food. Fishes have become adapted to the wide range of feeding habitats. Fishes are in general categorized into three basic feeding habits: herbivore, carnivore and omnivore. Fishes are also classified based on feeding strata into the surface feeder, the column feeder and the bottom feeder. Some investigators divided the fishes into three groups on the basis of feeding preference. These are the main food, occasional food and emergency food. In the present study the gut contents were identified either with naked eyes or with the help of microscope. The food was analyzed both quantitatively as well as qualitatively. The fullness of gut, Gastro-Somatic index (GaSI) and relative length of gut (RLG) were also calculated. In the present study, the food and feeding behavior of *Tor chilinoides* was observed which indicated that the fish with bottom feeding habit and the alimentary canal typical omnivorous pattern.

Juvenile idiopathic arthritis in relation with atherosclerosis

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Juvenile Idiopathic Arthritis (JIA) is a chronic inflammatory autoimmune disease which has an unknown reason. One previous study from Japan had shown that rate of incidence and prevalence in children who are suffering from JIA in Asian origin was lowered than that of European origin. HLA and protein

tyrosine phosphatase non-receptor 22(PTPN22) genes are two main genetic risk factors for JIA in multiple populations. Macrophage inhibitory factor, IL-6, IL-10, and tumor necrosis factor α have also been associated with JIA in different populations and subtypes. Activated T and B cells, plasma cells and activated macrophages which are recruited via an intense neovascularization process are present in the synovial membranes of JIA patients. IL-1b, IL6, IL-8 and TNF- α play a significant role in the development and progression of atherosclerotic lesions. Mutation in MTHFR 1298 associated with changes in the levels of homocysteine was also found to influence the development of endothelial dysfunction and increased risk of cardiovascular disease in person, suffering rheumatoid arthritis from childhood.

Phytochemical analysis of aqueous and ethanolic extracts of citrus fruit peels- *Citrus limon*, *Citrus sinensis* And *Citrus aurantium*

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Citrus fruits like lemon (*Citrus limon*), sweet orange (*Citrus sinensis*) and orange (*Citrus aurantium*) are commonly consumed fruits in all parts of India. However, in various food processing industries, the fruit peels which have various phytochemical, antioxidant and antibacterial properties are wasted. In the present study, the presence of various phytochemicals like tannins, alkaloids, flavonoids, terpenoids, cardiac glycosides and reducing sugars were estimated in the aqueous and ethanolic extracts of fruit peels of *Citrus limon*, *Citrus sinensis* and *Citrus aurantium*. In the aqueous extract of *Citrus aurantium*, flavonoids are high as compared to aqueous extracts of *Citrus limon* and *Citrus sinensis* which may contribute to its antioxidant activity. Terpenoids are more in *Citrus sinensis* as compared to *Citrus limon* and *Citrus aurantium*. While ethanolic extracts of *Citrus aurantium* and *Citrus sinensis* showed more alkaloids and tannins respectively. However, further studies are needed to explore the properties of fruit peels to be used as commercial formulations.

Recent advances in drug development against MDR strains of *Mycobacterium tuberculosis*

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Tuberculosis (TB) is a major infectious disease killing nearly two million people, mostly in developing countries, every year. The increasing incidence of resistance of *Mycobacterium tuberculosis* strains to the most-effective anti-TB drugs is a major factor contributing to the current TB epidemic. Inadequate dosing and incomplete treatment regimens, coupled with the ability of the tuberculosis to cause latent infections that are tolerant of currently used drugs, have fueled the rise of multidrug-resistant tuberculosis (MDR-TB). Resistance of *M. tuberculosis* to anti-TB drugs is caused by chromosomal mutations in genes encoding drug targets. Multidrug-resistant strains of *M. tuberculosis* (MDR-TB) evolve due to sequential accumulation of mutations in target genes. Proper management of MDR-TB relies on early recognition of such patients. Once identified, successful treatment of MDR-TB requires therapy with several effective drugs some of which are highly toxic, less efficacious and expensive. Despite all the challenges, field of tuberculosis drug discovery has made significant therapeutic advances along with improved understanding of Mtb life cycle, the pharmacological requirements for successful Mtb drugs and the new antitubercular chemical matter derived in recent years.

Corrosion Resistance of Ni-P-Al₂O₃-SiC Electroless Nano-composite Coatings in 3.5% NaCl Solution

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In most of the industries all over the world, safeguard of equipments and utensils from corrosion, abrasion and wear is indispensable. For proper functioning of industry, equipments should be fabricated by durable, sturdy and anti-corrosion materials. In recent time, electroless coatings have proficient comprehensive detection in mechanical and chemical domain, due to their inventiveness to fabricate hard, friction and corrosion resistant surface. In the current innovative experimental work, Ni-P-Al₂O₃-SiC electroless nano-composite depositions were developed on substrate material (MS AISI-1040) into the alkaline (pH = 9.2) Ni-P electroless bath solution having second phase Al₂O₃ and SiC nano particles correspondingly. The coating duration was two hours and it is found that depositions done fruitfully which is experienced by color on the coated sample (silverfish black). The fundamental composition and micro-structure of as-plated and heated samples were analyzed by EDAX and FESEM methods. The FESEM result show congregation of Al₂O₃ (white) and SiC (black) nano-particles separately into an electroless Ni-P matrix. The amount in terms of percentage of Ni, P, Al, Si, C and O were calculated by EDAX analysis. When the coated coupons were heat treated at 400°C for 1 hour in argon atmosphere, the nano-particles twisted out to be extremely dense packed which promote very elevated enrichment in corrosion resistance of these EL nano-composite coatings in standard NaCl solution in comparison to Ni-P coatings.

Efficacy of Organic Fertilizer- Amirthakaraisal on the Growth of Chilli Plant

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Chilli plant belonging to *Solanaceae* family is one of the major cash crop grown in India. Chilli being a good source of vitamin is used in wide range of medicines against tonsillitis, diphtheria, loss of appetite etc., Application of inorganic fertiliser in soil for the growth of plants has deteriorated the quality of soil and reduced the plant growth and yield. The paper examines the effect of Amirthakaraisal, an organic fertiliser on the growth of chilli plant. The organic fertiliser Amirthakaraisal is prepared by using only the cow ingredients. The seeds of chilli plant were soaked in various concentration of organic manure (1%, 3%, 5% & 7%) prior germination. Organic fertiliser at the rate of 1, 3, 5, 7 % concentration was sprayed on all plants. Plant height and root length were measured. Maximum shoot length and root length were observed in the plants treated with 7% organic manure. Effective results were obtained after application of organic fertilisers as compared to water as control.

For Baskakov - Beta Stancu Type Summation Integral Operators

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In this paper, we study the simultaneous approximation for summation-integral type operators, namely Baskakov- Beta Stancu operators. This paper is divided into three sections. The first section is an introduction, which includes the operators and a certain class of function with norm etc. The second section consists of some basic lemmas, which are necessary to prove the important results of the section that follows. In the third section, we obtain some direct theorems, which include pointwise simultaneous approximation, asymptotic formula, and an error estimation.

The future adequacy of freshwater in uttrakhand

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In Uttarakhand, there are many rivers to bring fresh water. The natural process of our planet earth is not very safe in developmental process globally. Fresh water, which is very essential for the survival of living beings, is also in critical stage due to unplanned industrialization, urbanization and lack of awareness among most of the people. India, which is a developing country, possess its some of the states in Himalayan lap, among northern Himalayan region, Uttarakhand is 27th state of India which has been carved out from Uttar Pradesh in 2000. The ganga covers more need fresh water not for human being but also all living things and agriculture need. The Ganges is a sacred river to Hindus along every fragment of its length. All along its course, Hindus bathe in its waters, paying homage to their ancestors and to their gods by cupping the water in their hands, lifting it and letting it fall back into the river; they offer flowers and rose petals and float shallow clay dishes filled with oil and lit with wicks (diyas). No place along her banks is more longed for at the moment of death by Hindus than Varanasi, the Great Cremation Ground, or *Mahashmshana*. Those who are lucky enough to die in Varanasi, are cremated on the banks of the Ganges, and are granted instant salvation. Hindus consider the waters of the Ganges to be both pure and purifying. Nothing reclaims order from disorder more than the waters of the Ganges. Moving water, as in a river, is considered purifying in Hindu culture because it is thought to both absorb impurities and take them away. The swiftly moving Ganges, especially in its upper reaches, where a bather has to grasp an anchored chain in order to not be carried away, is considered especially purifying. What the Ganges removes, however, is not necessarily physical dirt, but symbolic dirt; it wipes away the sins of the bather, not just of the present, but of a lifetime. It has been estimated that about 350 fish species live in the entire Ganges drainage, The Ganges basin supports major fisheries, but these have declined in recent decades. In the Allahabad region in the middle section of the basin, catches of carp fell from 424.91 metric tons in 1961–1968 to 38.58 metric tons in 2001–2006, and catches of catfish fell from 201.35 metric tons in 1961–1968 to 40.56 metric tons in 2001–2006. In the Patna region in the lower section of the basin, catches of carp fell from 383.2 metric tons to 118, and catfish from 373.8 metric tons to 194.48

