Proceedings of International Conference on Advances in Biosciences and Biotechnology

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ABSTRACT

The International Conference on Advances in Biosciences and Biotechnology (ICABB 2020) on theme "OMICS in Human Health and Disease" was held at Jaypee Institute of Information Technology, Noida India during 30th Jan to 1st Feb 2020. Omics in biotechnology has revolutionized medical research by employing high-throughput technologies that offers the opportunity to understand the flow of information that underlies disease diagnostics and therapeutics. Omics technologies have enabled cost-efficient and high-throughput analysis of human health and diseases. These technologies are highly applicable in the field of microbial and agricultural biotechnology too. Considering the wide application of omics based studies, the three days scientific program covered the major breakthroughs in the area of "OMICS in Human Health and Disease" including genomics, proteomics, transcriptomics, metabolomics, diseases diagnostics and therapeutics, computational approaches in biotechnology, microbial and agricultural biotechnology as well as current technological advancements in biotech industries. During this three days event, total 308 participant including 32 oral presentations and 167 poster presentations shared their research work and gained a lot of experience. In addition to this, vast research experience of various national and international key note speakers and industry experts enriched the conference. Thus, the event was an amalgamation of multidisciplinary fields of Biotechnology and provided great opportunities for exchange of ideas, scientific knowledge and experience among researchers, academicians, scientists and students from Biological, Medical and Computational fields.

KEYWORDS: Proceedings, International. Conference, Advances, Biosciences, Biotechnology.

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Proceedings

of

International Conference on Advances in Biosciences and Biotechnology ICABB 2020

(30th January to 1st February, 2020)

Organized by

Department of Biotechnology, Jaypee Institute of Information Technology,
A-10, Sector 62, Nodia, Uttar Pradesh, INDIA-201 309

International Conference on Advances in Biosciences and Biotechnology — ICABB 2020

(30th January to 1st February, 2020)

CONTENTS

About the Institute

Jaypee Institute of Information Technology, Noida was established in the year 2001 and has been declared as a "Deemed to be University" under Section 3 of UGC Act 1956 in the year 2004.JIIT's state-of-the-art, environmentally conditioned campus comprises smart buildings with Wi-Fi connectivity covering the Academic Block, Business School cum Research Block, Faculty Residences, Student Hostels and Annapurna. Well equipped modern laboratories and an intellectually stocked Learning Resource Centre with books and E-Resources provide a pleasant and stimulating ambience

About the Host Department

The Department of Biotechnology at JIIT, NOIDA, established in 2002, remains committed to provide research-informed teaching and learning, and vibrant R & D environment. Faculty with rich research exposure in academia and industry both in India and abroad contributes to the department academic core. The biotechnology scope is never ending as the power to alter life has just seen its beginning. The field of biotechnology is steadily growing in India. Biotech industry achieves record (15 %) growth in 2012-13. In response to continuously evolving technology and industry needs, curriculum is designed to impart skill sets enabling adaptation to academia, research, and industry. The curriculum provides engineering interface and integrates core subject area knowledge with professional development; focusing on entrepreneurship, analytical and research skills. The research emphasis is reflected in the active doctoral program, publications in international/national journals, and sponsored research projects totalling approximately INR-9.44 Crores from premier national funding agencies namely, the Department of Biotechnology (DBT), the Department of Science and Technology (DST), All India Council for Technical Education (AICTE), Indian Council for Medical Research (ICMR) and Department of AYUSH.

About the Conference

"International Conference on Advances in Biosciences and Biotechnology (ICABB 2020)" on OMICS in Human Health and Disease during 30th Jan to 1st Feb 2020 would be an amalgamation of multidisciplinary fields of Biotechnology providing opportunities for exchange of ideas, scientific knowledge and experience among researchers, academicians, scientists and students from Biological, Medical and Computational fields.

The scientific program will include plenary/ keynote lectures along with oral and poster presentation under 5 major themes focusing on breakthroughs in OMICS based studies in Biological sciences, Computational approaches in Biotechnology, Microbial and Agricultural Biotechnology as well upcoming current technological advancements.

All accepted abstracts will be published online under the umbrella of Research Reports ISSN: 2471-5689: 2020 which is a journal of The Company of Scientists. Selected abstracts from oral and poster presentations will be considered for publication as full length manuscripts by the Conference Technical Committee and the Editorial Members of various reputed scientific journals and book

Scientific Programme

For

International Conference on Advances in Biosciences and Biotechnology - ICABB-2020

(30th January - 1st February, 2020)

Day 1- Thursday, 30th January, 2020

08:45 onwards	**Conference Registration** (in front of Auditorium)
9:45-10:30	**Inauguration and Welcome Note**
10:30-11:00	**Tea/Coffee Break**

Technical Session I: Disease Diagnostics and Therapeutics (Chairperson: Dr Mohammad Takwa)

11:00-11:45	**Keynote Speaker** - Mitochondria as reversible regulators of skin wrinkles and hair loss in mice -**Prof. Keshav Singh (Alabama University)**
11:45-12:30	**Keynote Speaker** - One dimensional nanostructures for biosensing- **Prof. Christelle Prinz (Lund University, Sweden)**
12:30-13:00	**Invited Talk –** Nanostructure-assisted particle delivery into living cells– **Dr. Elke Hebisch (Lund University, Sweden)**
13:00-14:00	**Lunch Break**

Technical Session II: OMICS in Biological Sciences (Chairperson: Dr. G. P. S. Raghav)

14:00-14:45	**Keynote Speaker** -Ayurvedic Biology – the path for integration of modern and traditional health sciences - **Prof S. C. Lakhotia** (**BHU, Varanasi)**
14:45-15:15	**Invited Talk** - The chronicle of Indian subcontinent: genomic perspectives- **Dr. K Thangaraj** (**CCMB, Hyderabad)**
15:15-15:55	**Oral presentations** (7 min duration including Q & A**) (OP1-OP5)**
	Poster session (PP1-PP40)
15:55-16:15	**Tea/Coffee Break**
16:15-16:45	**Invited Talk** - Graphene oxide-Chloroquine (GO-Chl) induced autophagy mediated necroptotic cell death in A549 lung cancer cell line – **Dr. S. P. Singh (NPL, New Delhi)**
16:45-18:00	**Oral presentations** (7 min duration including Q & A**) (OP6-OP15)**
	Poster session (PP41-PP80)
18:30-19:30	**Cultural program**
20:00-21:00	**Gala Dinner**

Day 2- Friday, 31st January, 2020

Technical Session III: Computational Approaches in Biotechnology (Chairperson: Dr. Anil K Gupta)

09:40-10:25 **Keynote Speaker -** Data driven approaches for deciphering chemical structures of novel natural products by genome mining - **Prof. Debasis Mohanty (NII, New Delhi)**

10:25-10:55 **Invited talk -** Clinical implications of microRNA in Cancer: HCC model - **Dr. Baibaswata Nayak (Department of Gasteroentrology, AIIMS)**

10:55-11:20 **Tea/Coffee Break**

11:20-11:50 **Invited Talk -** Sperm: Not just a DNA vehicle**– Dr. Rajender Singh (CDRI, Lucknow)**

11:50-12:20 **Invited Talk –**Genetic architecture of Himalayan populations - **Prof. Gyaneshwar Choubey (BHU Varanasi)**

12:20-13:30 **Oral presentations** (7 min duration including Q & A**) (OP16-OP25)**
Poster session (PP81-PP120)

13:30-14:30 **Lunch Break**

Technical Session IV: Microbial and Agricultural Biotechnology (Chairperson: Prof. S. C. Lakhotia)

14:30-15:15 **Keynote Speaker -** Sustainable nitrogen management and biotechnological approach to improve nitrogen use efficiency – **Prof. N. Raghuram (GGSIPU, New Delhi),**

15:15-15:45 **Invited Talk**. - Nano-Agriculture for Ensuring Nutritional Security and rainbow revolution via Integrated Nutrients Management– **Prof. Anil Kumar Gupta (RLBCAU, Jhansi)**

15:45-16:15 **Tea/Coffee Break**

16:15-17:35 **Oral presentations** (7 min duration including Q & A**) (OP26-OP33)**

Poster session (PP121-PP169)

Day 3- Saturday, 1st February, 2020

Technical Session V:Recent Technological Advancements(Chairperson: Prof.Christelle Prinz)

09:40-10:25 **Keynote Speaker -** Biocatalysis, diverse examples of industrial applications - **Dr. Mohammad Takwa (Ecozyme AB, Sweden)**

10:25-10:55 **Invited Talk -** Application of Genome Mining in Human Healthcare **– Dr. G. P. S. Raghav (IIIT, New Delhi)**

10:55-11:20 **Tea/Coffee Break**

11:20-11:40 **Invited talk -**Functional Genomic Screen using CRISPR/Cas9 based genome editing from Thermo Fisher Scientific **- Dr. Ajay Kumar (Thermo Fisher)**

11:40-12:00 **Talk by Expert from HiMedia**

12:00-1:30 **Valedictory, Vote of Thanks & Closing Ceremony followed by Lunch**

Oral Presentations

Day 1 15:15 -15:55 Oral presentations and evaluation session

OP No.	ICABB ID	Title
OP1	ICABB_052	Proteomic profiling of morphtotypes of *Aspergillus terreus* and during interaction with lung epithelial cells revealed stage specific response
OP2	ICABB_055	Dendritic Cells:a key player in Naïve T-cell activation
OP3	ICABB_249.	Thrombotic Complications: Provoked on High Elevation
OP4	ICABB_047	Anticancer potential of human intestinal defensin 5 against 1, 2-dimethylhydrazine dihydrochloride induced colon cancer: A therapeutic approach
OP5	ICABB_210	In-vitro Cytotoxicity study of AuNP-Gabapentin on N2a neuroblastoma cell line

Day 1 16:45-18:00 Oral presentations and evaluation session

OP No.	ICABB ID	Title
OP6	ICABB_053	Urinary metabolic alterations for human participants residing in Siachen base camp
OP7	ICABB_035	Anti-quorum sensing activity of potassium salt of 2-methoxy-4-vinylphenol in *Pseudomonas aeruginosa*
OP8	ICABB_017	Role of Genetic Screening PGS and PGD for the Implantation of Euploidembroy in mother's womb through IVF
OP9	ICABB_015	Development of Tyrosinase-based colorimetric Biosensor for detection of phenolic compounds
OP10	ICABB_212	Unraveling the proteomic landscape of ex vivo and in vitro cultured FAC-sorted murine Sca-1 positive stem cells reveals distinct dynamics of translational machinery
OP11	ICABB_239	Protective effect of Withaferin A against nanoparticles induced oxidative damage in cellular immunity
OP12	ICABB_255	Gold nanoparticles as a delivery vehicle for transfection of full length HEV ORF2
OP13	ICABB_242	Structure Activity Relationship (SAR) studies to maximize the activity of lead compounds against *Mycobacterium tuberculosis*CysE
OP14	ICABB_151	In silico study of Molecular Docking and ADME Studies of Novel Derivative of ErlotinibTargeting the Epidermal Growth Factor Receptor in GlioblastomaTreatment in Glioma
OP15	ICABB_104	Andrographolide: a potential anticancerous agent in breast cancer therapeutics by targeting Estrogen receptor and Progesterone Receptor

Day 2 12:20-13:30 Oral presentations and evaluation session

OP No.	ICABB ID	Title
OP16	ICABB_026	Improved data curation strategies of genetic variants for precision diagnosis of monogenic disorders
OP17	ICABB_060	Engineering resistance against cotton leaf curl disease with the application of Antisense technology
OP18	ICABB_008	Waste water treatment using microalgae
OP19	ICABB_065	Green Biogenic synthesis of silver nanoparticles using *Eryngium foetidum* (long coriander) leaf extract at room temperature: characterization, antimicrobial and anti-cancer studies
OP20	ICABB_009	Assessment of arsenic and nutrients in wheat varieties (*Triticumaestivum*) grown in Ballia district, Eastern Uttar Pradesh, India
OP21	ICABB_213	Comparative analysis of liquid culture medium and abiotic conditions on morphological responses and saponin yield in in-vitro culture of *Bacopamonnieri*
OP22	ICABB_076	Cryopreservation and Regeneration of *Picrorhizakurroa*
OP23	ICABB_005	Toxin–Antitoxin Interaction study of mazEFXn Toxin-Antitoxin (TA) module from *Xenorhabdusnematophila*
OP24	ICABB_014	Production and Optimization of L-Glutaminase from tur husk by salt pan isolate under SSF
OP25	ICABB_071	Biotransformation of Xenobiotic compounds by lignin- degrading white rot fungi

Day2 16:15-17:35 Oral presentations and evaluation session

OP No.	ICABB ID	Title
OP26	ICABB_002	Increasing the virulence of entomopathogenic fungus *Metarhiziumanisopliae* by increasing the enzyme activity of virulence determining genes
OP27	ICABB_215	Molecular identification of endophytic fungi isolated from Medicinal plant of Northeast India
OP28	ICABB_075	Biodegradation of toxic organic pollutants in water source is powered by textile microbial proteins
OP29	ICABB_004	Unraveling the interaction mechanism of GTP with cody of *Bacillus anthracis*, a potent bioterror weapon
OP30	ICABB_089	Evaluation of Bacterial Inhabitants of Phylloplane Region of *Centella asiatica* for Their Role in Salinity Stress Tolerance
OP31	ICABB_010	Differential response of rice varieties under arsenic and iron using biochemical and molecular approaches
OP32	ICABB_250	Comparative Analysis of Lignocellulosic Pretreatment strategies for 2G Bioethanol Production
OP33	ICABB_252	Nutraceuticals potential of probiotics and prebiotics for obesity induced infertility disorder

Poster Presentations

Day 1 15:15 -15:55 Poster presentations and evaluation session

PP No.	Title
PP1	Flavivirus: Endoplasmic Reticulum (ER) stress induced pathogenesis
PP2	Endoplasmic Reticulum Stress regulation by Picornaviridae
PP3	Life style Diseases: A Cross Talk between Environment and Epigenetic Modifications
PP4	EMT transition stages during tumor progression
PP5	Microneedles for transdermal drug delivery
PP6	Prevalence of subclinical hypothyroidism in an otherwisw healthy population - a study
PP7	Prevalence of hyponatremia in an elderly population: a case study
PP8	H_2S Modulation : A Novel Therapeutics For Cancer
PP9	Cerebrovascular Disorders and Vascular Dementia
PP10	Intranasal delivery of nanoformulations for neuropathic pain
PP11	Anti-Proliferative effect of phytocompounds on glioblastoma cell lines
PP12	Approval pathway for new drug in India
PP13	Combined effect of Metformin and Vitamin D on cellular Bioenergetics and Hyperglycemia
PP14	Neuropathic pain management: a review
PP15	Degradation mechanism and production of secondary metabolites in response to stress
PP16	Drug Designing In lung Cancer Therapeutics:Applications To Challenges
PP17	Vanillin: Anti tumorigenic agent in high grade brain tumour
PP18	Effect of Different Drugs on Urolithiasis
PP19	Effect of Dietary Supplements on Kidney Health
PP20	Impact of radioactive metals on human health
PP21	Nanocarrier based approaches for combination therapy
PP22	Drug delivery for Alzheimer's Disease
PP23	Drugs and its effect on kidney health
PP24	Process of Drug Development in India
PP25	Anti-stress herbs and stress management
PP26	Nanobots-the future of medical treatments
PP27	Gut centric views of metabolic syndrome and herbal intervention
PP28	Water Pollution and Endocrine Disruptors
PP29	Role of nasal mucosal graft in drug delivery- recent advances and future perspectives
PP30	Advancement of peptide based therapeutics for the treatment of neurological disorders
PP31	Advances in therapeutics for Multiple sclerosis: classic and advanced drug formulations
PP32	Anti ageing therapies
PP33	Role of Metformin and Vitamin D3 in cancer
PP34	Drug delivery via RGD modified polymers and liposomes nano-vehicles in cancer therapeutics
PP35	CAR T Cell Therapy: Apotential tool for the treatment of solid tumors.
PP36	Human papillomavirus and development of HPV Vaccine for cervical cancer
PP37	Transdermal Therapeutics For The Treatment of Cancer
PP38	DNA vaccine as a new strategy for cancer immunotherapy
PP39	Emerging novel therapeutics to target human Glioblastoma
PP40	Critical Analysis of Diagnostic Biomarkers for Acute Myocardial Infarction

Day 1 16:45-18:00 Poster presentations and evaluation session

PP No.	Title
PP41	Technological Advancements of Nucleic Acid Based Biosensors
PP42	Botulinum toxin - a Miracle poison
PP43	Lycopene: A Sword Against Neurodegenerative Disorders
PP44	Animal venom as a chemopreventive agent: A review
PP45	Antiretroviral drug induced adverse reactions: a retrospective analysis
PP46	Biosensors and its Application – A review
PP47	Evaluation of plant extracts as possible phytotherapeutics for the treatment of asthma – A review
PP48	Size Control Synthesis of thiol functionalized monodispersed Gold Nanoparticles
PP49	Systematic review on liabilities of antibiotic
PP50	Remediation of neurodegenerative disorders by inducing neurogenesis mechanism
PP51	Adult Stem Cell Therapy : A Review
PP52	Role And Significance of Pharmacogenomics in Drug Development: A Review
PP53	Evaluation of Lepidine as Anti-ovulatory Agent in Female Rats
PP54	Effect of human enteric pathogen colonization on speck disease development in Solanum lycopersicum
PP55	Identification of functional genes in novel X-Chromosome of Indian *Drosophila ananassae*
PP56	Zymographic techniques to identify oxidative stress targets in cancer
PP57	Cloning and expression of host interactor for nsp2 protein
PP58	Anti-proliferative effects of clove oil on GBM cell lines
PP59	Study on γH2AX as a genotoxic marker for radiological and chemical exposure.
PP60	Gut microbiome and cancer immunotherapy
PP61	Recombinant Pneumococcal surface protein A (PspA) and conjugation of recombinant PspA with polysaccharide 6B from *Streptococcus pneumoniae* (PS6B-rPspA1)
PP62	Engineered Fibroblast Growth Factors: Their application in Tissue regeneration and Angiogenesis
PP63	A comprehensive review on potential of RNA interference for pest control
PP64	Antigenic variability of serotype A foot-and-mouth disease virus
PP65	Antioxidant Profiling and In silico study of Polyphenolic Flavonoids of Defatted Seeds against Receptors of Oral Squamous Cell Carcinoma
PP66	Drug utilization and pharmacoeconomic analysis of geriatric patient attending outpatient department of Tirunesh Beijing general hospital Addis Ababa, Ethiopia
PP67	Effect of folate in modulating mTOR expression and it's downstream targets in human HCC cell line
PP68	High glucose-induced dysregulation of visfatin synthesis and secretion in 3T3-L1 derived adipocytes
PP69	Physiological and biochemical analysis of *Tageteserecta* under zinc stress
PP70	Study on the association of mir-500a, stat-3 and cervical carcinoma
PP71	The Role Of Immune Cells And Animals Model To Understand The Mechanism Of Tuberculosis Granuloma
PP72	Systems biology study on MtrAB protein-protein interaction network of *Mycobacterium tuberculosis*
PP73	Efficient delivery devices appropriate for intra nasal delivery of therapeutic agents across the Blood Brain Barrier (BBB)
PP74	Applications of Machine learning techniques in predicting the early detection of psychiatric disorders: A review
PP75	Structural characterisation of PIP box of cdc45 in *Leishmaniadonovani*

PP76	CRISPR CAS9 Technology:A versatile tool for gene editing and cancer therapy
PP77	Computational peptide designing: applications and challenges
PP78	Targeting PPI for Therapeutic Interventions
PP79	Analysis of core genome and phylogenetics in various Anaplasma species using systems biology approach
PP80	Computer aided drug design for industrial applications- a review

Day 2 12:20-13:30 Poster presentations and evaluation session

PP No.	Title
PP81	Identifying protein targets implicated in ALS and docking them with ligands screened as per Lipinksi's Rule of Drug likeness
PP82	In Silico Identification of Dengue inhibitors in Giloy (*Tinosporacordifolia*)
PP83	Structural Characterization of Drug-Receptor Interactions: Computational and Experimental Strategies
PP84	Prediction of breast cancer using machine learning methods
PP85	Soft computing approaches in colorectal cancer genomics : a review
PP86	Phytoremediation: Curing air pollution with house plants
PP87	Remediation of e-waste
PP88	Phytoextraction of Precious Metal
PP89	Bioremediation of radioactive waste
PP90	Presence of Antibiotics in soil and water and its impact on animals and plants
PP91	Survey-based study on awareness of consumers towards fermented food products consumption
PP92	Bacterial cellulose: a sustainable source to develop food products
PP93	Effect of process parameters on production of bacterial cellulose
PP94	Herbal products in drug induced toxicity
PP95	Functional foods: the foods for the new world
PP96	Phytoremediation of Heavy Metals Using Energy Crops
PP97	Legumes in cancer prevention
PP98	Assessing Remediation Potential of Lead Tolerant Bacteria isolated from industrial area
PP99	Gut-brain-axis: probiotics interventions
PP100	Profiling of bioactive compounds from microorganisms
PP101	Assisting remediation of Cr(VI) using leguminous plants: A green approach
PP102	Small millets: grains full of nutrients yet largely underutilized
PP103	Ayurveda insights into management of Parkinson’s disease
PP104	Anti-Osteoporotic activity of probiotics
PP105	Microbes as a source of sustainable energy
PP106	Morphological and biochemical analysis to study the influence of chromium toxicity on ir-64
PP107	Evaluation of the metabolites from extracts of the lichens obtained from Forest Research Institute for their antimicrobial activity
PP108	Effect of different light colour sources on growth and development of plants
PP109	Remediation of nitrate using microbes and plants- a review
PP110	Green Bio-refinery: A strategic approach to sustainable manufacturing and low exergy waste disposal
PP111	A review on negative impacts of organophosphate pesticides
PP112	Biochar: Characteristics and its environmental applications
PP113	Screening of Microorganisms from Wastewater of North India
PP114	Purification and Crystallization of Catalase from Spinach
PP115	Survey on public knowledge and perception antimicrobial resistance
PP116	Microbial Pigment and Industrial Applications

PP117	Characterization of *ClitoriaTernatea* for its properties
PP118	Edible coatings: technique to improve shelf-life of cut fruits and vegetables
PP119	Fungal chitosan production and its characterization in submerged cultivation
PP120	Polysaccharide based Edible Coating

Day 2 16:15-17:35 Poster presentations and evaluation session

PP No.	Title
PP121	Bioremediation of aromatics pollutants
PP122	Advancements in Detergent Industry
PP123	Efficiency of microorganisms in utilizing natural tannins through fermentation for production of Gallic acid
PP124	Current status and future prospects of Biopesticide formulations
PP125	A Study on the impact of Abiotic Stress on Plant Growth
PP126	Harnessing the pesticide degradation potential of Trichoderma to address risks associated with consumption of agricultural products containing pesticide residues
PP127	Production and Characterization of Bacterial Cellulose from *Acetobacter sp.*
PP128	*Fusarium oxysporum* R1 invasion during corm rot disease in *Crocus sativus L.* (Saffron)
PP129	Study of the role of Exogenous Application of Salicylic Acid during Salt and Osmotic stress in *Euphorbia hirta.*
PP130	A review on plants as an Antibacterial agent
PP131	A study on biotransformation of vinblastine and ajmalicine using microbes isolated from soils
PP132	Alpha Amylase Enzyme Production by Normal Flora of Human Body
PP133	Application of bio-genic silica nanoparticle in crop management
PP134	Approches of artificial intelligence to modify crispr-cas9 technique
PP135	*Beauveriabassiana* as a potent biopesticide for control of locust: A review
PP136	Biofertilizer: A Review
PP137	Treatment of wastewater through bioremediation: a review
PP138	Biosafety issues associated with biopesticides - a review of regulations
PP139	Carbapenem-resistant Enterobacteriaceae (CRE) in Environment
PP140	Diversity of Cotton Leaf Curl Virus Infecting Cotton in India
PP141	Fungal mediated biosynthesis on silver nanoparticles
PP142	Green Pesticides: Essential Oils as Biopesticide in Pest Management
PP143	Heavy metal degradation from wastewater using microbes: A review
PP144	Investigating the stability of abundant flavonoids and antioxidant activity in processed v/s unprocessed juices over a target storage period
PP145	Isolation of Cellulose-Degrading endophyte from *Capsicum chinense* and determination of its cellulolytic potential
PP146	Isolation, identification of halophile from sambhar lake Jaipur. And antimicrobial activity of their metabolites against bacterial and fungal strain
PP147	Isolation, purification, characterization and quantification of the lipase producing microbes from various oil contaminated sites
PP148	Lactic acid production by *Lactobacillus sp.* isolated from fermented idli batter
PP149	Microbes in the field of pharmaceuticals
PP150	Presence of microorganisms in indoor environments
PP151	Seaweed as Biopesticide: A Review
PP152	Study of the role of exogenous application of Salicylic Acid during salinity stress in *Euphorbia hirta.*
PP153	Synbiotics: Properties, Actions and Combinations (A Review)
PP154	The usage patterns and key applications of microremidiation in microbial technology for environment detoxification and Development.

PP155	Use of *Trichoderma sps*. as biofertiliser for control of *Macrophominaphaseolina* causal agent of charcoal rot
PP156	Vitamin D enhancement and nutraceutical potential of mushroom mycelia
PP157	Cryopreservation and Regeneration of Picrorhizakurroa
PP158	Native Serratiamarcescens from rat hole coal mines- a potent bioremediator of heavy metals
PP159	Review on multiple potency of Karanj
PP160	Trends in the use of Edible starch films and their coating in horticulture
PP161	Bastfibre- study of composition, retting method, surface structure and application.
PP162	Comparative analysis of commercially available milk
PP163	Natural Pigments for textile dyeing
PP164	Effects of heavy metals and abiotic stresses on differential expression of mirna in ir-64
PP165	Production of platform chemical xylitol from Indian agricultural residues
PP166	Microorganisms And Genetically Engineered Microorganisms Application In Bioremediation
PP167	Antibacterial potential of bioactive compound extracted from *Tephrosiapurpurea* roots against methicillin resistant S*taphylococcus aureus* (MRSA) isolated from clinical samples of patients from Rajasthan
PP168	Green synthesis of Silver Nanoparticles from Tobacco Stem for Wound Healing
PP169	Transition stages during metastasis
PP170	Extremozymes in Textile Industry

MANOJ GAUR
Executive Chairman

JAIPRAKASH
ASSOCIATES LIMITED

January 24, 2020

Message

It is indeed a matter of great pleasure for me to know that the **Department of Biotechnology, Jaypee Institute of Information Technology, Noida** is organizing the**"International Conference on Advances in Biosciences and Biotechnology"** from 30th January to 1st February 2020, with its theme **"Omics In Human Health and Disease".**

I am certain that this International Conference will provide a wide opportunity to all the participants to share their research outcomes and also grasp new ideas and valuable suggestions for their researches. I believe that this meeting would provide a platform to develop linkages between the budding researchers, scientists and entrepreneurs associated with the diverse area of biotechnology.

I convey my best wishes to all the organizers and participants of the conference and also wish them a grand success in organizing this event.

With best wishes,

Manoj Gaur

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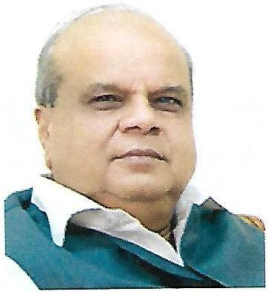
Jaypee Institute of Information Technology
(Declared Deemed to be University u/s 3 of the UGC Act)

Prof. S C Saxena
Vice-Chancellor

January 24, 2020



Message

It gives me a great pleasure to know that **Department of Biotechnology, Jaypee Institute of Information Technology, Noida** is organizing the **"International Conference on Advances in Biosciences and Biotechnology"** from 30th January to 1st February 2020 with its theme as **"Omics In Human Health and Disease".** The conference willprovide an excellent platform for exchange of research findings and new advances in the thematic areas of the conference. I am certain that these three days of conference will be of enormous value to all the participating delegates and will bring out new ideas and solutions to the ever challenging problems related to the themes.

I welcome all the delegates to this conference and hope that the theme will benefit the scientific fraternity and students. I convey my best wishes to the organizers and wish the event a grand success.

With best wishes,

S.C. Saxena

Message from the organizers

It gives us a great pleasure to extend a warm welcome to all the delegates to International conference on Advances in Bioscience and Biotechnology (ICABB 2020) on OMICS in Human Health and Disease, being organized by Department of Biotechnology, Jaypee Institute of Information Technology, Noida from 30th Jan to 1st Feb, 2020. This event would be an amalgamation of multi-disciplinary fields of Biotechnology providing opportunities for exchange of ideas, scientific knowledge and experience among researchers, academicians, scientists and students from Biological, Medical and Computational fields. We have received an overwhelming response from 308 participants including 32 oral presentations and 167 poster presentations. In addition to this, vast research experience of 6 keynote speakers, 8 invited speakers and 2 industry experts would enrich the conference further.

Omics in biotechnology has revolutionized medical research by employing High-throughput technologies that offers the opportunity to understand the flow of information that underlies disease diagnostics and therapeutics. Omics technologies have enabled cost-efficient and high-throughput analysis of human health and disease. The three day scientific program would cover major breakthroughs in the area of OMICS in Human Health and Diseases including Genomics, Proteomics, Transcriptomics, Metabolomics, Disease Diagnostics and Therapeutics, Computational Approaches in Biotechnology, Microbial and Agricultural Biotechnology as well as Current Technological Advancements in Biotech Industry.

The event has been made possible with sincere efforts of all the faculty members of Department of Biotechnology, staff from administrative and finance departments. The untiring efforts of the student volunteers who have worked day and night is highly appreciated. We are extremely grateful to all the national and international speakers who accepted our invitation. We are thankful to our Advisory Committee Members for their continuous support and guidance. The support from our publishing partners and sponsors is greatly acknowledged.

We thank Prof. S. C. Saxena, Hon'ble Vice Chancellor, for his constant motivation, guidance, valuable inputs and support extended to make this conference a success. Without his cooperation and full support, this conference would not have been possible.

Finally, on behalf of organising committee we wish you a comfortable stay and a fulfilling research experience during the conference. Thank you all once again, and we look forward to a productive event.

Prof. Pammi Gauba
Convenor

Dr. Shalini Mani
Organising Secretary

Prof. Sudha Srivastava
Organising Secretary

Keynote/Invited Talks Abstracts

MITOCHONDRIA AS REVERSIBLE REGULATORS OF SKIN WRINKLES AND HAIR LOSS IN MICE

Speaker: Prof. Keshav K. Singh,

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To evaluate the consequences of the decline in mtDNA content associated with aging we have created an inducible mouse model expressing, in the polymerase domain of POLG1, a dominant-negative mutation that induces depletion of mtDNA. We utilized this inducible mouse model to modulate mitochondrial function by depleting and repleting the mtDNA content. We demonstrate that, in mice, ubiquitous expression of dominant-negative mutant POLG1 leads to 1) reduction of mtDNA content in skin, 2) skin wrinkles, and 3) hair loss. By turning off the mutant POLG1 transgene expression in the whole animal, the skin and hair phenotypes revert to normal after repletion of mtDNA. Thus, we have developed whole-animal mtDNA depleter-repleter mice. These mice present evidence that mtDNA homeostasis is involved in skin aging phenotype and loss of hair and provide an unprecedented opportunity to create tissue-specific mitochondrial modulation to determine the role of the mitochondria in a particular tissue.

ONE DIMENSIONAL NANOSTRUCTURES FOR BIOSENSING

Speaker: Prof. Christelle N. Prinz,

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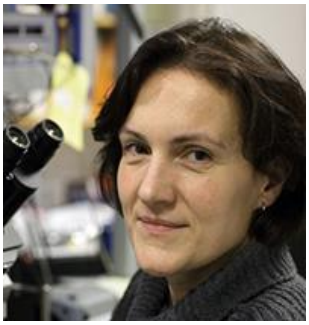

Semiconductor nanowires are very promising tools for biological applications. Their small dimensions, which are on the same length scale as many cell components, make them an ideal tool to probe and stimulate cells with minimal perturbation. In this talk I will review our work towards using nanowires for biosensing applications. For instance, we have shown that nanowires are a material of interest for developing neural implants, with a strong potential to minimize glial scars. We have also demonstrated that nanowires can be used for cellular mechanosensing and for the detection of biomarkers.

INTRACELLULAR DELIVERY OF FLUORESCENT NANODIAMONDS USING NANOSTRAWS

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The possibility to target, localize, and track specific cells, cellular organelles, and biomolecules is of great interest to all life sciences - from biosensing to diagnostics to studies of complex inter- and intracellular dynamics.

Fluorescent nitrogen-vacancy nanodiamonds (NVND) are promising fluorescent probes with unique properties and great potential to advance these and many other fields of research. NVNDs are small (10-100 nm), nontoxic, show high chemical stability, and can be bioconjugated to various targets. Furthermore, NVND have excellent photophysical properties: they are brighter than comparable organic dyes and they virtually don't bleach. These features make NVND ideal fluorescent probes for real-time live cell investigations.

However, the intracellular delivery of NVND as cellular reporters is challenging. Spontaneous cellular uptake of NVND suffers from potential trapping of the NVND in cell organelles; classical high-voltage electroporation can irreversibly damage the cell membrane and compromise the physiological cellular functionality.

To solve these issues, we present the fast, high-efficiency, and minimally invasive intracellular delivery of NVND using a platform of living cells cultured on nanostraws across which we apply a very small voltage (~25 V). With this setup and using confocal microscopy, we confirm the profoundly more rapid accumulation of NVND in the cytosol and the strongly decreased association of NVND with lysosomes in comparison with the spontaneous intracellular uptake of NVND. Using video-rate live cell STED microscopy, we show and verify the process of NVND delivery via the direct membrane opening around the nanostraws upon the application of the electrical field.

AYURVEDIC BIOLOGY – THE PATH FOR INTEGRATION OF MODERN AND TRADITIONAL HEALTH SCIENCES

Speaker: Prof. Subhash C. Lakhotia,

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The spectacular developments in experimental approaches in biology witnessed during the past several decades, including the more recent availability of various 'omics' approaches, have indeed revolutionized health sciences and health-care practices. However, the highly reductionist approaches followed in modern health-care practices together with the life-style changes that accompanied the 'information-technology' era have posed serious issues for human health. Consequently, the traditional health-care practices, including the traditional Chinese medicine and Ayurveda, have received greater social interests. However, despite the fact that roots of the modern medicine lie in the cumulative experience and knowledge available in various traditional health-care systems, there is a general feeling of mistrust between practitioners of traditional and modern health-care systems in current times. The mistrust largely stems from the lack of experimental and scientific understanding of the traditional treatment strategies. It is in this context that Ayurvedic Biology provides remarkable approaches to examine, in an unbiased manner, the efficacy, potential and the mechanisms of actions of various Ayurvedic practices.

Our lab's work in Ayurvedic Biology exploited the advantages offered by the fly model to examine the effects and the mechanisms of actions of some Ayurvedic Rasayanas/formulations. This talk would summarize our findings on the effects of Amalaki Rasayana (herbal formulation based on fruits of Amla) and Rasa-Sindoor (a sublimate of mercury and sulfur) on life–history traits of Drosophila and their remarkable actions in ameliorating neurodegeneration in Huntington's and Alzheimer's diseases. The talk would also illustrate how the omics approach can help us understand principles of Ayurveda in a rational manner so that myths and misconceptions associated with this traditional health-care system can be eliminated. Thus Ayurvedic Biology studies can help transform the traditional Ayurvedic practices from 'experience-based' to 'experiment-based' system. It is believed that this transformation would help in integration of modern and traditional wisdoms and thus provide holistic health-care.

THE CHRONICLE OF INDIAN SUBCONTINENT: GENOMIC PERSPECTIVES

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Modern India is a region of remarkable cultural, linguistic, and genetic diversity with over 4,500 anthropologically well-defined groups. Our genetic studies provided evidence that the enigmatic tribal populations of Andaman and Nicobar islands are the first modern humans who migrated out of Africa. Subsequently, we demonstrated that the contemporary Indian populations have descend from two divergent groups: (1) Ancestral South Indians (ASI), (2) Ancestral North Indians (ANI); and these founding groups have admixed during the past 2000 – 4000 years. Since then, almost all the populations of Indian subcontinent have been practicing endogamous marriages. To assess the impact of endogamy, we have analysed samples from more than 2,800 individuals from over 275 distinct South Asian groups from India, Pakistan, Nepal, Sri Lanka, and Bangladesh using about 600,000 genome-wide markers. We found that 81 out of 263 unique South Asian groups, including 14 groups with estimated census sizes of over a million, have a strong founder event than the one that occurred in both Finns and Ashkenazi Jews in the West – these are founder groups known to have large numbers of recessive diseases. We identified multiple examples of recessive diseases in Indian subcontinent that are the result of such founder events. Our study provides opportunity for discovering population-specific disease causing genes in communities known to have strong founder events. Mapping of mutations that are responsible for population-specific disease would help in developing strategies for diagnosis, counselling, management and modifying the clinical course of these disorders and to reduce the disease burden among South Asians.