An Assessment of Indigenous Knowledge on Medicinal Plant of Srinagar Valley, Garhwal, Uttarakhand, India

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The study was carried out around Srinagar valley of the Garhwal Himalaya in four villages i.e. Khanda, Maletha, Dang and Nethana. The purpose of study was to know the local biodiversity of medicinal plants around the valley, to document their uses by local community for curing health disorder and for overall sustainable development. As per the objective various methods, questionnaire and personal observation were applied to gain the required information. Village to village and door to door survey was carried out for taking information of those medicinal plants grown in the wild and also cultivated by the farmers. 25 medicinal plants were observed during the study. Documentation of such knowledge is important to evaluate the traditional exerts on the local flora. It is not only important for conservation of indigenous knowledge, but also for drug development and economic gain for the rural India. The study will help in sustainable development of the rural community for their sustainability in this finite resource rich sensitive habitat. This study will also helps in conservation of the ethno-medicinal plants that is on verge of endangerment in and around Srinagar valley.

Assessment of Physico-chemical Properties of Soil under Different Land use Pattern in Takoli Gad Watershed, Garhwal Himalaya, Uttarakhand.

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Soil, a thin layer of earth's which serve as a natural medium for growth of plant is one of the most important natural resource for sustaining life and environment in this changing sensitive mother Earth. For effective watershed development and in order to increase agricultural productivity and production, vegetative cover on the degraded land and for overall economic improvement of rural people in a watershed, soil analysis is one of the important aspects. This assessment was carried out to assess the physico-chemical properties of soil in different land use pattern on altitudinal basis of Takoli Gad Watershed, Tehri Garhwal, Uttarakhand, India. For this study, 162 soil samples were collected from three major land use pattern of watershed, which are agricultural land, non- agricultural land and forest land. Soil samples were analyzed for different physico-chemical parameters such as soil texture, pH, moisture content, water holding capacity, color, bulk density, nitrogen (N), phosphorus(P), potassium(K), magnesium (Mg), iron (Fe), copper(Cu), and zinc (Zn). Samples were determined as per standard method. According to the soil test results, the textures of the soil samples were found as silt loam, sandy loam, loamy sand, loam and sand. Soil bulk density ranged from 1.19 to 1.82 g/cm³. The mean soil moisture content ranged from 8.87% to 21.73%. Soil water holding capacity (WHC) ranged between 26.49%-30.46%. Color of the soil was found to be light brownish gray, light olive brown to yellowish brown. The pH ranged from 6.6 to 7.2. The result of study shows that the level of nitrogen, phosphorus and potassium concentration in the soil are low. Iron ranged from 30.8656 mg/l to 40.5886 mg/l. Copper ranged from 0.2283 mg/l to 0.5642 mg/l and zinc ranged from 0.6775 mg/l to 1.3816 mg/l in the soil samples. Magnesium concentration ranged from 39.1501 mg/l to 45.8771mg/l. This study will help the farmer of Takoli gad watershed to solve the problems related to soil nutrients and for overall sustainable development of rural livelihood in the watershed.

Vegetational analysis of woody vegetation under burnt and unburnt oak forest at Pauri, Garhwal Himalaya, India

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The present study was carried out in oak (*Quercus leucotrichophora*) dominated forest of Pauri. Two permanent plots were selected of which one was BPS and other was UBPS. The vegetational data were analysed for both the sites i.e., floristic composition, density, basal cover, A/F, Shannon Wiener index and Simpson's index of dominance (cd). A total of 6-8 trees species and 24-26 shrub species were found on both BPS and UBPS. BPS showed maximum density than UBPS. Contagious pattern of distribution was common. This paper represents a close association among man, fire and forest ecosystem.

Impact of fire on Phenological and Reproductive behaviour of *Anaphalis busua* (Buch.-Ham. ex D.Don) DC, a common weed under Pine dominated forest ecosystem

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The objective deals with the phenological observations of a common weed *Anaphalis busua* (Buch.-Ham. ex D.Don) DC and were made in the burnt and unburnt montane forest grazing land of Pauri Garhwal dominated by *Pinus roxburghii*. The phenological behaviour was studied on 6 point scale events: germination, vegetative growth, flowering, fruiting, seed maturation and senescence of the individual and an attempt have been carried out to analyze different phases monthly. The average plant height was maximum (59.86±1.8) on burnt protected site (BP) in contrast to the unburnt protected site (54.61±4.47). With respect to the reproductive phase, proportion (%) of flowering clump with flowering culms (CF)

was 88 % on BP, 75% on UP and number of flowering per clump (FC) was 22 on BP and 17 on UP. The reproductive phase was represented during peak growing rainy season and persistent up to winter season and again enhanced vegetative growth after resprouting during summer season. The gradation appears to be peculiarity extended on the unburnt site and the phase initiation found comparatively prompt on the burnt site.

Enzymatic potential of bacterial population after prescribe fire in Chilla forest Uttarakhand

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Prescribed burning is the application of controlled fire to the forest under specified conditions, to achieve a wide range of targets like silviculture enhancement, to control weeds, habitat management for wildlife and the most important protection of forests from wildfire. As we know the importance of microorganism in an ecosystem so it is essential to study the post fire effects of on functional behavior of microorganism. To keep this fact in mind, In the present study, the bacterial population was studied for their enzymatic potential after fire. Soil samples were analyzed for their Cellulase, Amylase and Protease activity. The enzymatic study revealed that the isolates recovered from burnt soil is more active Cellulase (94%), Amylase 69% and Protease 65% as compare to the unburnt soil which has Cellulase (86%), Amylase (47%) and Protease 43% respectively. The conclusion drawn from the above study is that the bacterial enzymatic properties were also affected by prescribe fire.

Synthesis of silver nano particle using aqueous extract of *phyllanthus fraternus* and their antimicrobial activity.

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According to World Health Organisation medicinal plants would be the best source to obtain a variety of drugs. In developed countries about 80% of plants are used in traditional medicine. Therefore, such plants have been investigated for better understanding of their medicinal properties. “Bhumi Amlaki” with profusely branched angular stems, growing up to 30cm in height. It is a common weed and found in the plains of Punjab to Assam and southward of Kerala. Limited information is available regarding anti-microbial activity of *phyllanthus fraternus*; therefore, in this study, aqueous extract of *phyllanthus fraternus* was prepared, evaluated for phytochemical constituents and used for green synthesis of silver nanoparticle. The extract as well as the nanoparticles synthesized were analyzed for their antibacterial effects. The result of qualitative and phytochemical studies showed that the aqueous plant extract of *phyllanthus fraternus* composed of different alkaloids, terpenoids and sterols. It is quite evident from our study and review that *phyllanthus fraternus* contains a number of phytoconstituent which reveals its uses for various therapeutic purposes. Silver nano particles have been synthesized by chemical reduction of silver nitrate solution by ethanol. The samples have been characterized by scanning electron microscopy and screened for antibacterial effect.

Synthesis and Antibacterial Activity Of substituted Schiff's Base Derivative

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A vast array of Schiff's bases having excellent broad spectrum activity forms an invaluable part of the present anti-microbial, anti-fungal, anti-tubercular, anti-cancer and anti-HIV of the clinicians. A number of these compounds are today's blockbuster of the anti-bacterial market due to their therapeutic efficacy having tolerable side effects and thus, challenging the predominance of well-established beta lactum antibiotics, which are becoming more prone to the resistant pathogenic bacteria. In view of this present

study synthesis of Schiff's bases was carried out with the aim of getting new antibacterial compounds. Firstly substituted acids were converted to acid hydrazides and then to Schiff's bases after condensation with substituted benzaldehyde. The synthesized substituted compounds were screened further for their antibacterial effect against *E. coli*, *Shigella*, *Salmonella*, *Klebsiella*, and *Pneumonia*. From this study it could be observed that Schiff's base having p-amino benzoyl aniline moiety showed very good zone of inhibition against *E. coli*, *Klebsiella pneumonia*, *Salmonella* and *Shigella*. So further attempts could be made to extend the series and explore their anti-bacterial potential to achieve helpful goals. All the synthesized compounds were characterized using various spectroscopic techniques like UV, IR, ¹HNMR and Mass Spectrometer.