GRAPHENE OXIDE-CHLOROQUINE (GO-CHL) INDUCED AUTOPHAGY MEDIATED NECROPTOTIC CELL DEATH IN A549 LUNG CANCER CELL LINE

Speaker: Dr. Surinder P. Singh,

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Autophagy is a highly regulated intracellular catabolic pathway for maintenance of cell homeostasis through the process of degrading proteins and organelles. Recent studies have indicated that inhibition/modulation of autophagy may lead DNA damage and genomic instabilities and could switch the cell signalling cascade from apoptosis to necroptosis. In the present study, we have conjugated graphene oxide (GO) with Chloroquine (Chl) a known autophagy inhibitor and studied the cell death signalling pathways and genotoxicity in human lung cancer A549 and normal lung BEAS-2B cell lines. Structural, functional and optical properties of GO, Chl and GO-Chl have been investigated using Raman, FTIR and UV-Vis spectroscopy respectively. The morphological aspect of GO and GO-Chl was analyzed using TEM, FESEM. Further, AFM measurements revealed the wrinkled morphology and formation few layer and monolayers (0.34 nm) of GO nanosheets. MTT assay exhibits significant cell death in A549 lung cancer cells on exposure with GO-Chl and negligible toxicity to BEAS-2B cell lines. DCFDA assay reveals that GO-Chl exposure enhances generation of ROS. Flow cytometry based Propidium Iodide (PI) assay reveals the plasma membrane disruption leading to alteration in the cell cycle and is attributed to ROS interaction. Further, flow cytometry based annexin V/PI assay for cell cycle analysis indicate towards the halts of the cell cycle at G1 phase and possible DNA damage response. The DNA damage in A549 cells was accessed using Comet assay. A significant increase in Olive tail moment with increasing concentration of GO-Chl is observed indicating DNA damage. Further, the autophagy response in A549 cells due to GO-Chl treatment is investigated through fluorescence microscopic analysis (MDC staining and GFP-LC3 plasmid), TEM observations and immunoblot analysis. Enhanced level of LC-3 I/II and Atg-5 markers signifies the autophagosomes formation and elevated expression of p62/SQSTM1 indicates the inhibition of autophagy at later stage. Further, the enhanced levels of p62/SQSTM1 are expected to inhibit the DNA repair mechanism. The modulation of autophagy machinery with DNA damage pathways may provide a therapeutic window for next generation nanomedicine and GO-Chl nanoconjugate could act as potential therapeutic agent.

DATA DRIVEN APPROACHES FOR DECIPHERING CHEMICAL STRUCTURES OF NOVEL NATURAL PRODUCTS BY GENOME MINING

Speaker: Dr. Debasisa Mohanty

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Availability of genome sequences of various organisms has opened up the opportunities for identification of pharmaceutically important natural products and deciphering their chemical structures by *in silico* analysis of biosynthetic gene clusters. Apart from polyketides and nonribosomal peptides, RiPPs (Ribosomally synthesized Posttranslationally modified Peptides) constitute a large family of peptide natural products. Recent experimental studies have also revealed functional implications of microbiome derived PKs, NPRs and RiPPs. During the last 10 to 15 years enormous advances have taken place in development of powerful *In silico* methods, which can link genomic space to chemical space and can predict chemical structures of polyketides, nonribosomal peptides and RiPPs. Most of these tools essentially use a knowledge based approach which derive prediction rules from analysis of genes to metabolite relationships in experimentally characterized PKS/NRPS and RiPP gene clusters. Linking sequence information to 3D structural features of biosynthetic enzymes from databases like PDB and use of powerful machine learning approaches for training of prediction models using the curated data have demonstrated the power of data driven research in chemical biology.

Even though a number of computational tools have been developed for analysis of secondary metabolite biosynthetic gene clusters, prediction of complete chemicals structures of PKs and NRPs from genomic sequences has remained a challenging task. Prediction of cyclization patterns of PKs and NRPs involving macrolactone or macrolactam bond has been a major bottleneck. We have developed a machine learning based algorithm for predicting cyclization patterns of PKs and NRPs and integrated it with SBSPKS tool suit developed earlier in our laboratory. SBSPKSv3 can predict complete chemical structure of NRPs and PKs starting from the genomic sequences. We have benchmarked our method over more than 250 known BGCs of NRPs/PKs.

The talk would give an overview of bioinformatics methods implemented in SBSPKSv3 (A structural bioinformatics resource for deciphering chemical structures of polyketides and nonribosomal peptides) and RiPPMINER (A machine learning based resource for predicting cleavage and cross-links in RiPPs. Our recent efforts towards development of databases which can help in deciphering chemical cross-talk between human microbiome and host will also be discussed.

CLINICAL IMPLICATIONS OF microRNA IN CANCER: HCC MODEL

Speaker: Dr. Baibaswata Nayak

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MicroRNAs (miRNAs) are a class of small (20-25 nt) endogenous non-coding RNAs those regulate expression of various genes at post-transcriptional level by targeting 3′ UTR of mRNA. Aberrant miRNA expression can occur through genomic alterations or epigenetic mechanisms. The up- or down-regulation of miRNAs directly affect numerous biological pathways, interrupt normal physiological functions and induce carcinogenesis. Ease of detection, high stability in circulation and tissue specificity makes miRNA as candidate circulatory biomarker for disease diagnosis, prognosis and monitoring therapeutic response. The miRNAs responsible for tumor formation are known as oncomirs. They inhibit function of tumour suppressor genes by its upregulation or activate oncogenes by its downregulation. Therefore, it is important to identify such miRs responsible for carcinogenesis and can be targeted using antimir or miR mimic as an anti-cancer therapeutics for cancer management.

Hepatocellular carcinoma (HCC) is the 3rd lead cause cancer related mortality and major HCC risk factors of viral etiology are HBV, HCV infection and non-viral etiology are ALD, NAFLD. HCC cases are presented mostly at advances stages and there is no suitable serum biomarker. Unlike other cancer, HCC is not susceptible to systemic chemotherapy so there is need of novel therapeutics. There is also no serum biomarker for monitoring response to commonly used locoregional therapy in unresectable HCC. Clinical implications of miRNA in HCC model was evaluated in consecutive HCC patients (n=90) treated with locoregional therapy. The changes in expression of miR-21,-221 and-16 and AFP level was evaluated at baseline and one month post treatment by RT-qPCR. The relative expression was calculated by comparative Ct method and the role of these miRNAs in prediction of therapeutic response was evaluated with help of AUROC curve by comparison with radiological imaging. Role of miRNA as anti-cancer therapeutics for management of cancer was evaluated by miRNA targeting. For which in vitro 3'-UTR Luciferase reporter-assay was carried out for confirmation of miRNA target such PTEN, a tumor suppressor gene. Over expression of these miR-21 and miR-221 in stable Huh-7 cell lines resulted activation of mTOR pathway as evidenced from phosphorylation of RPS6KB1 and increased cell proliferation as evidenced by MTT assay. LNA anti-miR-21 reduced mTOR activation by reducing expression of AKT, mTOR and RPS6KB1 indicating its potential as therapeutics. To find out miRNA as diagnostic marker, we have carried out miRNA PCR array of circulatory miRNA in healthy subjects, chronic Hepatitis B (CHB) patients, cirrhotic and HBV induced HCC patients. We have observed that upregulation of 9 microRNAs and down regulation of 3 microRNAs. The targets of these miRNA were found to be genes regulating cell proliferations. These miRNAs may have diagnostic potential for HCC in CHB patients progressing to HCC.

SPERM: NOT JUST A DNA VEHICLE

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Generation of gametes is the key to procreation. Sperm production is a continuous process of cell division and differentiation, which ensures the production of highly differentia spermatozoa with compact DNA in the nucleus. Sperm is thought to be a vehicle of paternal DNA, which facilitates its delivery to the ovum. However, recent studies have shown that sperm epigenome and RNA content are also very important players in fertility. We have shown that sperm epigenome alterations correlate with infertility. As the first generation of IVF born children makes to 40 years of age, we realized that these children are susceptible to increased risk of a number of imprinting disorders, which includes Beckwith-Wiedemann syndrome, Angelman syndrome, retinoblastoma, autism, intellectual disorders, cardiovascular disorders and the list is growing. Therefore, the analysis of sperm epigenome could provide markers for use in sperm quality control in IVF settings. Sperm also carries significant amount of RNA in it, which was initially thought to be the remnant of past activity (germ cell differentiation). However, recent studies have shown that sperm RNA is highly diverse, shows a pattern and at the same time varies significantly between individuals. We have shown that sperm RNA composition correlates with infertility and can be utilized as markers of fertility. From the above, it can be concluded that sperm carries not only DNA for transmission, but also a layer of epigenome and the whole transcriptome for transferring to ovum.

THE GENETIC ARCHITECTURE OF HIMALAYAN POPULATIONS

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Genetic simulation data strongly suggest that the Himalayan region of the Indian subcontinent, harboured human populations and even must have acted as a thoroughfare for human migration since the Early Upper Palaeolithic. Yet the precise role of this region in the peopling of Eurasia remains only poorly understood, and several prominent questions remain unanswered with regard to the appearance and dispersal of modern humans in this region. Our extensive analysis on high resolution data suggested that the genetic variations arose in this region due to admixture among populations was found to contribute to the selection processes. The massive intra-population (Himalayan region populations) sharing of genomes, than any other neighbouring groups (East Asian or South Asian), suggested a common ancestry of the populations studied. Furthermore, unlike to the Austroasiatic speakers, the sex-specific markers of Trans-Himalayan population divulged the equal roles of both males and females in expansion episode(s). Finally, our estimation of time of admixture suggested a recent expansion of Himalayan specific ancestry in the last millennium in Northeast India and North of Nepal.

SUSTAINABLE NITROGEN MANAGEMENT AND BIOTECHNOLOGICAL APPROACH TO IMPROVE NITROGEN USE EFFICIENCY

N. Raghuram[1]* Narendra Sharma[1], Ravi Ramesh Pathak[1], Dinesh Kumar Jaiswal[1], Supriya Pandey[1], Vikas Mandal[1], Akansha Malik[1], Bhumika Madan[1], Vimlendu B Sinha[1], N Arun Prem Kumar[2], Desiraju Subramhmanyam[2], CN Neeraja[2], Surekha Kuchi[2], A Jha, Rajender Parsad[3], V. Sitaramam[4]

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Agricultural nitrogen use efficiency (NUE) is extremely important to save at least Rs. 12,000 crores worth of wasted urea in Indian agriculture, apart from preventing air and water pollution impacting health, biodiversity and climate change. Nitrous oxide is 300 times more powerful greenhouse gas than carbon dioxide and poor fertilizer N use efficiency is responsible for 60-80% of its emission in various countries. Deposition of nitrogenous compounds accounts for most of the health impacts of particulate matter (PM2.5 and PM5) in air pollution. Lack of proper characterization of the phenotype and genotype for NUE has delayed crop improvement so far. We ranked 21 Indica rice varieties based on N-responsive germination and identified contrasting varieties: Early germinating or short duration varieties were least N-responsive with relatively lower yield and NUE, whereas the late germinating or long duration varieties were most N-responsive, with relatively higher yield and NUE. A comprehensive phenotyping was done for 25 phenological parameters throughout the life cycle of 3 pairs of contrasting rice varieties for N response at low and normal levels (1.5 and 15 mM) of nitrate or urea in the greenhouse. Of the 25 parameters measured, only 20 were significantly N-responsive, out of which only 8 contributed significantly to NUE, constituting its phenotype. They are, germination and flowering time, shoot/root length and vegetative biomass, apart from yield-related parameters. NUE was field-validated in two rice genotypes over 3 seasons. In order to characterize the genotype for NUE, baseline transcriptome data was generated on the genomewide N-response in Indica and Japonica varieties of rice using microarrays. Further, comparisons of N-responsive transcriptomes of contrasting varieties revealed some candidate genes/pathways involved in NUE and are being validated in activation-tagged transgenic rice lines. This approach could be used for NUE improvement in other crops.

NANO-AGRICULTURE FOR ENSURING NUTRITIONAL SECURITY AND RAINBOW REVOLUTION VIA INTEGRATED NUTRIENTS MANAGEMENT

Speaker: Prof. Anil Kumar,

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Malnutrition is a major challenge worldwide, especially in developing countries. Plant based nutritious diets have long been used in Indian culinary system since the historic times. The nutritional status of a community has therefore been recognized as an important indicator of national development. With increasing world population and deterioration in nutritive value of available food products, there has grown a major challenge to ensure nutritive and safer food supply to the world population. Nanotechnology intervention seems to be a viable alternative to ensure a safer and nutritive food supply to the consumers through nano-fortified food.

The problem with classic approach arises when most of the applied salts render non-usable sources. To overcome this problem, nano-fertigation can improve the accessibility and availability of minerals in rhizosphere. In this context, our lab has developed methods for green synthesis of several mineral nano-particles of important macro-/micro nutrients in a very affordable manner and is now planning to develop ingenious nano-nutrient formulations and/or nanofortified organic fertilizers for horticultural and agricultural crops for not only enhancing yield but also nutritional security through appropriate supplementation of nanoparticles of iron, zinc, copper, calcium, phosphate and boron synthesized by biological means. Such approach can also be employed for curtailing pathological and physiological diseases. Zinc (Zn) deficiency is one of the most widespread micronutrient disorders in rice like Khaira disease, due to which the rice plants remain stunted and may die, while those that recover show substantial delay in maturity and reduction in yield. To encounter this problem, Zn-fortified rice upon consumption will provide human nutrition as well. Iron deficiency is amongst the most prevailing causes of malnutrition in the developing world which triggers anemia especially in the children. A new user-friendly approach for nano- iron fortification has been developed to increase iron content in wheat by growing the seeds after soaking in nano-iron solution and can be delivered by food chains. The nanoparticles induce the pathways to trigger the nano-fortification of the crops. The technology developed has been awarded at the national level. The approaches developed in our laboratory to meet these goals are user-and eco-friendly and intriguingly they produce non-GM food which is safe to the consumers.

Nano-agronomic augmentation of crops would be a practical approach for the development of nano-agri-inputs and nano-agri products and have higher prospects in improving the human nutrition. It can be used to develop various nanoformulations of bioactive substances and macro- and micro-nutrients present in fruits, vegetables and herbs to increase their bioavailability and treat malnutrition or diseases. In our lab we have successfully carried out green synthesis of nanoparticles from spinach and turmeric which hold immense potential in solving the problem of iron deficiency or anemia, osteoporosis, inflammatory diseases, cancer and diabetes etc. Our research group first time prepared nanodelivery vehicle using finger millet prolamin for sustained release of fat soluble vitamins such as vitamin A, D and E. Nano-agriculture will pave way for development of highly productive and nutritive crop varieties, value added products, nutraceuticals and biofortified food products. The approach of integrated nutrient management employing nanoparticles has the potential to augment the efforts towards ensuring nutritional security and rainbow revolution.

BIOCATALYSIS, DIVERSE EXAMPLES OF INDUSTRIAL APPLICATIONS

Speaker: Dr. Mohamad Takwa,

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At Ecozyme we use biological systems, enzymes or whole cells, to create novel or more efficient, selective, and environmentally friendlier processes for various applications ranging from diagnostics, novel biomaterials and the conversion of biomass/biowaste into industrial products. We aim to promote the concept of a more sustainable use of the world's limited resources.

APPLICATION OF GENOME MINING IN HUMAN HEALTHCARE

Speaker: Dr. Gajendra P. S. Raghava,

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First human genome have been sequenced in 2003, in last one decade more than thousand human individuals have been fully sequenced. In addition more than 1000 cancer patients, tissues and cell lines have been sequences. The successes in genome sequencing catalyzed the transition of genomics from the laboratory to the clinic. Over the past decade, there has been a proliferation of studies demonstrating the potential utility of various applications of genomics including personalize treatment. The concept of personalized medice have different meaning for different professionals. In this talk, I will focus on recently developed web-based services mainly developed at our group which are freely available for scientific community working in the field of personalize medicine. Following is brief description of major web services

- **CancerDP:** It allow users to identify right drug for right person or rank anticancer drugs based on genomic features of cancer cells.
- **CancerDR:** A database of 148 anticancer drugs and their effectiveness against around 1000 cancer cell lines.
- **CancerTope:** In silico platform for designing genome-based personalized immunotherapy or vaccine against cancer.
- **HIVcoPRED:** is a web server for predicting the coreceptor usage by HIV strain, it is based on amino acid sequence of gp120 protein of HIV.
- **MtbVeb:** A web-based platform for designing vaccines against existing and emerging strains of mycobacterium tuberculosis including drug resistant and extreme drug resistant M.Tb strains. It also allow users to design vaccines against M.tb using all three appraoches (strain, antigen and epitope based vaccines).
- **MetaPred:** it predict metabolizing Cytochrome P450 enzymes (CYPs) isoform of a drug molecule/substrate, based on SVM models developed using chemical descriptors
- **EbolaVCR:** In silico resources developed to facilitate scientific community fighting against deadly virus EBOLA. This server enlists possible vaccine candidates, therapeutic siRNAs and other related resources.
- **CancerCSP:** It is a web-bench developed for predicting Early and Late stage of clear cell renal cell carcinoma (ccRCC) patients using gene expression data derived from RNA-seq experiments.