Evaluation of protein, carbohydrates, tannins and phenolics levels in fruit peels of pomegranate, lemon, orange, masami and banana

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Oxidative stress is causative factor for various diseases and aging. The antioxidant present in fruit peels makes them a functional food ingredient for antioxidant food and nutraceutical products. The natural bioactive compounds in fruits peels are carotenoids, quercetin derivatives, phenolic acids and anthocyanins. In the present study Fruits peels of pomegranate, lemon, orange, masami, banana were studied for their carbohydrate content, protein content, tannins, total phenolic content (TPC). Significantly high amount of carbohydrates ($p < 0.05$) were found in banana peels. The levels of proteins, tannins and phenolics were significantly higher in pomegranate and masami peels as compared to other fruit peels. The presence of these bioactive compounds in fruit peels can make peels a "functional food" with natural antioxidants.

Evaluation of the Potential of Thermophilic Bacteria for Bioremediation of Heavy Metals

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Biosorption and bioaccumulation can be applied to remedy environmental contamination with heavy metals as complement methods to currently used physical and chemical methods. The overall goal of this work was to analyze the potential of bacterial isolates for biosorption of heavy metals from the heavy metal solutions in-vitro. Bacterial strains were isolated and identified from the hot springs of Uttarakhand-Taptkund (Badrinath) and Gaurikund (Kedarnath). Nine isolates were showing potential for biosorption of different heavy metals (Mn, Ni, Zn, and Hg). Morphological and biochemical characterization was done by the conventional methods. Bacterial strains were screened for heavy metals Mn, Cu, Zn, and Hg. Bacterial culture was spread on plates prepared with tryptone soya agar simultaneously spiked with 0.5 mM, Cu, Mn, Zn, Hg solution. Plates were incubated at 60°C for 48 hr. Minimum Inhibitory Concentration of metals was estimated for each of the potential isolates. MIC was determined in Tryptone Soya Broth, culture were incubated at 60°C for at least 48hr, checking bacterial development by absorbance at 600 nm. For the assessment of the potential of selected isolates for bioremediation of heavy metals (Mn, Ni, Zn, and Hg), after 48 hrs of incubation of isolates, the concentrations of metal ion present in the supernatant were quantified by Inductive Couple Plasma Mass Spectrophotometer (ICP-MS). The isolates have shown the potential of biosorption of metal Manganese (Mn), Nickel (Ni), Zinc (Zn) and Mercury (Hg). Among the heavy metal studied, the maximum biosorption was found for Hg 95.33%, Mn 90.85%, Ni 69.5% and Zn 64.02%.

Is managing outside waste enough for well being?

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Waste is more than simply the stuff in our trash can. We may be tolerating waste in many parts of our life, including how we spend our time and money, where we invest our energy and how we manage our thought process. If we reduce waste in our life, it will help us to restore a sense of purpose and balance. The real source of happiness is inner peace which can be gained by eliminating inner waste from our mind and body. If our mind is peaceful, that is, free of the useless thoughts that can trouble us, we will be happy all the time, regardless of external conditions, but if it is disturbed or troubled in any way, we will never be happy no matter how good our external conditions may be. External conditions can only make us happy if our mind is peaceful. We can only remove our inner waste by preventing irrelevant and negative thoughts to come into our mind and by cultivating positivity in our mind and around. To experience pure and everlasting happiness and freedom from suffering, and to fully realize the meaning of our human life, we need to develop and maintain a peaceful mind by controlling and transforming our mind. The method for doing this is meditation. Meditation is a state of mind that is single-pointedly focused on a virtuous object, and whose function is to make the mind peaceful and calm.

Agricultural waste management and its significance

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Agricultural wastes are defined as the residues from the growing and processing of new agricultural products such as fruits, vegetables, meat, poultry, dairy products and crops. They are the non-product outputs of production and processing of agricultural products that may contain material that can benefit man but whose economic values are less than the cost of collection, transportation and processing for beneficial use. Agricultural development is usually accompanied by wastes from the irrational application of intensive farming methods and the abuse of chemicals used in cultivation, remarkably affecting rural environments in particular and the global environment in general. Generally, agricultural wastes are generated from a number of sources notably from cultivation, livestock and aquaculture. These wastes are currently used for a number of applications through the '3R' strategy of waste management. There is likely to be a significant increase in agricultural wastes globally if developing countries continue to intensify farming systems. It is estimated that about 998 million tonnes of agricultural waste is produced yearly. Organic wastes can amount up to 80 percent of the total solid wastes generated in any farm. Composting is a sustainable waste management practice that converts any volume of accumulated organic waste into a usable product. The conclusion is that a fundamental change in attitude is needed in the way wastes are managed. As the population keeps growing, more pressure is put on waste disposal of different kinds. In future, need for clean and safe environment will be among the most serious problems that needs to be tackled. Proper waste utilization will assist in developing our agricultural sector and provide viable biofuel resource for many.

AIDS: the Most Dreadful Immunological Disorder

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AIDS is caused by virus called HIV. HIV is an RNA based virus which attack T-cell in the immune system. First cases of HIV infection in India were detected in 1986 among female sex workers in Chennai. Uttarakhand has registered a 66% increase in HIV patient in just 8 years out of this 27.2% were noticed among injection drug user. HIV is transmitted by sexual contact, prenatal transmission during child birth, pregnancy, breast feeding and blood transmission. Symptoms of early HIV infection are

fever, chills, joint pain. During asymptomatic HIV the virus carries on developing and damaging the immune system and organs. Late stage HIV infection includes blind vision, dry cough, night sweats. Blood tests are the most common ways to diagnose the HIV. These tests look for antibody to the virus that are present in the blood of infected individuals. Diagnosis include COOMB test, rapid test for IGM antibodies meri screen and PCR is the confirmatory test. Although there is no cure for AIDS/HIV, medication can retard the virus growth. Anti HIV drugs that help in blocking the virus include protease Inhibitors, non nucleoside reverse transcriptase inhibitors, and integrase inhibitors. Viral load should be tested at the beginning of the treatment and then every quarter during therapy. CD4 counts should be monitored every 3-6 months. Treatment consists of highly active antiretroviral therapy. USACS show that there are about 20 deaths due to AIDS in Uttarakhand each month. Conclusion is having safe sex practices, admitting to intravenous drug use. Until a vaccine is approved and widely disseminated, people must avoid risky behaviors in order to curb the spread of this devastating disease. Lets aid each other to combat AIDS.

Hepatitis C Viral RNA and its genotypic determination in Clinical Isolates- Applications in Disease monitoring

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Hepatitis C virus (HCV) infection has reached epidemic proportions. Worldwide, more than one million new cases of infection are reported annually, and HCV is believed to be more prevalent than hepatitis B virus infection (HBV). Hepatitis C virus (HCV) infection is one of the most important Flaviviridae infections with significant clinical problems throughout the world in humans and it is responsible for the second most common cause of viral hepatitis. Aim: The frequency of infection with the major genotypes of hepatitis C virus (HCV) was investigated in the current study. Material and Methods: Specimens were collected from the patients with HCV infected cases. RNA was isolated, reverse transcribed and further processed for various molecular based parameters. Results: 30 serum specimens were quantified for HCV RNA viral load and their titre values were observed with the usage of Real Time PCR in-between 1.05x10¹-9.58x10⁷IU/ml. HCV genotype 3a was found in 17(56.6%) cases with highest prevalence. Genotypes 1a, 1b, 2a, 2b, 3b, 4, and 5a was found in 2(6.6%), 15(50%), 5(16.6%), 15(50%), 2(6.6%), 2(6.6%) and 2(6.6%) respectively. The findings also included that HCV viral RNA titre was elevated in HCV genotype 3a, assuming that HCV genotype 3a is the most replicated virus and need to be monitored thoroughly during diagnosis. Although type 1a, 1b, 2a, 2b, 3b, 4, 5a were also present but in lower proportion. Conclusion: The amount of HCV RNA in the blood (viral load) is believed to represent the steady state of viral replication and clearance. Therefore, it is important to utilize a highly specific and sensitive assay to quantify precisely HCV RNA in the blood of patients with HCV. This is particularly helpful for monitoring effect of anti-HCV drug therapy.