Oral Presentations Abstracts

OP-1

PROTEOMIC PROFILING OF MORPHTOTYPES OF *ASPERGILLUS TERREUS* AND DURING INTERACTION WITH LUNG EPITHELIAL CELLS REVEALED STAGE SPECIFIC RESPONSE

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Aspergillus terreus is a major causative agent of invasive aspergillosis in immune-compromised patients. A. terreus exists in dormant conidia and hyphae/mycelia morphotypes with intermediate germinating conidia. The current study employed proteomic approach to understand molecular events that allow conidia to exit dormancy and cellular machinery of A. terreus providing resistance to antifungal drugs. Using nLC-QTOF/ nLC-ESI-MS/MS, proteomic data from conidia, germinating conidia (16hrs), hyphae/mycelia (48hrs) of *A. terreus* (NCCPF 860035) cultured in DMEM media, germinating conidia interacting lung epithelial cells were compiled. A total of 42 proteins (17 uncharacterized) from conidia, 373 (74 uncharacterized) from germinating conidial stage, 389 from hyphae/mycelial network were identified. Whereas, 304 from germinating-conidia and 1190 epithelial cells proteins during the interacting with human lung epithelial cells (A549) were observed. Distinct protein profile at these morphotypes of *A. terreus* and host specific response were observed in different proteome datasets. We observed terrelycin , enzymes from terretonin and geodin mycotoxin biosynthesis pathway during the transition from conidia to mycelia/hyphae network. Catalase, superoxide dismutase, thioredoxin, glutathione S-transferase involved in redox homeostasis and heat shock proteins (Hsp90 and Hsp70) was abundant inn mycelia proteome. Additionally, SEM analysis showed dense hyphal network covered with porous extracellular matrix (ECM) in 48hrs cultured mycelia. Further, using SECRETOOL, secretory proteins such as glucanase Crf1/allergen (Asp F9), 1, 3-β-glucanosyltransferase and β-hexosaminidase reported in biofilm establishment. Gene ontology and KEEG pathway analysis of proteins from infected lung epithelial cells showed proteins from cytoskeleton rearrangement, transport, and transcription and signal transduction pathways. Also, cytoskeleton rearrangement proteins depicted the internalization of *A. terreus* conidia by human lung epithelial cells. Our studies added aid to the resistance mechanism, and terrelycin of *A. terreus*, and immune associated proteins in lung epithelial cells could be explored for future work as biomarkers.

Keywords: Biofilm, terrelysin, Germinating-conidia, Antifungal resistance, Redox homeostasis.

OP-2

DENDRITIC CELLS: A KEY PLAYER IN NAÏVE T CELL ACTIVATION

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Dendritic cells (DCs) and macrophages are well known antigen presenting cells with ability to produce IL-12 which shows that these have the potential to give immunity towards Th1 based response. In case of leishmaniasis, the protection comes from Th1 CD4 + cells producing IFN-g, TNF, and IL-2 which has been associated with disease control, macrophages activation and parasite elimination. Macrophages are well known as effectors of the innate immune system and are able to direct acquired immunity towards Th1 /Th2 based response by their ability to produce IL-12 and IL-10. DCs are the most potent and versatile type of Antigen presenting cell (APC) and play critical role in the initiation of immunity by producing soluble factors like chemokines and cytokines. The preliminary results revealed that mice (BALB/c) vaccinated with r-PDI primed DCs produced significantly high quantity of IL-12 and GM-CSF, whereas the level of IL-12 and GM-CSF remained low after vaccination with r-PDI primed with macrophages. IL-10 is a pleutropic cytokine produced by many cells is a suppressive cytokine and is usually triggered by parasite to promote immune pathogenicity. This preliminary data showed that after having well memorised against r-PDI, dendritic cells significantly enabled vaccinated host to reduce the expression of IL-10 compared to their macrophage counter parts against in vitro Leishmania donovani inection in mice. The trend shows that DCs –r-PDI vaccination has the abilities to trogger the protective cytokines, which is a necessity to programmenaïve T-cells to promoteimmune– protective environment against VL.

Keywords: Dendritic cells, Protein Disulphide isomerase, Visceral leishmaniasis, Interleukin- 10, Interferon–gamma.

OP-3

THROMBOTIC COMPLICATIONS: PROVOKED ON HIGH ELEVATION

Iti Garg, Swati Srivastava, Vinay Kumar, Chhavi Rai, Babita Kumari, Anju Bansal, Bhuvnesh Kumar

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Indian soldiers deployed for their duties and operations are required to live at moderate to very high altitudes for prolonged period. Most of them are from the plains and are required to stay in high altitude for varying periods of time. During their duties they may suffer from various maladies related to extreme adverse conditions prevailing at high altitudes (HA). These cases are further challenged by the risk managements under which rapidly evacuation of patients by air from the combat zone to definitive care destinations for timely initiation of their anticoagulation therapy. The increased incidences of both venous as well as arterial thrombotic episodes have been reported from HA regions but précised epidemiological records are not available for Indian Army. Venous thromboembolism (VTE) is a multi-factorial clinical implication that encompasses deep vein thrombosis (DVT) and pulmonary embolism (PE) with unknown pathophysiological mechanism with several genetic and acquired risk factors. There are limits to an individuals' ability to acclimatize to high altitude, some individuals acclimatize quickly, whereas others sub-optimally owing to genetic or acquired factors and apart for this existing diagnostic and therapeutic strategies have their own limitations. There are various OMICS approaches available, which are capable to identify genetic basis of susceptibility of Indian populations to high altitude so that corrective measures can be taken on time with a long-term perspective of improve health and performance of every individual. It will be also assist in designing predictive and diagnostic panels and pave path to improve health and performance of our soldiers at high altitude.

Keywords: Thrombosis, High Altitude, Acclimatization, Susceptibility.

OP-4

ANTICANCER POTENTIAL OF HUMAN INTESTINAL DEFENSIN 5 AGAINST 1, 2-DIMETHYLHYDRAZINE DIHYDROCHLORIDE INDUCED COLON CANCER: A THERAPEUTIC APPROACH

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The escalating predicament of multidrug resistant cancer cells and associated side effects of conventional chemotherapy necessitates the exploration of alternative anticancer therapies. The present study evaluated anticancer therapeutic potential of human defensin 5 (HD-5) against colon cancer. The *in vivo* anticancer efficacy of HD-5 against 1,2-dimethylhydrazine (DMH) induced colon cancer was elucidated in terms of tumor biostatistics, number of aberrant crypt foci (ACF), in situ apoptosis assay, changes in morphological as well as histological architecture of colon(s). The direct interaction of peptide was investigated by incubating peptide with normal and/or cancerous colonocytes followed by phase contrast, Hoechst 3342 and AO/PI staining as well as confocal microscopy. Changes in membrane dynamics were evaluated by MC 540 and N-NBD-PE staining. *In vivo* decrease(s) in tumor parameters, number of aberrant crypt foci along with marked increase in the rate of apoptosis was observed. H&E staining revealed neutrophils infiltration and restoration of normal architecture in treated colon(s) which was consistent with scanning electron microscopic observations. Furthermore, non-membranolytic mechanism was found to be acquired by peptide as it could traverse cell membrane gaining access to nucleus and cytoplasm thereby disintegrating cellular architecture. MC 540 and NBD-PE staining revealed that peptide could bind to cancerous cells by taking advantage of altered fluidity levels. Our results indicated that HD-5 exhibited strong cancer cell killing and does not affect normal host cells. The peptide can be exploited as promising option to combat developing menace of colon cancer and/or can at least be used as an adjunct to present day chemotherapies.

OP-5

IN-VITRO CYTOTOXICITY STUDY OF AUNP-GABAPENTIN ON N_2A NEUROBLASTOMA CELL LINE

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Neurological disorders such as epilepsy, Alzheimer's disease, Parkinson's disease, brain tumors, neuronal traumas, dementia, and Huntington disease constitutes 16.5% of deaths worldwide and also causes phsycho-societal burden. One of the major challenges in therapeutic modalities of neurological disorders is transporting the drug across Blood Brain Barrier (BBB). Nanomedicine are capable of transporting the drug load to specific target sites and interact at molecular levels may be considered as potential agents to cross the BBB. Gold nanostructures are being extensively explored for drug delivery, contrast agent, and photothermal therapy. Gold nanoparticles (AuNPs) have demonstrated their ability to cross the BBB and also act as neuroprotective agents. In present study, we have synthesized highly monodispersed AuNPs and functionalized with 3-Mercaptopropionic Acid (3-MPA) to attach Gabapentin (an antiepileptic drug). The synthesized nanoparticles and conjugates were characterized using Transmission Electron Microscopy (TEM), UV-Vis Spectroscopy, Fourier Transform Infra Red (FTIR) spectroscopy, Dynamic Light Scattering (DLS) and Atomic Force Microscopy (AFM). The results reveal the formation of monodispersed gold nanoparticles of size 8±2 nm, functionalization of AuNPs with 3-MPA and successful attachment of gabapentin. In-vitro cytotoxicity of AuNPs, 3-MPA-AuNPs and Gab-AuNPs on N_2a cell lines was investigated and compared. Gab-AuNPs exhibited relatively lower cytotoxicity in comparison to placebo drug (gabapentin) indicating the potential of gold nanoparticles in reducing the cytotoxicity of neuronal drugs. Further, in-vivo studies need to be carried out to check the ability of gold nanoparticles to cross the BBB.

Keywords: Gold Nanoparticles, Neurological Disorders, Nanomedicine, Blood Brain Barrier.

OP-6

URINARY METABOLIC ALTERATIONS FOR HUMAN PARTICIPANTS RESIDING IN SIACHEN BASE CAMP

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Exposure to environmental hypobaric hypoxia is responsible for reduced tissue oxygen availability due to fall in barometric pressure. Ascent to extreme environment requires acclimatization to reduced oxygen levels which might be by erythropoiesis, ATP synthesis, metabolic adaptation, adjustment towards tissue metabolism to compensate the oxidative stress, the details of which remain incompletely understood. NMR based metabolomics studies on responses to human hypobaric hypoxia has the potential to elucidate metabolic signatures of altitude exposure. Control urine samples were collected from healthy participants (n= 82, aged 20- 35 years) residing at sea level. Urine samples were collected from infantry soldiers stationed at Siachen base camp (5300m) for one year (n=80). 1H NMR spectra were acquired on each sample at 600 MHz on a Bruker Avance III spectrometer at 298K. Water suppression was achieved using 1D NOESYPR pulse sequence. The binning of spectral data was performed over the range of δ 0.2-10 ppm using Amix software. Principal component analysis (PCA) and partial least squares discriminant analysis (PLS-DA) using online tool Metaboanalyst 4.0 were used to study similarities/dissimilarities of metabolic profiles of samples. The alteration in urine metabolic phenotype under environmental hypobaric hypoxia was examined using 1H-NMR based metabolomics. PCA & PLSDA showed clear separation between controls & Siachen group indicating metabolic alterations. The weighted sum of PLS-regression coefficients showed top 30 important buckets which resulted in clusters separation in PLS-DA. Exposure to hypobaric hypoxia is associated with shifting towards anaerobic glycolysis & increase of muscle glycolytic intermediates. Our finding shows alterations in creatinine, glucose, ascorbate, tyrosine & hippurate metabolites indicating muscle breakdown, disturbed GFR & gutflora. This study is first to profile the systemic metabolic changes due to long term exposure to environmental hypobaric hypoxia using NMR based metabolomics. The findings can form the basis of early prediction, risk assessment & developing strategies to combat extreme environmentmaladies.

Keywords: Metabolomics, Nuclear Magnetic Resonance spectroscopy, Hypobaric Hypoxia.

OP-7

ANTI-QUORUM SENSING ACTIVITY OF POTASSIUM SALT OF 2-METHOXY-4-VINYLPHENOL IN PSEUDOMONAS AERUGINOSA

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The emergence of multidrug-resistant (MDR) bacterial strains in the last decade is astonishingly alarming. Many of the widely used antibiotics have failed to exhibit clinical efficacy against such strains. Eventually we would exhaust all the arrows in our antibiotic armamentarium. As a need of the hour, novel strategies are desperately required not only to curb, but also to reverse, the development of resistance in these pathogens, thereby maintaining their sensitivity towards current antibiotics. Intervention with bacterial virulence, rather than killing them, by inhibiting specific pathways/targets has emerged as a novel approach totacklethe drug resistance problem. The bacterial virulence is regulated via quorum-sensing, a cell-cell communication process precisely controlled by autoinducer molecules such as acyl homoserine lactone (AHL). The present study aimed at identifying promising quorum-sensing inhibitors in Pseudomonas aeruginosa, an opportunistic human pathogen especially associated with nosocomial infections, yielded four potential hits. Out of these, potassium 2-methoxy-4-vinylphenolate was the most potent quorum-sensing inhibitor targeting P. aeruginosa LasIR/RhlIR circuitry. It also inhibited biofilm formation, various virulence factorslikeLasA protease, LasB elastase and pyocyanin, and motility of bacteria like Swarming and twitching.

Keywords: Quorum-sensing, Pseudomonas aeruginosa, biofilms, 2-methoxy-4-vinylphenol, virulence, motility.

OP-8

ROLE OF GENETIC SCREENING PGS AND PGD FOR THE IMPLANTATION OF EUPLOID EMBROY IN MOTHER'S WOMB THROUGH IVF

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Preimplantation genetic screening (PGS) and preimplantation genetic diagnosis (PGD) are the modern techniques for the clinicians which can improve In vitro fertilization (IVF) success rates. The major indications of PGS have been used for the treatments of IVF which included advance maternal age, repeated implantation failure, and recurrent pregnancy loss. PGS has performedtoidentifythechromosomalaneuploidiesforall24chromosomesinthedeveloping embryos created through IVF cycle. Preimplantation genetic diagnosis (PGD) performed particularly when one or both genetic parents have an known genetic disorders and these are carrier for single gene defects, sickle cell, cystic fibrosis and Tay sachs etc. The past several decades have seen tremendous advances in the field of medical genetics. Previously, FISH, qPCRtechniques/usedforPGSbuttheyhavesignificantlimitations.FISHenabletoidentified the aneuploidy in 9 to 12 chromosomes. Continuous technical progress in single cell testing has led to high levels of efficiency and accuracy. The gold standard methods of single cell multiplex-polymerase chain reactions for monogenic diseases and fluorescent in situ hybridization for chromosomal aberrations are being replaced by whole-genomeamplification and genome-wide technologies. These generic methods substantially reduce the preclinical workload. Now the NGS technology has been clinically useful for the detection of chromosomal aneuploidies, chromosomal aberrations including imbalanced translocations, inversion, deletion, duplication, insertion and mosaicism, triploidy and single gene disorder in all 24 chromosomes which are frequently responsible for infertility. The purpose of the PGD and PGS performed for the parents who are at higher risk of inheritable genetic disease and they have desired to prevent their baby free from the genetic disease therefore, Embryo screening has been done for the best quality of euploid embryo for the implantation inwomb.

Keywords: PGS, PGD, IVF, Aneuploidy, Chromosomal Abnormality.

OP-9

DEVELOPMENT OF TYROSINASE-BASED COLORIMETRIC BIOSENSOR FOR DETECTION OF PHENOLIC COMPOUNDS

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Tyrosinase (EC 1.14.18.1) is a metalloenzyme which contains copper atom at its centre and belongs to class of type-3 copper protein, oxidoreductase enzymes and exhibits monophenolase and diphenolase activity. In the present work, tyrosinase enzyme was purified using potato peels by method of three phase partitioning (TPP). Three-phase partitioning (TPP) is a simple, efficient and one-step enzyme purification approach which is non-chromatographic in nature. In this method, ammonium sulphate and t-butanol are sequentially added to precipitate the protein from the crude aqueous extract. Generally, the protein gets precipitated as an interfacial layer between upper organic solvent phase and lower aqueous phase. Using this method of purification about 70% enzyme activity was recovered in a single step. The enzyme was evaluated for construction of a portable, economical, easy to handle and disposable paper-type tyrosinase biosensor. Tyrosinase was adsorbed via physical binding and found to generate ranges of colour in the presence of phenolic compounds within 5 minutes. The sensitivity of tyrosinase-biosensor was found to be 0.5 µM. The biosensor showed excellent performance in presence of phenols and showed good storage stability at 25°C and 4ºC for 30 days. Tyrosinase-based biosensor could be effectively applied for detection of phenolic contaminates in aqueous solutions.

Keywords: Tyrosinase; Three phase partitioning; Biosensor; Phenols

OP-10

UNRAVELING THE PROTEOMIC LANDSCAPE OF *EX VIVO* AND *IN VITRO* CULTURED FAC-SORTED MURINE SCA-1 POSITIVE STEM CELLS REVEALS DISTINCT DYNAMICS OF TRANSLATIONAL MACHINERY

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Adult stem cells (ASCs) are tissue resident stem cells endowed with the abilities of self-renewal and differentiation into mature cell types with specialized functions. Their main functions include maintenance of cell homeostasis and replacement of injured and dead cells. Due to their regenerative capacity, ASCs hold promise for various cell therapy applications. ASCs constitute a minuscule proportion of total cells that make up any tissue. Therefore, the molecular networks operating in these cells are still poorly understood. Investigation of the molecular composition of these cells requires their enrichment using cell type specific surface marker(s). Stem cells antigen1 (Sca-1) is an 18-kDa mouse glycosyl phosphatidylinositol-anchored cell surface protein that has widely been used for isolation of murine hematopoietic stem cells (HSCs). However, recently several studies have reported the expression of this protein in non-HSCs such as the liver, skin and muscles among others. In the current study, we used fluorescence-activated cell sorting (FACS) technique to sort Sca-1^+ stem cells from mouse hindlimb muscles. To obtain information about the proteomic composition of these cells, we utilized high-resolution mass spectrometry-based label free comparative proteomics analysis of 3 samples [i] directly sorted Sca-1^+ cells (ex vivo) [ii] Sca-1^+ expanded in cell culture (in vitro) and [iii] Sca-1^- cells (ex vivo). In total, our analysis led to the identification of 5793 proteins in all three datasets. Whereas 1708 proteins were found to be common to the 3 sets, a large number of proteins were unique to each set. Biological pathway analyses lead to the enrichment of translation initiation and myogenesis related pathway in the Sca-1+ set in in vitro condition which explains the myogenic potential of these stem cells. We also identified 20CD (cluster of differentiation) proteins which can serve as potential markers that can be utilized along with Sca-1 in future to enrich Sca-1^+/Sca-1^- cells. We also identified a large number of regulatory proteins such as kinases, phosphatases and transcription factors. Exploring the cell type specific expression patterns of these molecules will provide insights into the molecular regulatory mechanisms in stem cells. To the best of our knowledge, this is the largest inventory of proteins from Sca-1 stem cells isolated from mouse hindlimb muscles.

Keywords: Stem Cell Antigen-1 (Sca-1), regenerative stem cells, cell therapy, stem cells proteomics, mass spectrometry-based proteomics.

OP-11

PROTECTIVE EFFECT OF *WITHAFERIN A* AGAINST NANOPARTICLES INDUCED OXIDATIVE DAMAGE IN CELLULAR IMMUNITY

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The present study was undertaken to explore the protective effects of *Withaferin A* supplementation on zinc oxide nanoparticles mediated oxidative damage of cellular immunity in *Balb*/*c* mice. The animals were exposed to zinc oxide nanoparticles (ZnO NPs) along with *Withaferin A* for four weeks and various parameters like organ coefficient, cell viability, cytotoxicity, nitric oxide (NO), phagocytosis of macrophages, and the gene expression of *TLR6 and ARG* genes were studied. *In vivo* study showed that, dose-dependent reduction in macrophages phagocytosis, an increase in the levels of NO production along with up-regulation of pro-inflammatory (*TLR6, arginase)* gene was significant ($P^* < 0.05$) when animal was exposed to ZnO NPs. However oxidative stress produced by ZnO NP was reduced in presence of *Withaferin A* with decreased *TLR6* over expression and re-establishment of macrophages phagocytic activities. Our results reviled that a valuable insight into the underlying mechanism for the protective effects of *Withaferin A* against nanoparticles induced oxidative damage in cellular immunity.

Keywords: zinc oxide nanoparticles, cellular immunity,*Balb*/*c* mice, phagocytosis, macrophages. 4-6 minimum.

OP-12

GOLD NANOPARTICLES AS A DELIVERY VEHICLE FOR TRANSFECTION OF FULL LENGTH HEV ORF2

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Infection caused by hepatitis E virus is the major cause of acute hepatitis with an estimate of about 2 billion people living in regions endemic for the hepatitis E virus infection. Inability of the virus to grow in cell-culture based system making it difficult to develop traditional live attenuated or killed vaccine. Hence progress has been made towards the development of DNA or protein vaccine. As DNA and protein being poor immunogen, we have employed gold nanoparticles as adjuvant as well as delivery vehicle to enhance immunogenicity of the antigen.The gold nanoparticles were synthesized using citrate reduction method and were characterized by UV-visible spectroscopy and transmission electron microscopy. Suitability of gold nanoparticles as delivery vehicle to develop immune response against HEV was evaluated in terms of their cytotoxicity analysis on THP-1 cell lines. Cytotoxicity analysis shows that AuNPs are nontoxic to THP-1 cells upto 400µg/mL. Different ratios of DNA and gold nanoparticles were employed for transfection in order to get best ratio for transfection. Furthermore, desirable size of gold nanoparticles was found to be less than 20 nm and 1:20 ratio of AuNP: DNA was optimumfor transfection.

Keywords: Gold nanoparticles, HEV ORF2 full length, Transfection, Cell line

OP-13

STRUCTURE ACTIVITY RELATIONSHIP (SAR) STUDIES TO MAXIMIZE THE ACTIVITY OF LEAD COMPOUNDS AGAINST *MYCOBACTERIUM TUBERCULOSIS* CYSE

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Tuberculosis (TB) is an airborne disease caused by the bacterium *Mycobacterium tuberculosis* (*M. tb*) and is a major threat for health practitioners due to the increase in the drug-resistant strains of the organism. It also has the potential to exist in persistent form that cannot be targeted by currently available TB drugs. Therefore, novel therapeutics against persistent *M. tb* needs to be developed urgently. In *M. tb*, the biosynthesis of cysteine is an essential metabolic pathway reported to be up-regulated in the persistent phase of the organism and its absence in humans makes it a promising drug target. This pathway involves two enzymes – (1) Serine acetyltransferase (SAT/CysE) and (2) pyridoxal-5-phosphate (PLP)-dependent enzyme O-acetylserine sulfhydrylase (OASS/CysK). *In-silico* screening of ChEMBL bioactive anti-tubercular compounds were screened against CysE enzyme and yielded few potential lead molecules. Further study enables lead optimization through structure-activity relationship (SAR) study.

Keywords: SAR, *Mycobacterium tuberculosis*, Serine acetyltransferase, Molecular docking, MD simulations.

OP-14

IN SILICO STUDY OF MOLECULAR DOCKING AND ADME STUDIES OF NOVEL DERIVATIVE OF ERLOTINIBTARGETING THE EPIDERMAL GROWTH FACTOR RECEPTOR IN GLIOBLASTOMATREATMENT IN GLIOMA

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Glioblastoma (GBM), with restricted therapy alternatives, is a disastrous primary brain tumor. The receptor of the epidermal growth factor receptor (EGFR) in glioblastomas is recurrently enhanced, or mutated, over articulated, but up to 20 % of GBM patients find to be responded to kinase inhibition of EGFR. The ErbB receptor accounts for the restricted and redundant functions in the maintenance of tissues in adult mammals. Newly discovered drug targets and personalised treatments might be used to identify the characteristics of any individual's tumorigenesis.Several inhibitors of EGFR tyrosine kinase (TKI) failed clinically, due in part to assimilated resistance. To repeatedly examine this type of resistance, we used molecular docking and swissADME approach to explicate its presumed inhibitor. We have attempted to determine a drug candidate in the current research based on the discovery of structural drugs. Docking simulation was conducted on mutated EFGR to determine the best drug candidate from Erlotinib, a renowned anti-cancer agent, derivatives.The study involves the simulated screening of about 3200 molecular derivatives of Erlotinib and their molecular docking using a Lamarckian genetic algorithm. By using UCSF Chimera best top 2 best-docked proteins were examined and discovered the complicated atomic-scale properties amongst ligand and the target protein. Molecular docking outcomes showed binding energy ranging from -12.15 kcal/mol to -1.17 kcal/mol.Further wet lab study requires to study the actual binding as compulsory mode provided. To discover new inhibitors of EGFR with higher potency and specificity, further information will be needed for future designs molecules.

Keywords: Glioblastoma,EGFR, Erlotinib, ADME.

OP-15

ANDROGRAPHOLIDE: A POTENTIAL ANTICANCEROUS AGENT IN BREAST CANCER THERAPEUTICS BY TARGETING ESTROGEN RECEPTOR AND PROGESTERONE RECEPTOR

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Overexpression of Estrogen receptor (ER) and Progesterone receptor (PGR)are leading hallmarks of breast cancer that led to the death of over 627000 women worldwide. Based on this records, there are different ER and PGR specific drugs designed to inhibit the binding of their biological ligands estradiol and progesterone respectively. However, these synthetic drugs can only control the disease for a while and latter complicating the conditions of the patients. Synthetic drugs carry their own side effects and hence it has necessitated for an alternative therapy that are safer and efficient with minimal or no side effects. This necessity has revitalized the trend of using ethno-medicinal herbs for the formulation of naturally derived drugs. Ethno-medicinal herbs and their bioactive compounds are well known for their effectiveness and efficiency. Hence the aim of our study is to look into the possible anticancerous effect of phytocompounds of *Andrographis paniculata* compounds in breast cancer by targeting the ER and PGR. So, the molecular docking study of all the phytocompounds of AP resulted with andrographolide as the better ligand for ER and PGR with binding affinity of -7.4 kcal/mol and -8.3 kcal/mol respectively. Further, drug likeliness evaluation resulted no violation of Lipinski Rule of five and highest bioactivity score of 0.94 towards nuclear receptors. Other phytocompounds 14-Deoxy-11, 12-didehydro andrographolide Andrograpanin and 14-deoxyandrographolide also showed a significant binding affinity and interactions that suggest that these compounds could be a relevant ligand for both ER and PGR. Therefore, our study suggests that andrographolide is a potential anticancer agent that can be utilized as a significant lead compound in breast cancer therapeutics by targeting the receptors ER and PGR. Further experimental validation is required to support the study.

Keywords: Breast cancer, Estrogen Receptor, Progesterone Receptor, *Andrographis paniculata*, Andrographlide.

OP-16

IMPROVED DATA CURATION STRATEGIES OF GENETIC VARIANTS FOR PRECISION DIAGNOSIS OF MONOGENIC DISORDERS

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India, being a country with large population and the practice of consanguineous marriages in certain communities has a high prevalence of genetic disorders. Rare monogenic disorders involving one or multiple genes, apart from common genetic disorders are also an important source of morbidity and premature mortality for affected families. These, however, largely remain undiagnosed or misdiagnosed and therefore mistreated. The increasing affordability of next generation sequencing has led to accumulation of large-scale data on genetic variants for populations all across the globe. But precise diagnosis and so treatment is often impeded because practitioners are not able to extract relevant information on association of variant with the disease from humongous data. Curation of genetic variants from available literature can potentially improve and accelerate diagnosis of rare monogenic disorders like cystic fibrosis, Wilson's disease, congenital adrenal hyperplasia, Monogenic Diabetes etc. Data curation is the first and the most rate limiting step to interpretation of genetic variants for plausible pathogenicity and establishment of guidelines for the much-needed diagnosis of a monogenic disorders. Here, we propose a detailed workflow for precise, faster and unambiguous manual curation of genetic variants from biomedical literature with emphasis on case-specific difficulties with possible solutions.

OP-17

ENGINEERING RESISTANCE AGAINST COTTON LEAF CURL DISEASE WITH THE APPLICATION OF ANTISENSE TECHNOLOGY

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Cotton (*Gossypium hirsutum*) is one of the important cash crops of India and every year its production gets suffered by various pathogens and pests. Among them Cotton leaf curl disease(CLCuD)isthemajorcausesoflossofcottoncultivation.CLCuDismainlycausedby*cott onleafcurlvirus*,(CLCuV)atypespeciesofgenusbegomoviruswhichbelongstofamilyGemini viridae. This virus is transmitted by whitefly *Bemisia tabaci*, which is difficult to control because of the prevalence of multiple virulent viral strains or related species. Begomovirus genome is characterized by single-stranded (ss) DNA associated with betasatellite DNA and alphasatellite DNA molecules. Betasatellite DNA is a small ss circular DNA of ca.1.3 kb, approx. half the size of DNA-A (ca. 2.6-2.8 kb). The satellite molecule beta, which is essentially associated with CLCuD, encodes □C1, a pathogenicity protein that plays a vital role in symptom induction as a result of the suppression of the silencing defense mechanism. Studies on βC1 have suggested that its expression leads to developmental defects, and it is also involved in the silencing process following the pathway, which most likely overlaps the miRNA pathway in plants. Thus, βC1potentialcandidatetoexploretheideaofgenesilencingofCLCuVthroughthegeneticengine ering approach. Antisense construct targeting βC1 gene was developed and transgenic tobacco plants (*Nicotiana tabacum*) were raised following transformation with developed construct.

These generated transgenics(T_o)lineswerecheckedthroughPCRandSouthernhybridization.Transformedplant s were inoculated with viruliferous whiteflies. After 72hrs post inoculation, whiteflies were killed by applying insecticide and plants were kept under controlled conditions. The plants remained symptomlessevenafter6weekspostinoculation.SmallRNAswereisolatedfromthetransforme d plants and hybridized with suitable probes. This study confirmed small RNA production through Antisense technology and its role in resistance againstCLCuD.

Keywords: Antisense, □C1, Cotton leaf curl disease, small RNA, Transgenic.

OP-18

WASTE WATER TREATMENT USING MICROALGAE

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Dairy waste water (DWW) is majorly generated from liquid milk, milk products and the detergents/solvents used for cleaning purposes. DWW, when released from the Dairy industries, may pose a high risk to the living beings and the surrounding environment. Therefore, a sustainable and cost-effective approach is required for the treatment and safe disposal of DWW. Microalgae is an ideal candidate for the treatment of DWW due to its autotrophic nature, rapid growth rate, high adaptability to the external environment and no sludge generation. DWW was collected from a local industry generating copious amount of waste water with high BOD and COD. The initial values for physiochemical properties like pH, colour, TDS, TSS, TS, DO, BOD, COD etc were evaluated. Microalgae were allowed to grow in DWW for certain time period. Efficient reduction in TDS, TSS, TS, DO, BOD, COD were observed till stationary phase of algal growth. Spent biomass was also analysed for lipid production to be used in biodiesel.

OP-19

GREEN BIOGENIC SYNTHESIS OF SILVER NANOPARTICLES USING *ERYNGIUM FOETIDUM (LONG* CORIANDER)LEAF EXTRACT AT ROOM TEMPERATURE: CHARACTERIZATION, ANTIMICROBIAL AND ANTI-CANCER STUDIES

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In this study, rapid, eco-friendly and simple and efficient route was applied for synthesis of silver nanoparticles using a mixture of *Eryngium foetidum* aqueous leaf extract as stabilizer and reductant and 1mM of aqueous silver nitrate. The plant extract acts both as reducing agent as well as capping agent. UV-Visible spectrophotometer showed absorbance peak in range of 440-450 nm. The silver nanoparticles showed anti-oxidant potentials and antibacterial activities against both *Escherichia coli* (gram negative) and *Staphylococcus aureus* (gram positive microorganisms). Further, the *in vitro* cytotoxic effects of silver nanoparticles were screened against A549 human lung cancer cell line and viability of tumor cells was confirmed using MTT ((3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide, a yellow tetrazole).Results confirmed this protocol as one step, nontoxic, simple, fast, eco-friendly and an alternative for conventional chemical method or physical method. Without the involvement of any harmful chemical, the silver nanoparticles are green synthesized by the reduction/conversion of aqueous silver ions in only 2 hours at room temperature. The resulting silver nanoparticles range from 8 to 18 nm in size. The coriander leaf-negotiated bio-reduced silver nanoparticles were characterized by different UV-Vis spectrophotometer, FTIR and TEM. The surface Plasmon resonance of green synthesiszed silver nanoparticles was observed at 450nm by the UV-Vis spectra. The possible bio-molecules accountable for the stabilization of prepared nanoparticles are identified by the FTIR analysis. In addition, the particles showed good antimicrobial activity towards both microorganisms: *E. coli (*Gram-negative bacteria) and *S. aureus (*Gram -positive bacteria). MTT assay revealed a dose-dependent increase in cell toxicity. Microscopic observations showed that the control appeared normal whereas distinct cellular morphological changes indicate unhealthy cells. Moreover, it has shown good anti-cancer activity against human lung cancer cell line. Hence, it may be a smart option for the preparation of silver nanoparticles that can be used as antibacterial as well as cytotoxic agent in treating many medical complications.

Keywords: Green synthesis, coriander leaf, Silver nanoparticles, Characterization, antimicrobial, anti-cancer.

OP-20

ASSESSMENT OF ARSENIC AND NUTRIENTS IN WHEAT VARIETIES (TRITICUM AESTIVUM) GROWN IN BALLIA DISTRICT, EASTERNUTTAR PRADESH,INDIA

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Exploitation of arsenic (As) contaminated drinking water, ground water and food has caused problem for millions of people in Asian countries. Use of deep tube wells, hand pumps and rivers are the main sources of naturally occurring high concentration of As in deeper ground water. Therefore, plants irrigated with As polluted ground water face declining global agricultural food productivity, and human health. In West Bengal, India, As contamination has been proven by a lot of researches and awareness programs, but in Uttar Pradesh (UP), villagers are still facing problem of As contamination in soil, water and crops which is creating hardship to the local people. Ballia district falls in central Ganga plain and is located in the eastern part of UP. The district is divided into 6 tehsils and 17 blocks. Farmers of the region depend on ground water, tube wells and canals for irrigation purposes. Previous reports have highlighted the presence of As in water sources of the region. Arsenic is a contaminant of public concern which needs special attention towards As accumulation behaviour in crops, growing at various ground water contaminated soils in the district. The present study deals with analysis of As and nutrients in ground water, soil and different parts of wheat varieties growing in different blocks of Ballia district. Results revealed accumulation of As in root, stem, leaf and grains of the plants, grown in Sohaon and Haldi blocks, which also correlated with the concentration of As present in soil and groundwater.

Keywords: Heavy metals, arsenic, *Triticum aestivum.*

OP-21

COMPARATIVE ANALYSIS OF LIQUID CULTURE MEDIUM AND ABIOTIC CONDITIONS ON MORPHOLOGICAL RESPONSES AND SAPONIN YIELD IN IN-VITRO CULTURE OF *BACOPA MONNIERI*

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Bacopa monnieri is a well-documented nootropic plant have been explored for seasonal variations in the yield of therapeutically important saponins called bacoside. The variation was also evident among germplasm from different geographical locations. Such variations are evidently seen in the phyto-compounds concentration in herbal formulation, thereby affecting their therapeutic efficacy. Propagation of plant under controlled environmental conditions provides a robust solution to the issue of environmental and seasonal variations. Alternative strategic approaches used for modulating the growth rate and yield of secondary metabolites inpropagating the plantlet in liquid culturing, provides a cost effective scalable strategy for large scale plant propagation under defined culture conditions. Such studies are significant for designing an optimized strategy for improving the yield of saponins having nootropic importance in *Bacopa monnieri*. Existing data is not indicative of conditions or parameters that are usually the key parameters in *in- vitro* culture of plants and thus their role in hydroponics cannot be ruled out. These parameters when regulated, may obtrude as key parameters as their role is vital for plant growth metabolism. The study puts a step forward in analyzing the role of liquid culturing conditions on the bacoside yield of the plant for optimization of cultivation conditions.

OP-22

CRYOPRESERVATION AND REGENERATION OF *PICRORHIZA KURROA*

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Picrorhiza kurroa belongs to family Scrophulariaceae and is a perennial herb. It isadditionally known as Kutki, Katui in Sanskrit. It is one of the prehistoric plants mentioned in Ayurvedic and Unani systems of medicines carrying plethora of medicinal properties. The plant is endemic to Indian Himalayan Region and available in the regions of Himachal Pradesh, Uttarakhand and Kashmir etc. It is used for treating malaria, hepatic fibrosis, bronchial asthma, constipation, and jaundice. The plant is listed endangered in Red Data Book, so in order to reclaim its natural population many alternative technologies along with conventional cultivation techniques were applied. In order to have long term germplasm conservation of some novel accessions of *Picrorhiza kurroa* cryopreservation can be applied and its regeneration potential can be explored. So this study was carried out for the development of somatic embryo(SE) on optimized MS media supplemented with growth hormones like IBA and KN. Selected torpedo shaped or heart shaped SE were selected and encapsulated in sodium alginate beads, followed by using osmoticum (sucrose 0.3M) ,air-drying and direct immersion in liquid nitrogen (LN-196°C) for cryopreservation. These one-month old cryopreserved SE were first thawed and warmed rapidly in waterbath at 37˚C and kept in regeneration medium having MS IBA, KN and GA. Some of the beads had been potted in greenhouse at 25°C temperature and humidity ranging from 70-80% in potting mixtures having vermiculite, perlite and cocopeat for direct regeneration. The regeneration was observed in cultures forming shoot primordial after 2 weeks of incubation under optimized tissue culture conditions. So, this technique would be very useful for long time conservation and preservation of commercially important medicinalplants.