Molecular characterization of HLA-B27 Sequence specific allele in Autoimmune Disorders

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The HLA-B are a group of cell surface molecules encoded for by the major histocompatibility locus on chromosome 6 of the human genome. These genes show various polymorphic forms, one of which is the B27. Seventy to 80% of people with the HLA-B27 antigen have no clinical manifestations related to the presence of this gene. However, it has been estimated that up to 20% of people carrying this antigen have at least one of several associated conditions. These include Classically, B27 associated uveitis presents with sudden onset acute anterior uveitis in a young patient. It starts in one eye but is usually asymmetrically bilateral. The inflammation may be more severe than that found in idiopathic anterior uveitis and may be associated with a fibrinous reaction (25%), a hypopyon (14%) and the formation of

posterior synechia. Studies show that it is also associated with higher recurrence rates than the idiopathic variety. Posterior segment involvement in HLA-B27 associated uveitis is an under recognized phenomenon but has been shown to occur in up to 17% of patients with B27 associated uveitis. This may take the form of posterior vitritis, vasculitis or papillitis. **DIAGNOSTIC TESTING:** Although opinions vary as to the importance of the diagnostic testing for the HLA-B27 gene, we believe that all patients with recurrent anterior uveitis and the absence of another clear etiologic agent, must be tested for HLA-B27, because of its prognostic implications and because it may help in therapeutic planning. Patients who give a history suggestive of a spondyloarthropathy should be tested for the HLA-B27 gene irrespective of the location of the uveitis and the number of episodes. We believe that patients with a suggestive history should be screened for the gene even if they present with a first episode of uveitis. Treatment Treatment of the acute uveitis is with topical steroids and cycloplegics. Periocular steroids are indicated in severe inflammation.

Human Papilloma Virus and its Association with Cervical Cancer

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Human *Papilloma* virus is primary cause of cervical cancer. HPV is DNA virus, with a genome of approximately 8000 nucleotides. Diseases caused by infection by HPV vary from condyloma to neoplastic transformation in cervix, vagina and vulva, as well as carcinoma. There approximately 200 different type of HPV, which are classified according to DNA sequence. Cervical cancer is the third or fourth most common female Malignancy worldwide, causing an approximate 529,828 new cases each year. It is a disease in which cancerous cells develop in the uterine cervix. (This is the connecting passage between the uterus and vagina.) The peak incidence of cervical cancer occurs between the age of 40 to 55. It rare before the age of 35. At least 50% of women are exposed to the HPV virus during their lifetime. Low risk type: HPV type 6 and 11 can cause genital wart and are low risk type because they rarely cause cervical cancer. High risk type: HPV type 16 and 18 are considered high risk type because they may cause cervical cancer in more women. They are more likely to develop cervical intraepithelial Neoplasia due to the asses that HPV has on DNA. The Pathogenesis of Cervical cancer is related to two viral proteins E7 and E6, Transmission of HPV by direct skin to skin contact, including sexual intercourse, anal sex, or and contact involve the genital area (hand to genital contact.) When virus persists (in 10 to 20% of cases), there is a chance of developing cervical cancer. Smoking can increase the risk of cervical cancer. Cervical screening. Cervical screening is the process of detecting and removing abnormal tissue or cell in the cervix before cervical cancer develops. several cervical screening method for cervical cancer are the Pap test, liquid based cytology, the HPV DNA testing and the visual inception with acetic acid. Pap smear or HPV testing can be done at any time during your menstrual cycle. Treatment for genital warts depends on the type of warts. Aldara (Imiquimod is genital warts treatment cream). Imiquimod cream should be applied once daily at bed time three times a week for up 16 week. The treatment area should be washed with soap and water. Podophyllotoxin is usually recommended to treat cluster of small warts. Imiquimod is type of cream usually recommended to treat large warts. Trichloroacetic acid may be recommended to treat small warts that are much heard.

Type-Specific Human Papillomavirus detection in cervical specimens–Clinical Utility in Cervical Cancer Management

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Infection with oncogenic human papillomavirus (HPV) is a necessary source for the progression of cervical cancer. Several types of human papillomaviruses (HPVs) are associated with a range of benign

and malignant lesions including genital condyloma and anogenital cancer as well as for the development of genital warts. Material and methods: Thirty cervical specimens from the department of Obstetrics & Gynecology of SMI Hospital, Patel Nagar, Dehradun were collected for the present study. Genotyping and screening of clinically relevant HPVs were done using multiplex PCR applying Dual Priming Oligonucleotide (DPO) technology which can simultaneously detect genotype (HPV-16 and 18), HPV type 6 and 11 and screen out 16 high-risk HPV types (26, 31, 33, 35, 39, 45, 51, 52, 53, 56, 58, 59, 66, 68, 73, 82). Six patients came positive for Human papillomavirus. Patients with low grade squamous intraepithelial lesion (LGSIL) and high grade squamous intraepithelial lesion (HGSILs) were highest in number (05). LGSIL positive cases harbored HPV type 16 (03 cases) where as patients with HGSIL were HPV type 16, HPV type 18, HPV mixed types and HPV type 11 positive. A case with cervicitis harbored HPV type 16. Discussion: Thus the conventional PCR using DPO technology is helpful for detecting and screening clinically significant HPV genotypes so that the existing vaccines for the particular genotype can be prescribed as well as for HPV types causing generalized and genital warts, proper treatment can be given to the patient. However more epidemiological research on the prevalence of various HPV types is required before the need for regionally-tailored vaccines is confirmed.

Studies on Anti-Inflammatory Potential of *Azadirachta Indica* Extract

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Natural Products and plant based drugs are extremely valuable for treating wide variety of diseases for a long time. One of the commonest of those is inflammation and microbial diseases (Particularly bacterial) that leads to a pathological onset and hence a diseased state. Many allopathic drugs in market are available for treatment of inflammation and bacterial diseases like NSAIDs (for inflammation) and antibiotics (for bacterial diseases) but these drugs are oftenly associated with a side effects like gastric irritation, hepatotoxicity and resistance (in case of antibiotics). Therefore search for its alternate medicine which is cost effective, less resistance and having good therapeutic activity is gaining potential these days. In view of these *Azadirachta indica* was taken up for present study with the aim of exploring its anti-inflammatory and antibacterial potential from various plant parts. *Azadirachta indica* is known as wonder tree and Number of pharmacological activities are associated with almost all parts of it. Twigs, leaves, flowers were extracted with water, phytochemical investigation and anti inflammatory studies were carried out on albino rats. The different aqueous extracts were screened for their anti-inflammatory potential. The anti inflammatory activity was performed by using plethysmograph. Before drug treatment paw volume of the animal was measured by mercury displacement method. The combination of floral twigs and leaves (1:1:1) gave an inhibition of 61.25% as shown in table 10. Therefore, combination of leaves and floral extract (1:1) has well defined anti-inflammatory activity and further work can be carried out to device of formulation for its made up delivery

Climate Change Impact on Indian Agriculture

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Climate change is a matter of global concern because of its impending threats to sustainable economic development. Compared to economic activities, Agriculture is more sensitive to climate change. Climate change and Agriculture are interrelated processes, both of which take place on global scale. Climate change affects agriculture in a number of ways including through climate change in average Temperature, Rainfall and Climate extremes (e.g. heat waves) changes in pest and diseases, changes in Atmospheric CO₂ and Ground level ozone concentration. In recent years several studies have examined the impact of climate change on Agriculture. In 2009, it has been reported that a 1.0°C rise in mean temperature would reduce yield of wheat, soybean, mustard groundnut and papaya by 3-7%. By 2099, If temperature were to

rise by 2.5- 4.9 °C The damage of the crop will increase to 10-40% even after internalization of the positive effects of carbon fertilization. Researchers have confirmed that crop yield falls by 3% for every 1°F increase in the temperature. More detailed analysis by international rice research institute forecast 20% reduction in yield over the region per °C of temperature rise. Higher level of CO₂ can stimulate photosynthesis in certain plant. Moreover the protein content of grain decreases under combined increase of temperature and CO₂. For a country like India, Sustainable Agriculture development is not only to meet the food demands, but also for poverty reduction through economic growth. Hence some interventions such as improvement in forecasting and early warning systems, establishing hazard and vulnerability mapping, augmenting public awareness and improvement in irrigation can be done to reduce adverse impact of climatic change.

A study of Physico-Chemical parameters and Bacteriological analysis of some water springs in Uttarakhand.

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In the present investigation, physicochemical and bacteriological analysis of 16 springs located along NH58 from Rishikesh upto Badrinath was done. Several physicochemical parameters like pH, temperature, hardness, alkalinity, chloride, phosphate, nitrate, TDS and conductivity of spring water were estimated to evaluate the drinking water quality of these springs. Most probable number (MPN) counting method was used to detect coliforms. In addition to this, water samples were also tested for the presence of various other pathogenic bacteria such as, *Vibrio cholera*, *Pseudomonas aeruginosa*, *Salmonella*, *Shigella*, etc., The study reveals presence of pathogenic bacteria in some of the springs of Uttarakhand.