Keywords: Cryopreservation, Somatic embryos, *Picrorhiza.*

OP-23

TOXIN–ANTITOXIN INTERACTION STUDY OF MAZEF^{XN} TOXIN-ANTITOXIN (TA) MODULE FROM XENORHABDUS NEMATOPHILA

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Xenorhabdus nematophila is a gram-negative, motile bacterium from Enterobacteriaceae family. X.nematophila is a source of novel genome encoded Toxin-Antitoxin (TA) modules. Toxin-Antitoxin (TA) modules are formed by a toxin gene having detrimental effects which arecounteredbyassociatedantitoxingene.InX.nematophila,withgenomewidescreeningby insilicoapproach,wehaverecentlyidentified39TAmodules.Inthisstudywehavedeciphered the in vitro interaction between toxin and antitoxin encoded by mazEF^{Xn} TA module. Directional cloning approach was applied to clone of Toxin (mazF^{Xn}) 375 bp gene and Antitoxin (mazE^{Xn}) 156 bp gene in pBAD/His-C and pGEX-4T/GST vectors respectively. Recombinant proteins were expressed and purified by GST and Ni-NTA affinity chromatography. Interaction between toxin and antitoxin was determined by Far Western. Purification results showed single band in SDS-PAGE at the position corresponding tobelow 21.5 kDa and at the position above 31kDa protein marker which were corroborated with the sizeofrecombinantHistaggedMazF^{Xn} recombinantprotein(~19kDa)andGSTfusionwith MazE^{Xn} recombinant protein (~ 31 kDa)respectively. Nitro cellulose membranecontaining SDS-PAGE separated and immobilized MazE^{Xn}-GST protein was overlaid with recombinant purified MazF^{Xn}-His protein. Later, immunoblot was washed and probed with anti-His monoclonalantibodies.Resultshowedabandatthepositionof19kDa(asapositivecontrol) while bands were also observed at the position of 31 kDa indicating an interaction between MazE^{Xn} and MazF^{Xn} in vitro. Thus, MazE^{Xn} and MazF^{Xn} from X. nematophila participate in protein-proteininteractions.

Key Words: Xenorhabdus nematophila, Toxin-Antitoxin (TA) Module, SDS-PAGE,Ni-NTA Chromatography, FarWestern.

OP-24

PRODUCTION AND OPTIMIZATION OF L-GLUTAMINASE FROM TUR HUSK BY SALT PAN ISOLATE UNDER SSF

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The present work deals with the screening of various agro-industrial byproducts such as rice husk, chickpea husk, groundnut husk, green gram husk, tur husk, black gram husk, wheat bran, groundnut oil cake and safflower oil cake for L-glutaminase production under SSF. The different parameters optimized in this study were fermentation time, pH, temperature, concentration of L- glutamine, inoculum level, moisture content, carbon and nitrogen sources. During screening, it was found that tur husk is more productive and pH 7, temperature 30°C and 80 % moisture content supported the maximum production on enzyme. Solid state fermentation has various advantages over submerged fermentation such as high productivity, simple technique, low production cost, less energy requirement. One of the major uses of microbial L-glutaminase is in the food industry as a flavor enhancingagent.

Keywords: L-glutaminase, solid state fermentation, tur husk, optimization.

OP-25

BIOTRANSFORMATION OF XENOBIOTIC COMPOUNDS BY LIGNIN DEGRADING WHITE ROT FUNGI

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The environmental pollution is rapidly expanding with increased development, releasing hazardous xenobiotic compounds with widespread contamination of soils, ground waters and surface watersresulting in severe repercussions, including the loss of food sources, mutagenic and carcinogenic effects to the mankind. This recognition of worldwide threat to public health due to environmental pollution has resulted in new physical and chemical treatment processes for environmental restoration,but these processes, remove organic pollutants at low level, are highly selective in terms of the range of pollutants and expensive for the treatment of large amounts of waste. Hence a cost effective, efficient and eco-friendly bioremediation method of choice is based on the use of indigenous or introduced microorganisms such as the white rot fungi (WRF), a group of basidiomycetes characterized by their unique ability to degrade lignin in wood, making them an important link in the global carbon cycle.Under nutrient C, N, or S limitationconditions, white rot fungi produce certain extracellular enzymes including laccase, manganese peroxidase, and lignin peroxidaseto degrade insoluble chemicals such as lignin and many similar structured hazardous environmental pollutants at considerably higher and lower concentrations. The lignin-degrading system of WRF is non-specific, non-stereoselective and free radicals-based involving highly reactive free radicals carrying out series of chain reactions, resulting in complete degradation of pollutants. WRF enzymes are not repressed even when the pollutant concentration is reduced to ineffective levels for enzyme induction and most important is WRF can be cultivated on inexpensive agro-residues like straw, wheat, corncobs, woodchips etc.

Keywords: White rot fungi, Xenobiotics, Bioremediation, Lignin, Enzymes.

OP-26

INCREASING THE VIRULENCE OF ENTOMOP_ATHOGENIC FUNGUS METARHIZIUM ANISOP_LIAE BY INCREASING THE ENZYME ACTIVITY OF VIRULENCE DETERMINING GENES

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The Productivity of crops is at risk due to pests and pathogens. Pest insects have adverse and damaging effects on agricultural production. Although chemical insecticides provided excellent control of major pests of crops besides, they posed considerable environmental problems such as adverse effects on fish and wildlife, biomagnification, persistence in water, soil and food crops etc. For combating these harmful effects and environmental degradation we can substitute chemical pesticides with biological control agents. Fungi such as Metarhizium spp. has the potential to act as biopesticides. Chitinase and protease are pivotal enzymes in the host cuticle infection process. The downside of Metarhizium anisopliae is the slow killing speed of insects. To decrease the LT50 we have targeted chitinase and protease genes. Increasing their enzyme activity through mutations and their overexpression can give lower Lt50 value. Three exons of a chi2 gene were amplified from the genomic DNA of Metarhizium anisopliae and fused to get a full chi2 gene. For obtaining the pr1a gene, fungal spores were inoculated into sdb media and for 48 hrs and fungal mycelia harvested by filtration. The harvested mycelia were again inoculated into induction media with 1% colloidal chitin and basal salts. After 24 hours mycelia were again collected by filtration. RNA was isolated from mycelia using trizol method. cDNA was prepared from RNA and used as a template for amplification of the pr1a gene. Amplified genes were cloned into pET28a vector. Wild type chitinase and protease genes were made mutant by addition of a fragment. A fusion protein of mutated protease and chitinase was also created using a Gibson assembly method. Clones were confirmed using PCR method and restriction digestion method Overexpression of mutant construct in fungus will be used to increase the virulence of Metarhizium anisopliae.

Keywords: Virulence, Entomopathogenic, Chitinase, Protease, Metarhizium anisopliae.

OP-27

MOLECULAR IDENTIFICATION OF ENDOPHYTIC FUNGI ISOLATED FROM MEDICINAL PLANT OF NORTHEAST INDIA

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Endophytes are microorganisms, which grow inside the living plants without causing any direct visible effects. They are mostly major source of secondary metabolites for the human welfare. These secondary metabolites are usually novel therapeutic drugs. Endophytes have influence on their host in many ways, such as they help the host plants to be resistant to insect and pathogens. Endophytic fungi are known as potential biocontrol and plant growth promoting agents for their host plant. They colonize inside the host plant for avoiding competition by any other microbes in the soil. The host plant with medicinal valueis used for treatment worldwide for several ailments including tumors, warts, skin diseases, inflammations, rheumatism, jaundice, leprosy, microbial infections, and malaria. Medicinal plant was procured from Assam (26.20^{o} N, 92.93^{o} E), India. Endophytic fungi were isolated from the root of the medicinal plant by using standard protocols. After isolation of fungal endophytes, their morphological identification was performed followed by molecular identification of the endophytes from genomic DNA and subsequently sequenced using ITS region of 18S rDNA. The obtained sequences were aligned by using BLAST algorithm at NCBI. Most abundantly, *Aspergillus* and *Penicillium* species were identified.

Keywords: Medicinal Plant, Fungal Endophyte, BLAST Algorithm, *Aspergillus* and *Penicillium.*

OP-28

BIODEGRADATION OF TOXIC ORGANIC POLLUTANTS IN WATER SOURCE IS POWERED BY TEXTILE MICROBIAL PROTEINS

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A large number of enzymes from bacteria have been reported to be involved in the biodegradation of toxic organic pollutants. Bioremediation may be a cost compelling and nature friendly biotechnology that is powered by microbial proteins. The water is an essential resource for life on the planet and for human development. The textile industry is one of the anthropogenic activities that most consume water and pollute water bodies. Therefore, the present work aims to undertake a review on the main effects of the release of industrial dyes and the essential bioremediation mechanisms. The textile dyes significantly compromise the aesthetic quality of water bodies, increase biochemical and chemical oxygen demand (BOD and COD), impair photosynthesis, inhibit plant growth, enter the food chain, provide recalcitrance and bioaccumulation, and may promote toxicity, mutagenicity and carcinogenicity. In spite of this, the bioremediation of textile dyes, that is, the transformation or mineralization of these contaminants by the enzymatic action of bacteria biomasses is fully
possible.Anotheroptionistheadsorption.Theinvestigate,askinthislocalewouldcontribute towards creating progressed bioprocess innovation to reduce the toxicity of the pollutants and alsotoobtainnovel useful substances.Theinformationonthemechanismsofbioremediation- related enzymes such as oxido-reductases and hydrolases have been broadly studied.the enzymes from different microorganisms include within the biodegradation of wide range of pollutants,applications,andproposalsrequiredtoovercometherestrictionsoftheirproducti ve utilize.

Keyword: Bioremediation, Ecotoxicity, Mutagenicity, Carcinogenicity, Microorganisms

OP-29

UNRAVELING THE INTERACTION MECHANISM OF GTP WITH CODY OF *BACILLUS ANTHRACIS,* A POTENT BIOTERROR WEAPON

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Introduction & Objectives: *Bacillus anthracis*, aprioritized bioterrorism bacterium causes the fatal zoonotic disease, anthrax, with humans as contingent victims. It harbors a global transcriptional regulator, CodY which controls diverse cellular activities such as metabolism, sporulation, pellicle, and biofilm formation, and most importantly virulence. GTP and Branched Chain Amino Acids are the metabolic effectors of CodY, which affects its DNA-binding ability. In order to gain an insight into the interaction mechanism of CodY and GTP and the biochemical reactions that ensue, of which scarce is known presently, we carried out GTP interaction assays *in vitro*. **Methods:** We assessed the interaction mechanism of GTP and CodY protein *in vitro*. In this direction, the *cody* gene was over-expressed in *E. coli* expression system and the purified recombinant His_6-CodY protein was subjected to GTP interaction assays. Consequently, His_6-CodY protein could be crosslinked to the radiolabeled GTP in a UV-crosslinking assay with a competitive inhibition by the non-radiolabeled pyrimidine nucleotides. The observed autophosphorylation activity of the recombinant protein was based labile and acid stable owing to the presence of the conserved serine residue (S215) critical for the activity as the mutant version of the protein (His_6-CodYS215A) failed to autophosphorylate under similar assay conditions. An absence of any secondary structural changes in His_6-CodYS215A protein was confirmed by CD spectroscopy. A weak GTP hydrolyzing activity was observed in the Thin-layer chromatography assay with the Km and the Vmax of the reaction measured as 0.16 mM and 0.0154 mM min^{-1} respectively in the coupled enzyme assay. **Results** It was shown that CodY of *B. anthracis* binds to GTP and hydrolyzes it too. Also, CodY of *B. anthracis* could undergo autophosphorylation in the presence of GTP at a conserved Serine residue (Ser^{215}), in the Helix-turn-Helix DNA binding motif, critical for the activity as exhibited by the mutagenesis studies. **Conclusion** Our study was the first to demonstrate that CodY of *B. anthracis* displays some unique biochemical attributes such as GTP hydrolysis and autophosphorylation not observed in its homologs in other Gram-positive bacteria. Further, the presence of a conserved S215 residue in its DNA-binding domain hints the presence of aself-regulatory mechanism of CodY activityin the cell. Finally, our findings have contributed to the current understanding of the structure-function relationships in CodY of *B. anthracis.*

Keywords: *B. anthracis*; CodY; homology modeling; GTP-binding; autophosphorylation; hydrolysis

OP-30

EVALUATION OF BACTERIAL INHABITANTS OF PHYLLOPLANE REGION OF*CENTELLA ASIATICA* FOR THEIR ROLE IN SALINITY STRESS TOLERANCE

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Plants like *Centella asiatica* have immense commercial significance due to its complex and diverse phytochemical composition. Phytochemical composition of *Centella asiatica* contains various biochemical components like pentacyclic tripenoids, asiaticoside, brahmic acid etc, which are known to have medicinal importance and used to treat various disease conditions. Such commercially valuable plants are always needed to cultivate at large scale to fulfill high global demand. Like other living forms plant growth is also impacted by various physical, chemical and biological factors. Biological factors comprise microbial inhabitants which populate plant body as natural habitat. Arial or above ground parts of plant body are altogether known as phyllosphere. Various bacterial species are found as natural microflora of phyllospheric region ofplant.

In current era, climatic conditions are adversely affected by human activity. Such adverse effects in climatic conditions create many abiotic stresses which further affect crop productivity. Now a day's concentration of salts in soil is continuously increasing which make agricultural land saline and less productive for crop. Phyllospheric bacteria can enhance plant growth under certain abiotic stress conditions like high soil salinity by improving host plant's in built alleviation mechanism against such abiotic stresses. Phyllospheric inhabitants are known to regulate various biochemical and molecular processes of host plant and control intracellular concentration of various plants metabolites which able to protect plant against abiotic stresses. This study includes isolation and identification of various species of bacteria from leaves of *Centella asiatica* by using various microbiological and biochemical protocols. This research will contribute in development of new bioaugmentation method to increase crop productivity of various commercially important medicinal plants like *Centella asiatica*. So, the study will have significant contribution in field of agricultural biotechnology.

Keywords: Abiotic stress, *Centella asiatica*, Phylloplane, Phytochemical composition, Salinity stress.

OP-31

DIFFERENTIAL RESPONSE OF RICE VARIETIES UNDER ARSENIC AND IRON USING BIOCHEMICAL AND MOLECULAR APPROACHES

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Adaptation of plants to the environment are always challenged under stress. Among metal stress, arsenic (As) has been proven as a major threat to human health and agriculture especially in rice cultivation. Rice plants are more efficient in acquiring As from paddy soils, which leads to increased reactive oxygen species and phytotoxicity. Iron (Fe), an essential microelement, interacts with As and plays a significant role in physiological and biochemical pathways. It leads to the formation of plaque around roots and serves as a strong adsorbent for As. The present work was designed to study the role of Fe in reducing As toxicity in two rice varieties i.e. Lalat and Ratna. The experiment was performed on hydroponically grown 12 days old seedlings treated with As(III) (150 μM) and Fe (2.5 mM) alone and in combination. Growth response, physiological, morphological and biochemical parameters along with Fe related enzymes were studied. An attempt was made to observe the expression analysis of *WRKY* transcription factors in response to As(III) and Fe alone and in combination in both the rice varieties, since *WRKY* transcription factors play an important role in heavy metal stress. We observed that seed germination, morphogical and physiological parameters decreased, while biochemical parameters including antioxidant enzyme activities increased during As stress as compared to control. Fe related enzymes showed varying response during As and Fe treatment alone and in combination. Our observation revealed that Fe helps in mitigating the As stress in both the rice varieties. *WRKY* expression profile indicated that *WRKY* transcription factors play a role in protecting plant from Asstress.

Keywords: Arsenic, Rice, Iron, Rice varieties, *WRKY*.

OP-32

COMPARATIVE ANALYSIS OF LIGNOCELLULOSIC PRETREATMENT STRATEGIES FOR 2G BIOETHANOL PRODUCTION

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The consequent increase in energy demand has promoted the use of lignocelluloses for production of alternative and renewable fuels such as bioethanol. Pretreatment (chemical, physico-chemical or enzymatic) of lignocellulosic biomass constitutes an essential role in second generation production of biofuels. In our present study, sugarcane bagasse (SB) and corn cob (CC), major agricultural wastes generated in our country, were subjected to different pretreatment strategies such as acid, alkali, steam explosion and enzymatic, and were further evaluated for bioethanol production using two yeast strains, Saccharomyces cerevisiae BY4741 and Pichia stipitis NCIM 3497. The alkali treatment using NaOH yielded maximum amount of reducing sugars, 15.88 mg/ml and 11.45 mg/ml in the hydrolysates of SB and CC, respectively. The ethanol concentrations obtained were 2.4 g/L from alkali treated SB using Saccharomyces cerevisiae BY4741 and 2.6 g/L from acid-alkali treated CC using Saccharomyces cerevisiae BY4741. Work is under progress for further increase in ethanol yield through cost effective process.

Keywords: Lignocellulosic biomass, second generation bioethanol, pretreatment, Saccharomyces cerevisiae

OP-33

NUTRACEUTICALS POTENTIAL OF PROBIOTICS AND PREBIOTICS FOR OBESITY INDUCED INFERTILITY DISORDER

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Infertility is tremendously challenging problem faced by the modern era population and its management is associated with substantial shortcomings. Determining the root cause of infertility in human is a complex process and it involves a lot of research and investigations. In the present modernized society, the problem of infertility has been widened by several factors and has an impact on both men and women all over the world. The potential of nutraceuticals/functional foods is being realized in the prevention of poor life style generated diseases.Research evidence reviled the concept that obesity and metabolic consequences are strongly related to changes in both the function and composition of gut microbiota, which can modulating energy metabolism. However, the functional foods, mainly probiotics are not still explored in depth in the area of reproductive health. Hence, to cover this gap we are proposing that the dietary approach as probiotics and prebiotics supplementation may be proven beneficial for reproductive disorders among human populations. In this study the C57BL/6J female mice, eight weeks old (n=6) were divided into six groups, Control (CON), Skim-Milk (SM), High fat diet (HFD), Dahi, Probiotics (PFM) and Prebiotics (Pre), Synbiotic product milk (SPM). Except CON group all others were co-administered with high fat diet (35%) and probiotic bacteria fermented milk having 10^9 CFU counts. After 20 weeks all the mice were sacrificed and sample collection was done. Body weight was significantly decreased among treated groups as compared to controls (***$P<0.001$) and estrous cycling interruption was observed among high fat diet fed group while restoration to normal pattern was found in treated groups. Antioxidative status was improved in liver as well as in ovarian tissues. Ovary histopathological data revealed that there was alteration at tissue and cellular level among different groups. Important findings from this study shows that probiotic in form of curd may act as better food based therapeutics for Improved reproductive health.

Keywords:Gut microbiota, probiotics, prebiotics, high fat diet, synbiotic product milk.

Poster Presentations Abstracts

PP-1

FLAVIVIRUS: ENDOPLASMIC RETICULUM (ER) STRESS INDUCED PATHOGENESIS

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Flavivirus is a family of over 90 enveloped positive stranded single stranded RNA viruses that include West Nile virus (WNV), Dengue virus (DENV), Japanese encephalitis virus (JEV) and Hepatitis C virus (HCV). These viruses affect the different arms of the unfolded protein response (UPR) according to their benefit, later causing apoptosis to enable the release of mature virions. Under normal physiological conditions the UPR signalling proteins- PERK (PKR like ER kinase), IRE1 (Inositol requiring protein1) & ATF6 (Activating transcription factor6) are inactive as they are bound to BiP (binding immunoglobulin protein). But during viral infection the translation of viral genome results in formation of a single polyprotein that undergoes cleavage to form 10 mature viral proteins which includes 3 structural proteins - core(C) protein, precursor membrane protein (prM), envelope protein (E) & 7 non-structural proteins (NS). These viral proteins trigger ER stress causing sequestering of binding immunoglobulin protein (BiP) to mis/unfolded proteins, autophosphorylation, dimerization & activation of UPR proteins. The auto-phosphorylation of PERK hampers the viral protein synthesis due to its ability to mediate interferon response hence is inhibited by viral non-structural proteins. The activated PERK further phosphorylates eIF2-α which stops the general translation and results in formation of CHOP (C/EBP homologous protein) that causes apoptosis. *Flaviviruses* alsoupregulate the ATF6 pathway which leads to increased BiP production and increased cell viability. Upregulation of IRE1 pathway causes production of chaperones for relieving ER stress & CHOP for apoptosis under severe stress. Thus a variation in mode of virus infectivity can be seen as some cause direct apoptosis of infected cells whereas others lead to chronic infections due to the upregulation of TRAF2-JNK (TNF receptor associated factor –c Jun n-terminal kinase) pathway.

Keywords: ER stress, Unfolded Protein Response (UPR), *Flavivirus*, Apoptosis, Binding immunoglobulin protein (BiP), PERK (PKR like ER kinase), IRE1 (Inositol requiring protein1), ATF6 (Activating transcription factor6)

PP-2

ENDOPLASMIC RETICULUM STRESS REGULATION BY PICORNAVIRIDAE

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The endoplasmic reticulum (ER) is a eukaryotic organelle correlated with the folding and transport of proteins. The correct folding of proteins is controlled carefully by ER chaperones as incorrect folding leads to formation of inactive proteins. The accumulation of such misfolded proteins lead to dysfunction of ER, a condition called ER stress, as a result of which the cell activates evolutionarily conserved pathway known as the unfolded protein response (UPR) in an effort to restore homeostasis. The UPR restore normal conditions by upregulating ER chaperones and degradation of misfolded proteins by endoplasmic reticulum associated degradation (ERAD) pathway. Viruses utilize the host machinery to produce viral proteins which increase the influx of proteins in the ER leading to induction of UPR. This review summarizes the strategies that the picornaviridae family of viruses utilizes to hijack the cellular pathways in order to promote their replication and subsequent release of virions from cells by apoptosis. It further suggests novel strategies to decrease viral multiplication through modulation of UPR elements and apoptotic processes.

Keywords: ER chaperones, unfolded protein response (UPR), endoplasmic reticulum associated degradation (ERAD), apoptosis

PP-3

LIFE STYLE DISEASES: A CROSS TALK BETWEEN ENVIRONMENT AND EPIGENETICMODIFICATIONS

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Epigenetics is the study of heritable changes in gene expression (active versus inactive genes) that do not involve changes to the underlying DNA sequence — a change in phenotype without a change in genotype — which in turn affects how cells read the genes. DNA methylation and chromatin remodelling are the two elementary mechanisms that mediate epigenetic phenomenon in all living beings. Many of these epigenetic changes are necessary to direct normal cellular development and differentiation in the developing organism. However, developmental abnormalities may occur in response to inappropriate epigenetic signalling that occurs secondarily to still poorly understood causes. With identical genetic heritages, two twins may evolve differently depending on their respective environments.There is growing evidence that our genes "listen" to the environment in complex ways that affect our health and behaviour. Thus, in addition to genetic and stochastic influences on epigenetic processes, epigenetic variation can also arise as a consequence of environmental factors. Different environmental factors such as chemical pollutants, dietary components, behaviour, physical activities, working habits, smoking and alcohol consumption etc are known to affect the epigenetics of human genome and may lead to different disease related to our life style. Diets with low vitamin B_{12} and folate lead to reduced levels of DNA methylation as they are required for methionine and SAM synthesis similarly selenium epigenetically modulates DNA and histone to activate methylation-silenced genes. Smoking tobacco decreases DNA methylation but hypermethylates genes such as p53 and p16 and increases acetylation due to degradation of HDAC. Alcohol is an antagonist of folate metabolism and effects DNA methylation. When exposed to toxic levels of arsenic it causes hyper/hypomethylation of blood DNA. Although epigenetic modifications are influenced by the environment, most of these changes tend to be re-established each generation; however, this does not happen at some loci in the human genome. Thus, epigenetics is expected to help explaining how gene expression is modulated by lifestyle and environmental factors, and to bring a more complete understanding of individual responses to environmental cues and acquired risk factors.

Keywords: Epigenetics, DNA Methylation, Histone Modification, SAM (S-adenosyl methionine), Methylation-silenced gene.

PP-4

EMT TRANSITION DURING TUMOUR PROGRESSION

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Metastasis is the process in which cancer cells spreads to new areas of the body mainly through bloodstream or lymph system, some epigenetic modifications occur in the cells which makes them metastatic. EMT is the process which takes place during metastasis in which epithelial cells gets converted into mesenchymal cells, in which apico-basal polarity gets converted into front-back polarity, as well as cells expressing E-cadherin changes their expression to N-cadherin. EMT is also involved in the processes like wound healing and tissue fibrosis. In another process referred to as MET, mesenchymal cells are converted to epithelial cells wherein cells after undergoing EMT produce new tumour sites. When the tumour cells just acquire the potential to penetrate the surrounding tissues, the invasion process gets started, and when these cells pass through the extracellular matrix they enter in intravasation stage. As the cells pass through the circulatory system, they escape from extracellular matrix and vascular membrane by the process called extravasation. Ultimately these neonate cells travel to a new location and produce secondary tumour, called as micrometastasis. The literature supports the findings of involvement of EMT in metastasis and based on published reports, we propose that EMT is involved mainly in the stages of invasion and intravasation whereas MET is involved in stages after micrometastasis.

Keywords: Metastasis, Epigenetic, Apico-Basal, Wound healing, Tissue fibrosis.

PP-5

MICRONEEDLES FOR TRANSDERMAL DRUG DELIVERY

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Drug delivery refers to administrating a pharmaceutical compound into a body in order to carry out its therapeutic effects. Among the several routes for drug delivery, skin is one of the most commonly approached routes; the drug is delivered across the skin by injection infusion methods. This route specifically requires to overcome the mechanical barrier provided by '*Stratum Corneum*' of Epidermis and vascular and nervous networks within the Dermis. Traditional hypodermic needles are seen to have many drawbacks upon clinical applications. Whereas, Microneedles are tested and proved to show better delivery of the drug, overcoming the drawbacks of hypodermic syringes. Microneedles are the micron scale hybrid between transdermal patches and hypodermic syringes. There are multiple MN designs that have been fabricated i.e. hollow, solid, coated and polymer microneedles. Hollow microneedles are similar to regular hypodermic needles but are shorter in length and liquid formulation of drug is infused through pores in microneedles. Solid microneedles create hole in the skin and then a patch is applied; Coated microneedles are coated with drugs; Polymer microneedles can be dissolving, non-dissolving or hydrogel forming made up of polymers. There are various advantages and disadvantages associated with the use of this techniques. Among these microneedles the best technique is hydrogel-forming microneedles. Current review will highlight on how hydrogel-forming microneedles enhances the drug delivery and the effects on the drug delivery correlated with the drugs used for formation of reservoirs and demonstrated using different skin models and lab rats for the experiments.

PP-6

PREVALENCE OF SUBCLINICAL HYPOTHYROIDISM IN AN OTHERWISE HEALTHY POPULATION - A STUDY

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Hypothyroidism is a commonly prevailing disorder in the adult Indian population. Subclinical hypothyroidism (SCH) is an early stage of hypothyroidism and is usually detected in patients who have had thyroid function testing performed due to symptoms of hypothyroidism. Mild thyroid failure can be diagnosed when peripheral thyroid hormone levels are within normal reference laboratory range but serum thyroid-stimulating hormone (TSH) levels are mildly elevated. This condition occurs in 3% to 8% of the general population and it has been observed that it is more common in women than men, and also its prevalence increases with age. The symptoms of subclinical hypothyroidism are difficult to diagnose. This is especially true when TSH levels are only mildly elevated. When symptoms do arise, however, they tend to be vague and general and include constipation, fatigue, goitre, weight gain, hair loss, memory problems with a "brain fog". The most common cause of subclinical hypothyroidism, accounting for 60% to 80% of cases, is Hashimoto (autoimmune) thyroiditis, in which thyroid peroxidase antibodies are usually present. A survey was done on subclinical hypothyroidism and 155 patients were interviewed. Out of these 63 patients (40%) suffered from subclinical hypothyroidism. The prevalence of hypothyroidism was high, affecting approximately one in 10 adults in the study population. Females and elderly people were found to have a significant association with subclinical hypothyroidism.

Keywords: Subclinical hypothyroidism, Fatigue, Hashimoto thyroiditis, Peroxidase antibodies,

PP-7

PREVALENCE OF HYPONATREMIA IN AN ELDERLY POPULATION: A CASE STUDY

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Hyponatremia is the most frequent electrolyte disorder both in hospitalized and outdoor patients. Elderly patients represent a high-risk group for the occurrence of hyponatremia because age is a strong independent risk factor for hyponatremia. Decreased serum sodium concentration is a rather frequent electrolyte disorder in the elderly population because of the presence of factors contributing to increased antidiuretic hormone, the frequent prescription of drugs associated with hyponatremia and also because of other mechanisms such as the "tea and toast" syndrome. Hyponatremia in elderly subjects is mainly caused by drugs (more frequently thiazides and antidepressants), the syndrome of inappropriate antidiuretic hormone secretion (SIAD) or endocrinopathies; however, hyponatremia is multi-factorial in a significant proportion of patients. Special attention is needed in the elderly population to exclude endocrinopathies as a cause of hyponatremia before establishing the diagnosis of SIAD, which then requires a stepped diagnostic approach to reveal its underlying cause. Hyponatremia is an important and common electrolyte abnormality that can be seen in isolation or, as most often is the case, as a complication of other medical illnesses (eg, heart failure, liver failure, renal failure, pneumonia).The normal serum sodium level in the body is 135-145 mEq/L. Therefore, hyponatremia is defined as a serum sodium level of less than 135 mEq/L. This research is based on the prevalence of hyponatremia in an elderly population. This study indicates an increase in patients of hyponatremia above 60 years of age. This study also tells the increase in number of patients having hyponatremia as well as abnormal creatinine levels.

Keywords: Creatinine, hyponatremia, patients, sodium.

PP-8

H_2S MODULATION: A NOVEL THERAPEUTICS FOR CANCER

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Hydrogen Sulphide (H_2S) is the third gaseous transmitter along with nitric oxide and carbon monoxide. H_2S molecule can only be oxidized since sulphur is present in –2 oxidation state which is the lowest oxidation state of sulphur which makes the molecule a reductant and can only be oxidized. As a result it can easily modify biological pathways. Endogenously H_2S production involves 3 major enzymes namely cystathionine γ-lyase (CSE), cystathionine β-synthase (CBS) and 3-mercaptopyruvate sulphurtransferase (3MST). Inhibition of CBS enzyme has shown anti-tumor effect in cancer cells particularly in colon and ovarian cancer. H_2S donation at higher amounts has reportedly exhibited induction of cancer cell apoptosis while not showing any adverse effect on the nearby surrounding cells. H_2S has been found to have a dual role in cancer. To depict it graphically a bell shaped model has been proposed which explains that endogenous H_2S or a relatively lower exogenous H_2S amount shows a pro-cancer effect whereas a higher amount of exogenous H_2S given for a prolonged time shows anti-cancerous effect. This paradoxical role of H_2S has ignited an enthusiasm towards researching and developing more enzyme inhibitors and H_2S releasing hybrids. Moreover, the major critical issues towards this mechanism is the dose and after effects of the therapy on the cancer cells and surrounding healthy cells. For the future aspects, the role of enzyme inhibition needs to be examined and researched in depth to understand its effects on tumor cells in formulating a novel strategy to inhibit cancer cell growth using H_2S.

Keywords: Hydrogen sulphide, Cells, Anti-cancer, Apoptosis, Enzymes.

PP-9

CEREBROVASCULAR DISORDERS AND VASCULAR DEMENTIA

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Cerebrovascular disorders (CvD) describe a group of events that disrupts the blood flow to the brain. This obstruction in blood flow involves a number of risk factors, hypertension, environmental, behavioral, to name a few, and could result in major vascular problems like stroke, the most widely known of which are ischemic and hemorrhagic. Strokes rank second in the cause of death and third as a cause of disability. One of the major consequences of stroke is disruption of the activity of blood brain barrier (BBB), a selectively permeable membrane which is responsible for regulating cerebral blood flow. Any damage to vascular endothelium or abnormalities in mechanisms like neurovascular coupling and autoregulation are the major factors behind this disturbed cerebral blood flow. As of now, there are various methods in use for the management of CvD which may involve either treatment with blood pressure medicines (Apresolins), blood thinners (Warfarin) or surgical treatments like carotid endarterectomy, clipping depending on the kind of cerebrovascular accident.

Occurrence of stroke establishes chances of disorders like vascular dementia (VaD), a neurodegenerative disorder characterised by decline in cognitive functions. VaD accounts for about 17-20% of all dementia patients making it the second leading form of dementia after Alzheimer's. There is no set cure for vascular dementia yet and the limited treatments basically work by improving blood flow and memory and preventing further deterioration. It has been reported that apart from drugs like ticlopidine and donepezil, there are certain herbs such as **Gingko biloba** and **Bacopa monnieri** (Brahmi) which have proven beneficial in such conditions.

Keywords: blood-brain barrier; stroke; cerebral blood flow; vascular dementia.

PP-10

INTRANASAL DELIVERY OF NANOFORMULATIONS FOR NEUROPATHICPAIN

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Pain can be defined as an unpleasant sensation that can range from mild, localized discomfort to agony. It can have both physical and emotional components. The physical part of pain results from an unpleasant sensory experience with actual or potential tissue damage. It can arise due to a number of diseases and conditions including diabetic neuropathy, cancer, osteoarthritis, back pain, post-operative pain, fibromyalgia, etc. It is a common and increasing health concern worldwide, having a significant social and economic effect on both patients and healthcare systems. Due to the complexity of pain and individual differences in clinical response, the currently available treatment modalities are not always successful in alleviating pain and may also show certain unfavorable side-effects. Most potential medications for neurological disease treatment are unable to enter the brain at sufficient levels to be therapeutic, due to the bloodbrain barrier. Delivering therapeutic agents to the brain intranasally offers a non-invasive way to bypass the blood-brain barrier. Nanosized drug carriers have been shown to enhance the delivery of drugs to CNS relative to similar formulations in the form of drug solutions.

Nanoformulations help to make the delivery of drugs intranasally a possibility. Nanoparticles' surface modifications can be used as a powerful technique to encourage uptake and absorption of the drug. Modification of nanoparticles by conjugating mucoadhesive agents such as chitosan, absorption enhancing agents such as bile salts and surfactants or permeation enhancing agents such as glutathione enhances the drug's absorption and uptake. Current research developments in this medical field are therefore focused on the advancement of potential treatments to meet many of the unmet needs and to solve current pain management limitations.

Keywords: Pain, Nanoformulations, Intranasally, Brain, Nanoparticles

PP-11

ANTI-PROLIFERATIVE EFFECT OF PHYTOCOMPOUNDS ON GLIOBLASTOMA CELL LINES

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Glioblastoma multiforme (GBM) is a severe brain tumor affecting aged as well as pediatric population. Even though treatment for the disease is present, the problem is grave due to the property of resistance development in GBM cells against the standard treatment of temozolomide (TMZ). The accumulation of several mutations of the intermediate genes of pathways leads to the growth of the mutated cells resulting in clonal evolution. Due to the increasing side effects and resistance against several chemical inhibitors/drugs, it is extremely necessary to find an alternative to combat adverse effects of the treatment. One way to overcome this issue is to use the phytocompounds for therapeutic interventions. Certain phytocompounds were selected based on the ability to cross blood-brain barrier. These phytocompounds tend to target various aspects of cell cycle regulation, apoptotic pathways and cell proliferation. Additionally, they tend to downregulate various angiogenic causing tumor growth. The selected compounds have been observed to show anti-proliferative efficacy against GBM cell lines. Therefore, phytocompounds as antiGBM drugs can be effective and as well minimize the side effects of current treatment.

Keywords: Cell cycle regulation; Efficacy; Inhibition; Temozolomide

PP-12

APPROVAL PATHWAY FOR NEW DRUG IN INDIA

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Developing, manufacturing and marketing a new drug requires a tremendous amount of research work and requires huge investment during clinical trials. The Indian regulatory body CDSCO lookout efficacy and safety of drug. 122A ,122B, 122D, 122DA, 122DAA and 122E rules of Drug and Cosmetics Act describe the data to be generated for approval of clinical trial /import /manufacture of new drug. Drug Controller General of India (DCG) grant approval of the manufacture /import of new drug and permission for Investigational New Drug (IND). Clinical investigation or clinical experiments are conducted in conformity with the written permission of licensing authority mentioned in clause (b) of Rule 21. The applicant must file an application in form 44 along with fee and all relevant data as per Schedule Y. NDA is received via the agency. Regulatory bodies ensures that enough information and data have been submitted at every stage and justify the work. Possible status of application can be -Not approvable, Approvable, Approval. This review summarizes the approval pathways for New Drug in India.