Fly ash heavy metals as potential environment pollutant: Risk and management

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Electricity generation from coal based thermal power plants generates enormous amount of by product called fly ash. Fly ash is potential pollutant owing to its physico-chemical properties. Its current production is about 120-150 MT with rising figures in upcoming years. This enormous quantity is recommended for usage in different sectors. Thus risk evaluation of this chemical substance is utmost before recommendation of such material in different spheres. This can be done using scientific techniques stating potential for exposure and adverse effects caused by particular contaminants. This assists us in managing such material in our environment.

Municipal Solid Waste Management in Dehradun city

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Although waste is generated by humans, they show no concern towards its final disposal. Therefore present paper seeks to evaluate the management and waste disposal with reference to the waste classification, disposal methods and waste evaluation in Dehradun city. Waste management project are carried out by the Nagar Nigam by the provision of waste collection facilities which includes, containers and compact trucks, and waste disposal process through sanitary landfills and compost plants. According to municipal cooperation of Dehradun about 180-200 metric tons of waste /day are being collected from different parts of the city. The collected waste is then transferred to Sheesambara landfill disposal plant at Selaqui, Dehradun. The municipal cooperation aim at making profits regardless of the waste reduction or the resultant destructive environmental impacts.

Ionizing radiations: blessing and bane

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Enhanced use of ionizing radiations in today's life has opened multiple biomes for radiation exposure to the public. On one hand radiation acts as blessing in the form of radiation therapy and nuclear medicines on the other hand it acts as bane due to unplanned exposure. Increased use of ionising radiation (IR) as treatment modality in multiple carcinomas and augmented risk of unplanned exposure due to ionizing radiation can lead to serious problems within an organism. Ionizing radiation induces cell death by direct and indirect effect. Direct effect is mediated by deposition of radiation directly on DNA to induce damage whereas indirect effect is mediated via radiation induced free radicals. A spectrum of damages is induced due to radiation exposure including direct burn damage to exposed tissue, DNA damage and mortality, including both acute lethality and long-term reduction in life span. Minimizing the damages due to planned exposure shall help in increase the therapeutic gain using ionizing radiation. Multiple researchers have exploited the ionizing radiation induced mutation for developing the improved strains with high yield. Plethora of naturally occurring compounds has been tested to provide protection against radiation induced damages. Hence, ionizing radiations as a blessing or bane depends on its aim of use.

Structural and functional characterization of MarR family proteins from *Brucella abortus*

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Multiple antibiotic resistance regulatory (MarR) protein is a member of multiple antibiotic resistance regulator family. These protein are the member of helix-turn-helix transcriptional factors. These proteins are found mainly in archae and bacteria. MarR proteins are negatively regulated by marRAB operon in *E.coli*. These proteins encode for the drug efflux pump system. Transcription of divergently oriented genes is repressed by the binding of MarR proteins in the intergenic region of DNA. The expression of MarR proteins is inhibited by phenolic compounds, or oxidation of cysteine residues, which result in attenuated DNA binding. Multiple antibiotic resistance phenotype is the result of mutation in MarR proteins. The mechanism of their action and how the binding of phenolic compound alter the structure of MarR proteins is not fully understood. We in present study are trying to structurally characterize MarR proteins from bacterial pathogen *Brucella abortus* using bioinformatics tools. Sequence of the MarR is retrieved from NCBI database. MUSCLE and Clustal W program are used for the phylogenetic analysis and multiple sequence alignment. Secondary structures are predicted by J Pred2, PSIPRED and SABLE. MUSTER tool is used for fold recognition. Prosite, Motif and Inter ProScan are use for the prediction of architectural motif and topology of protein.

In silico prediction of the probable drug targets from hypothetical proteins of *Brucella abortus*

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Brucella abortus is a small, aerobic, non-motile, non-spore forming gram-negative, coccobacillus or short rod shaped, facultative intracellular pathogen which belongs to alpha-2 subdivision of the Proteobacteria. This intracellular parasite is a blood borne pathogen that causes premature abortion of a cattle fetus, this disease known as Bovine brucellosis. Brucellosis is a bacterial zoonosis. In human, it prominently causes sacroiliitis and hepato-splenomegaly including many other febrile diseases, but it can be treated with antibiotics. The genes that do encode for virulence in *B. abortus* are not well enough understood. Therefore, the identification of virulence factors in *Brucella* is vital for drug therapy strategies to control brucellosis. The genome of *Brucella abortus* encodes a large number of Hypothetical proteins. Many

advanced bioinformatics tools are used to identify the potential drug targets by studying uncharacterized HPs. VICMpred is used to predict the virulence factor among the number of uncharacterized HP sequences. SWISS-MODEL web-server is used for homology modeling of protein 3D structures. It makes use of templates (experimental protein structures) to build models for target sequences. Pymol software package is used to analyze the atomic structure of biological molecules and to align model and template to calculate their RMSD value. Procheck is used to validate the model structures. The study is currently underway to further shortlist the valid targets that can be used for drug related studies

Effect of Temperature, Humidity and Moisture content on the Fungal Diversity in three different forest types of Pauri Garhwal District (Uttarakhand)

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With the change in the type of environment and vegetation the microfloral diversity also gets affected. In forest ecosystems, plant communities are responsible for determining the soil fungal communities as the development of different fungi depends on the nutrients provided by the soil, which is ultimately affected by the dominant tree species. Hence, we have focused on studying the mycofloral diversity in the forest soil of three different forest covers of Pauri Garhwal district. The forest soil was collected from three sites in the concerned forest type as Khangarh (Sal forest), Pali Malli band (Pine forest) and Lansdowne (Oak forest). The soil samples were collected by digging the earth up to a depth of 30cm, the temperature, pH and humidity of the soil as well as that of the environment was recorded on site, using the soil pH tester and humidity meter. The samples were kept in polythene zipper bags and taken to the laboratory. The fungi were cultured on Czapek-dox selective media and the growth was observed after an incubation period of 48hr. A total of 26 species belonging to 14 genera were isolated by using serial dilution agar plating method. Identification and characterization of the mycoflora was done with the help of authentic manuals of fungi. *Aspergillus niger*, *Aspergillus parasiticus*, *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus clavatus*, *Candida albicans*, *Candida berkhoutii*, *Curvularia lunata*, *Curvularia brachyspora*, *Penicillium Corylophilum*, *Penicillium citrinum*, *Alternaria alternata*, *Helminthosporium*, *Fusarium oxysporum*, *Mortierella uniramosa*, *Mortierella elongata*, *Mucor haemilis*, *Mucor circinelloides*, *Trichoderma viride* and *Cladosporium oxysporum* etc. were observed during the study period.

Fungal Approach for the Bioremediation of Toxic Synthetic Industrial Dyes

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Most of the synthetic dyes are carcinogenic and mutagenic in nature and cause several diseases in flora and fauna. The use of extracellular enzyme systems from white rot fungi are now growing very fast for bioremediation purposes. In view of the above, the present study was undertaken for the removal of five toxic synthetic dyes viz. Congo red, crystal violet, fuchsine basic, malachite green, and brilliant green using fungal cultures. 15 wood rotting fungal cultures were used based on their capabilities to grow on mineral salt medium (MSM) containing dye as the only carbon source. Qualitative and quantitative assays for dye decolorization were done using the 10 isolates capable of growing in dye-containing medium and the extent of dye removal was measured spectrophotometrically, percent decolorization of dyes was calculated. The fungal cultures removed the dye from the medium either by accumulating it in mycelia (bio-sorption) or by metabolizing it to some non-colored components. All the selected cultures were found to have higher bioremediation potential towards Congo red showing >90% removal of the dye from the medium within 16d. The fungal cultures varied significantly in their decolorizing potential for brilliant green showing 11-95.05% decolorization of the dye within 16d. No effective removals of dyes were shown by the selected cultures of Basic fuchsine and crystal violet. These selected isolates were then checked for extracellular

enzyme activities (laccase, lignin peroxidase manganese peroxidase and azoreductase) in culture filtrates. Spectral analysis (UV-Visible spectroscopy and FTIR) also confirmed degradation / removal of these dye by the potential isolates

Clinical Utility of ADA levels, AFB and Nested PCR for CSF Specimens in Tuberculosis Meningitis Patients

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Extra Pulmonary tuberculosis (EPTB) is of many types and Tuberculosis meningitis (TBM) is a severe illness of the central nervous system, mainly in developing nations like India. Due to lack of early and appropriate diagnosis of tuberculosis meningitis, the fatality rate remains high, even when it is not fatal; the follow-up is worrying and disabling. Prompt diagnosis and treatment are necessary to decrease the high rates of disability and death associated with TBM. Current study includes, analyzing the efficacy of Nested TB (N-PCR) PCR, ZN Staining and to determine the ADA levels in CSF specimens in Tuberculosis Meningitis suspected patients. Out of 58 patients considered for the study, 20 (34.4%) were positive for TB PCR, out of which 12 patients (60 %) were males and 8 (40 %) females. It was analyzed that out of the 58 CSF specimens, none came positive for ZN smears, where as in 28 patients who showed elevated ADA levels, 20 showed MTC positive results by N-PCR. Thus the estimation of ADA titre is not a sole criterion for the confirmation for the diagnosis of Tuberculosis meningitis thus it must be followed along with TB PCR results as well as with other clinical findings. It is significant for clinicians to collaborate the results from PCR, ADA and the other findings for the management of TBM patients. The CSF PCR for TBM, compared to the culture and ADA is more rapid, specific and therefore of clinical value when the clinical suspicion is high and the results are reviewed in parallel with clinical and other laboratory findings.

Altitudinal Variation in the Volatile Constituents of *Cymbopogon Flexuosus*

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Cymbopogon is one of the most important essential oil yielding genera, comprising of about 140 species worldwide, out of which 45 species have been reported to occur in India. The lemon grass essential oil is mainly comprises of cyclic and acyclic monoterpenes such as Citral (a racemic mixture of two isoforms geranial and neral), is the major constituent and others are geraniol, citronellol, citronellal, linalool, elemol, 1,8-cineole, limonene, β -caryophyllene, methyl heptenone, geranyl acetate and geranyl formate are found in the essential oils of different species with marked variations. The essential oils of *cymbopogon flexuosus* (lemon grass) of the family poaceae collected from different altitudes of the uttarakhand region were subjected to detailed GC/MS analysis in order to determine the variation of concentration in their constituents. Plants collected from 450 m altitude afforded citral [geranial (37.29%) and neral (44.98%)] as a high concentration whereas less concentration of citral (geranial and neral) was found in the plants collected two other sites. The geraniol, camphene and neryl acetate were obtained in a high concentration form the plants collected at 250 m altitude but in the plant from two other altitudes it was found only in less proportion. Similarly γ -cadinene, terpineol and camphene were the major constituent of plants at 1000m altitude but in other plants it was detected in very low concentration. Since, the concentration of plant constituents changed from one altitude to another. The medicinal properties of such plants would vary accordingly

Nitrogen and phosphorus removal from beverage effluents by bacteria isolated from farmland

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Nitrogen and Phosphorous nutrient enrichment is the major problem for the waste water treatment plant specially for the industries like food and brewery, beverages etc. which makes effluent treatment plant ineffective or non-functional (ETP) therefore, current aim to characterized the effluent and treat them for the removal of nitrogen and phosphorous. In the current work, we characterized the beverage industrial effluent for turbidity, pH, alkalinity, biological oxygen demand, total hardness, chemical oxygen demand, total solids, nitrates, phosphates, colour, turbidity etc. We determined that there are many parameters which are far above then the prescribed limit. Further, effluents were treated for the nitrogen and phosphorous with the organism which was isolated from the agricultural soil. We observed that these organisms significantly reduced the nitrate and phosphate level. Next, we are planning to use this organism at pilot scale to treat the effluents. Nitrogen and phosphorus from wastewater has become an emerging worldwide concern because these compounds cause eutrophication in natural water. Moreover, nitrate is a risk to human health also therefore an effort has been made to treat the effluents.

Fuzzy set and its applications

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Mathematical programming is one of the areas to which fuzzy set theory has been applied extensively. The theory of fuzzy sets has advanced in a variety of ways and in many disciplines. Applications of this theory can be found, for example, in artificial intelligence, computer science, medicine, control engineering, decision theory, expert systems, logic, management science, operations research, pattern recognition, and robotics. Mathematical developments have advanced to a very high standard and are still forthcoming today. The objective of fuzzy logic control (FLC) systems is to control complex processes by means of human experience. Furthermore, fuzzy control methods have shifted from the original translation of human experience into control rules to a more engineering-oriented approach, where the goal is to tune the controller until the behavior is sufficient, regardless of any human-like behavior. These models in turn have been used to offer computationally efficient approaches for solving vector maximum problems.

Applications of Advanced Molecular Tools for the Characterization of Swine Flu (H1N1)

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Swine influenza (also called swine flu, hog flu, and pig flu) is an infection by any one of several types of swine influenza virus (SIV). SIV is any strain of the influenza family of viruses that is endemic in pigs. As of 2009, the known SIV strains include influenza C and the subtypes of influenza A known as H1N1, H1N2, H3N1, H3N2, and H2N3. Swine influenza virus is common throughout pig populations worldwide. Transmission of the virus from pigs to humans is not common and does not always lead to human influenza often resulting only in the production of antibodies in the blood. If transmission does cause human influenza, it is called zoonotic swine flu. Influenza Strains: influenza B viruses and subtypes of influenza A virus are further characterized into strains. There are many different strains of influenza B viruses and of influenza A subtypes. However, the only subtypes of influenza A virus that normally infect people are influenza A subtypes H1N1, H1N2, and H3N2. Between 1957 and 1968,

H2N2 viruses also circulated among people, but currently do not. Only influenza A viruses infect birds. Wild birds are the natural host for all subtypes of influenza A virus. Typically, wild birds do not get sick when they are infected with influenza virus. However, domestic poultry, such as turkeys and chickens, can get very sick and die from avian influenza, and some avian viruses also can cause serious disease and death in wild birds. Symptoms of Swine Flu: The symptoms of H1N1 flu virus (human swine flu) are very similar to those of seasonal human influenza and includes; Body aches, Chills, Cough, Fatigue, Fever, Headache, Loss of appetite, Sore throat. Some people with H1N1 flu virus have also reported vomiting and diarrhea. The severity of symptoms can vary from mild to severe and sometimes require hospitalization. In some cases, severe complications such as pneumonia and respiratory failure can cause death. Like the seasonal flu, swine flu may worsen existing chronic medical conditions. Incubation Period: The incubation period for swine flu (time between infection and appearance of symptoms) can be up to seven days, but is most likely to be between two and five days. It is, however, at this stage there is no certainty about the incubation period. How Swine Flu virus is detected? SAMPLE: Respiratory specimens including throat swab, and nasopharyngeal /nasal swabs. From incubated patients admitted in the ICU the sample is bronchoalveolar lavage or tracheal aspirates. Samples are transported in special viral transport medium that is packed in such a way that there is no chance of contaminating the environment or it being a risk to those handling the box. Real Time PCR (RT-PCR) is the gold standard test for testing suspected cases of swine flu. Advantages of PCR assays over more conventional viral culture-based diagnostics for influenza include significantly higher sensitivities (95-98%) and short turnaround times (6 -8 hours) which is very important for the patient management.

Cyanobacterial and microalgal diversity of Badrinath Hot Spring, Uttarakhand

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Cyanobacterial and microalgal samples were collected from the Badrinath hot spring along the temperature gradient 30- 60°C. The sample sites were divided into three temperature ranges *viz.* 30°- 40°C, 40°- 50°C, 50°- 60°C. The identification of the algal samples was done based on morphological features following relevant literature. Data showed that temperature strongly affected the distribution of algal species in the hot springs. Out of the total, maximum number of species were recorded (43) for temperature range 40°- 50°C. *Pseudanabaena catenata*, *Phormidium sp.*, *Chroococcus minor*, *Chroococcus minutus*, *Chroococcus indicus* were present in all the temperature ranges. *Synechococcus elongatus* and *Mastigocladus laminosus* were identified as the dominant thermophilic forms. These two forms completely dominated the springs at high temperature range. Besides cyanobacteria, species of microalgae and diatoms were also present at high temperatures. Three morphotypes of *Craticula sp.* and two species of *Cosmarium* were found growing at temperature > 45°C. The Shannon-Weiner index (H) was calculated which ranged between 0.008 to 0.53 for the study site.

Deleterious effects of climate change on vegetation of Doon Valley

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Presently climate change is a major issue that a whole world population is facing. It is not only affecting the human population but also the plant population equally. Many areas of the Doon valley are facing ill effects of climate change on its vegetation. Both wild as well as cultivated varieties of the plants are suffering from major loss due to the various factors like diseases, habitat loss, increase temperature etc, which are results of climate change. Change in flowering pattern and shorten life span has been observed in the plants of hilly areas of the valley. Depletion of forest density is observed in the many forests areas of the region. Traditional crop species of the area have become more prone to the diseases. Such changes

are giving rise to poor yield and vernalization in hilly and plane parts of the valley. Broad leaved forests are continuously being converted into chir pine forests and scrubs.

Bio-fumigation potential of endophytes to increase the shelf life of fruits and vegetables

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There are several causes of post-harvest losses in fruits and vegetables, and microbial infections are responsible for the greatest losses that occur during the transport, storage and sale of these products. Chemical control is the most used method to control post harvest diseases in fruits and vegetables by directly applying synthetic fungicides to the product to be consumed. However, the indiscriminate use of fungicides may be associated with serious toxicity problems in humans and environmental imbalance. Mycofumigation, which involves the exploitation of volatile antimicrobial compounds (VOCs) secreted by fungi to control the microbial invasion has become a promising alternative for controlling phytopathogenic fungi associated with post harvest diseases in fruits and vegetables. The technique has some advantages in comparison to traditional disease control methods. It does not require direct contact between the antagonist and the plant product, the antimicrobial volatiles diffuses easily in closed environments, they do not leave residues on the plant products to be consumed, and the most of the antimicrobial volatile mixture exhibit bioactivity against a wide range of microorganisms, including many phytopathogens associated with post harvest diseases.

***Calotropis procera*: A Plant with Great Medicinal Values**

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Calotropis procera (Common Name: Madar, Aak) has been known to a traditional system of medicine. In the current study, the medicinal value of the plant is analyzed through Laboratory Experiments and other references. *Calotropis p.* is used for digestive disorders including diarrhoea, constipation, stomach ulcer, and for painful conditions including toothaches, cramps, joint pains and for parasitic infections including Elephantiasis and worms. A variety of bioactive compounds have been isolated from the different parts of this plant and were analyzed pharmacologically. The plant is popularly known because it produces large amount of latex. A macerated bark extract can be used for de-hairing hides and tannins. The latex is cardiotoxic with the active ingredient being Calotropin. Compounds derived from the plant have been found to have emeto- cathartic and digitalic properties. The principal active medicines are Asclepin and Mudarin, few other compounds also have bacterial and vermifugal properties. The plant is reported for analgesic activity, anti-microbial activity, anti-oxidant activity, anti-pyretic activity, insecticidal activity, cyto-toxicity activity, hepato-protective activity, pregnancy interceptive properties, purgative properties, pro-coagulant activity and wound healing activity.

Graphene Membranes for Water Desalination

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Water scarcity is a major problem in these days. This problem lowers the quality of human life and wastes a large amount money worldwide each year. One of the most powerful technique to fully secure the availability of fresh water is desalination. Desalination converts salty water into drinkable water by removing salt and other solids from sea-water or brackish water. Nano technology have a great potential to be used in water treatment. Recent progress has been achieved using GRAPHENE OXIDE (GO)-assisted membranes in desalination applications. The multi-layer GO laminates have a unique architecture and superior performance that enable the development of novel desalination membrane technology. With

good mechanism properties, they are easily fabricated and have the ability to be industrially scaled up in the future. The study considers fabrication and mechanism for innovative GO assisted desalination membranes, and their future opportunities and challenges.

Radiations and Health Hazards

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Mobiles phones have brought revolution in human life. Before the invention of mobile phones very few people would have imagined that in future they would have instrument like mobile phone. But this great invention has brought with itself many health hazards. Mobile phones are operational on radio frequency, which ranges from 100MHZ to 300MHZ. People who are using mobiles while driving vehicles have risk that can be proven to be dangerous and risks life. RADIATIONS produce by mobile phones cause enough disruption to our body cell's. Mobile phone RADIATIONS may impact male infertility. Health issues associated with mobile radiations include childhood leukemia, brain tumors, genotoxic effects, neurological effects and neurodegenerative diseases etc. Sperm DNA fragmentation significantly altered in the subjects who use the mobile phone for more than 4 hours for a day and in a particular for those who use the device in the pocket of trousers. There are hazardous health effects of exposure to radio frequency electromagnetic RADIATIONS emitted from mobile phone on the human reproductive pattern. So it is important to take precautionary steps to protect ourself and minimize our exposure . We can avoid body contact, we can short the call duration, limit kids cell phone use time, switch sides of head when talking and many more things we can do to minimize the exposure.

Waste Management In Delhi

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Delhi is a city and union territory of India. The national capital territory of Delhi covers an area of about 1,484 sq.km. According to 2011 census, Delhi city's proper population was over 11 million. Along with intrinsic population growth the rural to urban mass migration account for additional population pressure on city. On an average, Delhi generates 9,000 tonnes of municipal solid waste per day. Three main and two subsidiary bodies are responsible for solid waste management in Delhi. In Delhi, there are 3 main landfill sites to manage such a huge amount of waste namely- Bhalswa land fill site, Ghazipur landfill site, Okhla landfill site. Integrated MSW management plant of 4000 TPD capacity has also been developed at Narela Bawana operational for 2000 TPD. 3 more plants are also setup in Delhi for generating energy in which around 4500 tonnes of MSW is used. Even after so much effort done by govt. And private sectors 78% Delhities dump garbage on roadside, according a report published by Hindustan Times. The survey done in between people living in a society and ragpicker shows that common people does not even not about waste segregation. After surveying residential society in South Delhi, initiatives must be taken towards educating people about correct practices of solid waste disposal.

Waste Management

Nitu Kumari

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We generate garbage or rubbish every day. Waste generated by an entire town or city is so huge that disposing it off is an immense problem. It cannot be burnt as this generates smoke and poisonous gases. It cannot be thrown into water as it will pollute the water. So waste management is big challenge for us. First, all garbage is segregated into bio-degradable, non-biodegradable and toxic (poisonous) waste by different colors of bin. Green bin is used to keep bio-degradable waste like vegetables, fruit peels, meat,

leaves, flowers, paper etc. Blue bin is used to keep non-biodegradable waste like plastic bags, cold drink cans, needles, bulbs etc. Black bin is used to keep toxic waste like medicines, batteries, dried paint, shoe polish etc. Keeping four Rs (Refuse, Reduce, Reuse and Recycle) in mind waste can be managed. All plastic bags should be refused to accept as far as possible. This should be reused whenever it is possible to do so without any adverse effects. Garbage should be reduced by consuming less and throwing less. Biodegradable waste can be recycled by the method of composting. It is natural process that recycles the nutrients in the waste to yield manure or compost. By recycling paper the number of trees can be saved. A lot of research is being conducted all over the world on developing eco-friendly, biodegradable plastics. Waste materials should be reused as far as possible. The rest can be sold to the kabadiwala for recycling.

Bio-prospecting fungal endophytes inhabiting medicinal plants of Dehradun

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Endophytes are organisms i.e. fungi and bacteria, that live within the living plant cells. They establish a symbiotic relationship with the host plant. For these organisms, all over part of their life cycle occurs within their host, without causing any apparent symptoms of disease. These endophytes produce secondary metabolites, that serves as a potential candidate for antimicrobial, anticancer, antioxidant, enzyme production and many more properties. The aim of this study was to screening of amylase producing fungal endophytes inhabiting medicinal plants. Endophytic fungi were isolated by tissue inoculation of three medicinal plants i.e. *Ocimum basilicum* (Lamiaceae), *Withenia somnifera* (Nightshade) and *Syzygium aromaticum* (Myrtaceae) 16 endophytes were isolates from the leaves and stems of these plants used as targeting microbes for the production of amylase by use starch agar plates by using the gel diffusion method respectively.

Green synthesis of zinc oxide nanoparticles using leaf extract of *Hedera nepalensis* K. Koch and its biological activity

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Green synthesis of metal oxide nanoparticles using plant extract is now getting popular these days because of its simplicity, economical and eco-friendly approach. The green synthesis method is now the preferred method as compared to physical and chemical method of nanoparticle synthesis. The present investigation was carried out by taking leaf extract of *H. nepalensis* for the synthesis of zinc oxide nanoparticles from zinc acetate dehydrate. The synthesised nanoparticles was characterised by using UV-Visible spectroscopy XRD, SEM, and EDX which proved that the synthesised ZnO NPs are in the range of nanoparticles. The wavelength specific UV-Vis absorption peaks for ZnO nanoparticles were recorded at 372 nm which confirmed the presence of zinc oxide in nano scale. Synthesised nanoparticles were tested for their antimicrobial activity against uro-pathogens and some standard strain of pathogenic bacteria. The synthesised ZnO NPs are active against *K. pneumoniae*, *E. coli*, *Bacillus subtilis*, *Staphylococcus aureus*, *B. cereus*, *Serratia marcescens* and no activity has been recorded against *Proteus* spp. and *S. typhi*. The synthesised ZnO NPs was also tested for their antioxidant potential and found to have significant antioxidant properties.

Effects of Vehicular Emission on Plant Pigments

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Air pollution is a serious problem in many heavily populated and industrialized areas in the world. Vehicular pollution is an important cause of the pollution which is the by-product of mechanized mobility and adversely affects both plant and human life. In many urban areas of the world, motor vehicle traffic is a major source of air pollution, contributing 57%–75% of total emission as studied by WHO. As we all know Delhi is most polluted city and surprisingly no Indian city passes the World Health Organization's guideline value for PM₁₀ pollution of less than 20 micrograms per cubic meter. Only 52 out of 280 cities pass Indian government's own standards of air pollution that say PM₁₀ shouldn't exceed 60 micrograms

Traditional Ecological Knowledge on Agriculture Practices

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Traditional ecological knowledge (TEK) is indigenous knowledge and local community knowledge. It is a knowledge which includes traditional technologies and methodologies of subsistence of ethno botany and ecological knowledge. TEK includes the direct relationship between human and natural phenomenon, they used hunting, gathering, fishing trapping, agriculture and medicinal plants to sustain their life. Traditional agriculture is the most practised form of agriculture around the world. India and as in many other developing countries having a rich agricultural tradition of their own, the word 'improved agriculture' and "progressive agriculture" have become synonymous with the spread of HYVs (High Yielding Varieties of Crops) grown with ever-increasing doses of chemical fertilisers and pesticides. Traditional agriculture is based on treating the soil and plants with organic methods. Soil fertility is protected or maintained by organic methods from long time to helps soil conservation. Pest control is done in natural ways which does not harm the environment, water remains clean and safe. This paper is based on the different traditional agriculture practices used mostly in tribe areas of different states, which is one of the important and finest method to conserve environment. The traditional practices and its knowledge are decreasing day by day due to migration from villages, technical innovation, urbanisation and industrialization.

Inhibition of alpha Amylase and alpha Glycosidase Enzymes by Various Earth Worm Extracts

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The earth worm extracts have been analysed for the inhibition of alpha amylase and alpha glycosidase enzymes. These two enzymes are the key enzymes for the control of glucose in the human system so have direct impact upon the health of an organism. These two enzymes have direct involvement in the diabetic process. So the inhibition of these two enzymes helps in the reduction of diabetes. Various extracts of the earth worms, viz, Ethyl acetate, Acetone, DMSO, Ethanol and Water have been used for the inhibition of alpha amylase and alpha glycosidase. Among the various extracts it had been found that water extract posses the highest inhibition potential followed by ethanol extract. The DMSO, Acetone posses the inhibition potential in between water extract and the Ethyl acetate extract. So it could be concluded that polar solvents possesses high inhibition potential than the lesser polar solvents, which could be due the polar extracted compounds from the concerned extract of earth. Diabetes mellitus is spreading in an alarming way throughout the world and three fourth of the world populations and considered as a major cause of high economic loss which can in turn impede the development of nations. Moreover, uncontrolled diabetes leads to many chronic complications such as blindness, heart disease, and renal failure, etc. For this, therapies developed along the principles of western medicine (allopathic) are often

limited in efficacy, carry the risk of adverse effects, and are often too costly, especially for the developing world. But the research in reference is the first research in the world in which it had been shown that earth worm extracts can be used as anti-diabetic medicines. Other properties of earth worms, like antimicrobial anti-inflammatory etc are known already but the anti-diabetic effect has been analysed first time in the world.

Waste Management in India

Ruchika Verma

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Waste management is the process of treating solid wastes and offers variety of solutions for recycling items that don't belong to trash. There are various methods of waste management like, landfills, Incineration or combustion, recovery, recycling, plasma gasification, composting, etc. The most easier method of waste management is to reduce creation of waste material. India generates over 150,000 tonnes of municipal solid waste per day, with Mumbai being the world's fifth most wasteful city. Yet, only 83% of waste is collected and less than 30% is treated. According to the World Bank, India's daily waste generation will reach 377,000 tonnes by 2025. In India, Swachh Bharat Mission is one of the most noteworthy step from Narendra Modi government. Several workshops are organised throughout the country, to make the people aware about this concept ranging from Gobar-dhan, biodegradable waste management, menstrual health management, faecal sludge management, plastics and liquid waste management. The Clean India Dashboard tracks programme generated almost 88.4 megawatts energy from waste-to-energy projects. As India's own economy grows faster and further, the country will face an insurmountable waste crisis, unless the government puts a high priority on waste management. We must demand our right to live in a clean and healthy natural environment. "Behaviour change begins at home, and by adopting the 4Rs (refuse, reduce, reuse, recycle), each one of us can help realise our collective dream of a Swachh Bharat"

Haematological studies and ABO susceptibility among the patients of dengue in Dehradun, district Uttarakhand

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Dengue is a viral mosquito-borne infection. The data was collected zone and month wise, from CMO office Dehradun. The distribution of age and sex among the subjects suffering from dengue fever in Dehradun, The data was collected zone and month wise, from CMO office Dehradun. In which (54.02%) males and (45.97%) female. We have taken different age groups in the patients in which 25.00% has been found in the age group of 21-30 among the total subjects, and 8.00% has been found in the age group >60. In the dengue fever multiple symptoms has been shown in a single individual. Most commonly headache shown by 89.99% patients. The range of total platelets count in male and female suffering from dengue fever, the highest range <50000 and lowest range of 150000-450000. The range of TLC (Cells/cumm) among the subjects suffering from Dengue fever in which (54.69%) males and (45.97%) females found among them, the highest range i.e (65.88%) has been found in the range of 4000-1000 and lowest number of individuals (0.05%) has been found in the range of >11000. The range of RBCs (Millions cells/mCL) among the subjects suffering from Dengue fever in which (54.02%) males and (45.97%) females found among the, in which the highest range i.e (34.30%) has been found in the range of 2.5-4.5 and lowest number of individuals (10.10%) has been found in the range of 4.5-5.5 ABO blood group distribution in subjects suffering from dengue fever in which (54.02%) males and (45.97%) females. The blood group O shows maximum no of individuals (42.78%) and blood group AB shows minimum number of individuals. Blood group A shows highest prevalence of individuals.

Pancreatitis: Inflammation in pancreas

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Pancreatitis is an inflammatory condition of pancreas, an organ located behind the stomach and below the ribcage. In the inflammatory condition of pancreas, enzymes secreted from the pancreatic tissue, attack and damage the tissue from which they are secreted. There are two types of pancreatitis, acute pancreatitis and chronic pancreatitis. Gall stones and alcohol consumption are the most common causes of acute pancreatitis, though the exact cause is still unknown. Gallstones create blockage on the opening of pancreas and this can disrupt some of the pancreatic enzymes which then start the tissues of pancreas. A study found that people who regularly drank more than 35 units of alcohol a week were four times more likely to develop acute pancreatitis than people who never drank alcohol. Instead of that accidental damage of pancreas, antibiotic or chemotherapy medication, mumps, measles like viral infection, cystic fibrosis can also be certain cause of pancreatitis. Scientists have found that MCP-1 mutation, are eight times more likely to develop severe acute pancreatitis than the general population. In chronic pancreatitis, the damage is irreversible and its cause is also unknown. Some predicted reasons of chronic pancreatitis are hereditary, hyperparathyroidism, autoimmune pancreatitis, obstruction, trauma and pancreas divisum. There are few treatments like analgesia, enzyme therapy, antisecretory therapy, neurolytic therapy, endoscopic management and so on.

Integrated Nutrient Management for food security and Environmental protection

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The present study, deals about the effect of modern agriculture on human society and their possible solution. In India the main economic gainer is agriculture but after green revolution the tradition agriculture was replaced by modern agriculture. As modern agriculture is a good economic gainer for the farmers and a very good for the output of the country. This is the one phase of the coin let see another phase of the coin, this Agriculture has degraded the environmental quality in enormous manner. We have exhausted the environmental resources in very short period of time for fulfil the demand of food for the human being. No doubt agriculture is the necessity for the human being, we can't survive without crop development and variations, but the time has been come to accept the concept of sustainable agriculture for long time survival on the earth planet. INM is the technique to grow crops by the using of minimum amount of chemical fertilizers and resources. In this study we have carried out an experimental research on the effects of nutrient management on the selected crop. By accepting the nutrient management plan we will be able to give more enhanced and advanced quality of food material to our next generation without causing the degradation of the environmental quality. So INM is the technique of great concern not only for the enhancement of crops but for the human welfare also by which we will be able to provide nutritionally good food material to the human society.

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