Keywords: clinical trials, new drug, CDSCO, Schedule Y, Form 44

PP-13

COMBINED EFFECT OF METFORMIN AND VITAMIN D ON CELLULAR BIOENERGETICS AND HYPERGLYCEMIA

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Diabetes is a group of metabolic disorder. On the basis of various factors like age at onset, degree of insulin resistance, β cell dysfunction it can be classified into two types – Type 1 Diabetes (T1DM) and Type 2 Diabetes (T2 DM). Recently T2 DM has been reported to account for more than 85% of Diabetic cases. It has been estimated by IDF that around 425 million people were having diabetes in 2017 and the number has been increasing till now. Thus, there is a huge need for prevention and treatment of diabetes. In this regard, metformin has been the first and foremost choice for the treatment of Type 2 DM. Metformin works primarily by decreasing hepatic glucose production and gluconeogenesis suppression via AMPK pathway. But it also has been observed to affect respiratory chain complex 1 so it is suggested that it could be complemented with other therapies. In the similar context, Vitamin D supplementation seems to be a promising agent as it improves insulin action as well as enhances insulin sensitivity. It also proven to be a good anti-oxidant in various studies. Along with that, studies also suggested that Vitamin D helps in improving mitochondrial metabolic activity and ATP levels. Interestingly, mitochondria activity is also crucial for proper insulin secretion and action as activation of PPAR-δ and exocytosis mechanism both are energy dependent processes. Thus, contributing Vitamin D supplementation with Metformin may be used as potential upcoming therapy or treatment because Vitamin D supplementation may reduce the adverse effects caused by metformin and also improve overall mitochondrial activity. Thus, our study aims to create awareness among researchers/clinicians that combining Vitamin D along with Metformin could pave a way for therapeutic approach in the treatment and management of Type 2 Diabetes Mellitus.

Keywords: Diabetes, Vitamin D, Metformin, ATP, Mitochondria

PP-14

NEUROPATHIC PAIN MANAGEMENT: A Review

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The source of persistent pain can either be nociceptive or neuropathic, both of them have almost similar pathways for transmission, however important physiological variations exist within the mechanism through that the body processes and resolves these painful stimuli. Neuropathic pain sufferers generally complain of numbness, burning, or tingling, or a combination type of symptoms they describe such as electric shock, burning, and tingling. Approaches for treatment can either be non-pharmacological or pharmacological that can be projected as first- line, second-line, and third-line pharmacological treatments. The therapies that were effective in treatment of neuropathic pain includes, antidepressants, topical treatments, anticonvulsants, opioids and invasive options. Nano medicine and Novel drug delivery systems can also be used to deliver therapeutic agents to specific targeted sites in a controlled manner. Nanoparticles encapsulated drug delivery had certain advantages over normal drug delivery for treatment of neuropathic pain. Treatment of neuropathic pain not just reduces pain, it also improve physical functioning, reduces psychological stress, and improves the overall quality of life.

Keywords: Nociceptive, Symptoms, Pharmacological Treatment, Nanoparticles, and Drug Delivery.

PP-15

DEGRADATION MECHANISM AND PRODUCTION OF SECONDARY METABOLITES IN RESPONSE TO STRESS

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Over use of antibiotics is the main cause of its pollution on environment and it needs to be removed on priority basis. Organic agriculture, medical waste and waste water is the main source of antibiotics in environment. Antibiotics are frequently used for growth production on animals and after the consumption, undigested antibiotics are excreted out through animal's body into the environment. Plants plays an important role in environment remediation due to ability to carry out intracellular degradation process. For detail analysis *Vigna radiata* grown with its lowest concentration(100 ppm) and with its highest concentration (500 ppm) along with control plant samples for three weeks. After three weeks of analysis chlorophyll carotenoid flavonoid, total phenolic, glutathione peroxidase and catalase were estimated., The changes in the total Chlorophyll, Carotenoid, Phenolics and Flavonoid content due to ampicillin toxicity was estimated using spectrophotometer. The magnitude of plants photosynthetic and pigment responses generally increased with increasing concentrations of antibiotics with highest content at 200 ppm concentration, but the overall effects were moderate. Root and shoot length were also estimated. It was observed that the trend line of root and shoot increased with increase in the concentrations of antibiotics

Keywords: Antibiotics, Ampicillin, Phytoremediation, Chlorophyll, Carotenoid, *Vigna radiata.*

PP-16

DRUG DESIGNING IN LUNG CANCER THERAPEUTICS: APPLICATIONS TO CHALLENGES

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Owing to the elevated statistics of patients suffering from lung cancer by 15% since 2004, efficient drug designing has acquired a top level priority in cancer therapeutics. Small Cell Lung Cancer (SCLC) also referred to as small cell undifferentiated carcinoma is 11th most recurrent form of lung cancer to occur in individuals from the age of 23 to late 40s. It usually occurs in smokers since the breathing tubes (Bronchi) becomes highly malignant and undergoes rapid uncontrolled multiplication. SCLC is detected at a very advanced stage when the cancer has already spread throughout the body. Despite availability of technology for treatment of various types of cancer, SCLC poses a wide variety of contradicting hinderances while drug designing. SCLC is very sensitive towards chemotherapy and radiotherapy and many patients die of the recurrent diseases. Two major sources of attrition in drug development is **efficacy** and **toxicity**. Drug treatments like Nitrogen mustard and Triethylene thiophosphoramide have been traditionally used to cure symptoms but the inefficiency has lead to need of modified drugs. Cancer cells with homogenous genomes can respond differently to the same therapy. De Novo resistance or intrinsic resistance is an acquired propensity to oppose alkylating agents like Mitomycin C and Cyclophosphamide are given to destroy DNA of cancer cells. Chemotherapy-induced toxicity is a very common drawback to pharmaceutical industries while carrying out combination therapies. Combination therapies include mismatching of antitumor drugs to create therapeutic interventions. Currently the Modern treatments include Nano-carriers (nano models to deliver drug to target organs) and Bio markers (used for cancer screening and risk assessment)are being practiced. In the light of past evidences regarding incapacitation, the field of modern Biotechnology including bioinformatics, computer aided drug designing with advance research may provide the possible scope for development of effective drugs for cure of Small Cell Lung Cancer in future.

Keywords: SCLC, Drug Resistance, Chemotherapy and Modern Biotechnology.

PP-17

VANILLIN: ANTI TUMORIGENIC AGENT IN HIGH GRADE BRAIN TUMOUR

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Vanillin (4-hydroxy-3-methoxybenzaldehyde) is an organic aromatic compound with a pleasant smell, used as a flavoring agent in food. It has an anti-oxidant, neuroprotective, antibacterial properties and is also able to cross blood brain barrier (BBB). Glioblastoma multiforme (GBM) is known as a lethal and high grade brain tumour. The patients diagnosed with GBM have 10-15 months of median survival rate due to failure of current standard treatment. This lethal disease needs advancements in therapeutics. Vanillin has been reported as anti-cancer agent in neuroblastoma (SH-SY5Y) and hepatocyte carcinoma (HepG2) cell lines but its effect on GBM cells in not known. Moreover, the actual mechanism by which vanillin inhibits the growth of cells is still unknown. The aim of our research is to investigate the anti-cancer effect of vanillin in U87MG, LN229 GBM cell line. The effect of vanillin on cell proliferation was evaluated using 34,5-dimethylthiazol-2-yl-2,5-diphenyltetrazolium bromide (MTT) assay. The effect of vanillin on cell migration was investigated by using wound healing assay.The in-silico prediction of targeted molecule was determined. Our results have shown the anti-proliferative effect of vanillin on cell growth and on migratory cells in U87MG, LN229 GBM cell lines. To conclude, this organic product might be useful in inhibiting the tumour development and could be a possible phytotherapeutic.

Keywords: Anti-migration; GBM, in silico, MTT assay; Phytotherapeutics.

PP-18

EFFECT OF DIFFERENT DRUGS ON UROLITHIASIS

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Urolithiasis is the process of development of kidney stones in the human body specifically in the portion of the kidney, bladder or urinary tract. It is formed in a three-step process which is: Nucleation, Aggregation, and Growth. There are different risk factors of having Urolithiasis such as genetics, dehydration, obesity, high protein diet or taking medication. Medications having potential benefits of management of patients with pain, it is well-known that the combination of a wide range of medications may lead to several adverse side effects, including nausea, dizziness, headaches, constipation, weakness and kidney stones. Urinary calculi can be induced when the drugs crystallize and become the primary component of the stones. In this case, urinary super saturation of the agent may promote formation of the calculi. Patients taking diuretics or water pills increase calcium concentration in their urine. Patients who take calcium-containing antacids and calcium supplements also increase their urinary calcium. Other medications associated with an increased risk of stone formation include phenytoin, ceftriaxone, magnesium trisilicate, sulfa medications, triamterene and ciprofloxacin. It is also found that patients being treated for HIV/AIDS with indinavir can also form kidney stones. Indinavir, may lead to crystalluria and renal stone formation in up to 50% of patients, and occasionally also causes acute renal failure caused by obstructive uropathy. When this type of situation occurs, discontinuation of medication is usually prescribed by medical professionals.

Keywords: Urolithiasis, Drugs, Kidney Stones, Medication.

PP-19

EFFECT OF DIETARY SUPPLEMENTS ON KIDNEY HEALTH

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Nutritional supplements are used as supporting substances to fill the nutrient deficiency gap in the body due to lack of nutrients in the food or due to an unbalanced diet taken by a person. Nutritional supplements consist of nutrients that are extracted from natural sources or synthesized chemically. Supplements available in the market for different nutrients such as protein, vitamins, minerals, carbohydrates, antioxidants etc. Studies indicate that use of supplements had various side effects including constipation, diarrhea, kidney diseases, liver disease, blood thinning, nausea, and many allergic reactions. Vitamin D is needed in the body for many crucial functions such as improvement in bone health, immunity, brain performance, mood, and skin glowing, but if taken in excess as nutrient supplement it exhibited a lot of side effects such as kidney stones formation, bone pain, frequent urination and many more. Vitamin C is needed by the body to form collagen, skins, tendons, ligaments, blood vessels and in the repair and maintenance of cartilage, bones, and teeth in a human body. But taking a high dose of Vitamin C, causes oxalate crystallization which gets deposited in the bones, soft tissues and also in the kidney causing stones. There are many other supplements that cause different diseases like renal tubular necrosis, diuretic problems, kidney failure, and many other diseases. The nutritional supplements should be taken when required and with the approval of the medical practitioner.

Keywords: Nutritional Supplements, Kidney diseases, Renal tubular necrosis, Diuretic problem.

PP-20

IMPACT OF RADIOACTIVE METALS ON HUMAN HEALTH

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A radioactive material when breaks down, it releases energy into the environment which can harm a human body in two ways either by killing the cells directly or by causing mutations to DNA which if not repaired can turn cancerous. Leafy green vegetables in Japan were found to contain up to 22,000 becquerels/kg of iodine-131. Eating a kg of such vegetables would give half the amount of radiation typically received by the average person from the natural environment in a year. Uranium is another radioactive element found in the environment. Depleted uranium (DU) is a waste product of uranium enrichment. It was used as armor-piercing ammunition in international military conflicts and contributes to health problems, known as the Gulf war Syndrome and recently as the Balkan Syndrome. Since uranium compounds have poor solubility and lack of information on speciation makes impossible the use of radio ecological models for exposure assessment, biomonitoring be the only way used for assessing exposed persons. The toxicity of uranium includes nephrotoxicity, genotoxicity, and developmental defects. Also, at the molecular level, it raises the biological plausibility of adverse effects on the brain, on reproduction, including estrogenic effects, on gene expression, and on uranium metabolism. The atomic energy act of 1954 allows the US government to control the development, regulation and disposal of nuclear materials and facilities in the United States. As the damage is irreversible, and possibly cumulative, efforts in the present needs to be more vigorous to limit environmental heavy metal contamination and exposure. This study explored the sources and imact of these Radiaactive elements.

PP-21

NANOCARRIER BASED APPROACHES FOR COMBINATION THERAPY

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Combination therapy for the treatment of various human diseases is becoming more popular these days because they show synergistic effects, reduces individual drug-related toxicity and overcomes multi-drug resistance through different types of mechanisms. Nanocarriers are a group of nano-sized vehicles prepared to deliver drugs to target malignant organs or tissues that provides improved targeting efficiency and therapeutic efficacy for cancer and many human health disorders. Variety of nanocarriers developed are able to accommodate appropriate loading and release of drug and ultimately increase the bioavailability of the drug with wide spectrum of chemical and physical properties. The introduction of multi-drug incorporation in a certain nanocarrier with the help of nanotechnology has really helped the researchers to come up with a single system that can perform targeted drug delivery without losing its concentration inside the body and showing full efficacy. This review focuses on developments on nanocarrier mediated targeted drug delivery systems using combination therapy.

Keywords-Synergistic effect, nanocarriers, bioavailability, targeted drug delivery.

PP-22

DRUG DELIVERY FOR ALZHEIMER'S DISEASE

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Alzheimer disease is an irreversible, progressive brain disorder caused by combination of genetic, lifestyle and environmental factors that affect the brain over time and slowly destroys memory and thinking skills and, eventually, the ability to carry out the simplest tasks. It is the most common cause of dementia, a syndrome in which there is deterioration of memory, thinking, behaviour and the ability to perform everyday activities. It occurs due to the formation of amyloid plaques (abnormal clumps) and neurofibrillary tangles (tangled bundles of fibres) which are considered as some of the main features of Alzheimer's disease along with Mild cognitive impairment (MCI) and the loss of connections between nerve cells in the brain. This damage initially appears in the hippocampus part of the brain essential in forming memories. As neurons die, additional parts of the brain are affected and by the final stage of Alzheimer's, damage becomes significant and brain tissues shrunk significantly. Alzheimer's disease is currently ranked as the sixth leading cause of death in the United States. Medications called cholinesterase inhibitors (Aricept,Exelon,Namzaric,Namenda and Razadyne) are prescribed for mild to moderate Alzheimer's disease. A medication known as Namenda, an N-methyl D-aspartate (NMDA) antagonist, is prescribed to treat moderate to severe levels of the disease. These medication provide only symptomatic relief and does not cure it completely, Current research on drug delivery systems can be described in four broad categories(routes of delivery, delivery vehicles, cargo, and targeting strategies). Medications can be taken in a variety of ways such as, by swallowing, by inhalation, by absorption through the skin, or by intravenous injections.

Keywords: Dementia, Amyloid plaques, Neurofibrillary, Mild Cognitive Impairment, Cholinesterase, Namenda.

PP-23

DRUGS AND ITS EFFECT ON KIDNEYS

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Nephropathy is a disease that causes damage to the small blood vessels or to the glomeruli in the kidneys that clean blood which may lead to kidney failure at some point in life. Nephropathy is also induced by unprescribed or abusive drug intake. Several antiviral, hypertensions, antineoplastic, diuretic, nonsteroidal anti-inflammatory drugs like acyclovir, indinavir, triamterene also increase the incidence of nephropathy. Drugs cause nephropathy by different mechanisms which include tubular cell toxicity, inflammation, crystal nephropathy, etc. Drugs such as cyclosporine, tacrolimus cause alteration of glomerular filtration rate (GFR) and reduction of renal blood flow which increases the risk of renal failure; other drugs like fungizone, cisplatin, antiretrovirals, etc. results in a high level of toxins in the blood. Apresoline, NSAIDs have been known to cause inflammation in nephrons causing fibrosis and renal scarring. Drugs such as ampicillin, ciprofloxacin, sulphonamides, anti-virals, indinavir, etc. show the effect by producing crystals which are insoluble in human urine, which precipitate further leading to the calculi formation. Drugs like vasculitis, thrombotic microangiopathy, etc. cause the blood vessel thickening, microvascular occlusion, deformation in nephrons. Drugs containing macromolecules such as mannitol and dextran as the stabilizing agent have been known to cause proximal tubular cell swelling and altered kidney function which leads to osmotic nephropathy. Proper consultation from the doctor is necessary before taking the drug because of various possibilities of nephropathy from different category of drugs.

Keywords: Nephropathy, Drugs, Kidney, Toxin, GFR.

PP-24

PROCESS OF DRUG DEVELOPMENT IN INDIA

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Drug development process is a bringing of new pharmaceutical drugs to the market once a compound has been identified through the process of drug discovery. It takes more than 5 to 7 years to provide therapeutic applications after satisfactory passing all development process phases. The Central Drugs Standard Control Organization is an Indian regulatory body for pharmaceuticals and medical devices, bequeathed to protect the citizens from the marketing of unsafe medication, being equivalent to Food and Drug Administration (FDA) in the US. The government recognized the importance of their regulation and thus developed Ethical and Regulatory Guidelines. One of the most important is the Food and Drug Administration approval for a successful drug development. There are four phases for drug development: discovery and development of the new compounds, pre-clinical investigations, and clinical trials of drugs on healthy volunteers for safety and toxicity profile, testing of drug on patients to assess efficacy and side effects. The last step in drug development is the FDA review which involves the safety surveillance and ongoing technical support. Therefore, drug development is a complex process requires proper plans and well-coordinated team efforts with economic management.

Keyword: Drug Development, FDA Approval, CDSCO.

PP-25

ANTI-STRESS HERBS AND STRESS MANAGEMENT

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Stress, both physical and psychological, is attracting increasing attention among neuro-researchers over the last few decades; there has been a surge of interest in the research of therapeutic management of stress-induced manifestations. As stress affects the function of both body and brain which are essentially chemically driven systems. Hence, a wide variety of medications are known to be used in the process of stress relief and prevention. For instance, sedatives (also referred to as tranquilizers, hypnotics, and/or anxiolytics), antidepressants, and beta-blockers have all been used to help people cope with stress. However, many of the medications that are useful for stress relief are also addictive. Serious behavioral and health problems are possible and even likely to occur as a result of using such substances unless care is exercised. Hence alternative safe therapy for stress management is required. There is plethora of information which suggests that a large number of herbs are also known to play role in curbing the problem of stress without manifesting any side effects. The present study highlights the importance of common anti-stress herbs, their bioactive compound exhibiting the effect and mechanism of their action. Some common herbs included in the study are Panax Ginseng, Rhodiolarosea, Golden root Ashwagandha,Ocimum Sanctum,Holy Basil and Centella asiatica etc.

Keywords: Stress, Therapy, Anti-stress herbs, Cortisol.

PP-26

NANOBOTS-THE FUTURE OF MEDICAL TREATMENTS

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Fascination and inspiration by futuristic and science-fiction movies has enabled scientists to shape many modern day-to-day technical innovations such as 3D printing, mobile phones, internet, robots, etc. Nanobots, miniatures machines that can perform multiple functions, is one such fiction becoming reality. Nanobots are the tiny robots of about 50-100nm dimensions, hat are essentially unique molecules designed to perform specific and complex tasks and fully controlled and programmed by humans. Due to their size and the other properties they have multiple applications in different fields ranging from storing data in nanochips to perform complex medical functions like delivering drug to cancerous cells, removing bacteria and toxins from the body, or using sensors to monitor diabetes. These nanomachines are still in developmental phase buy recent advancements have enabled researchers to view them as the future of medical treatments. This study emphasizes on two tested applications of nanobots in the medical field - (1) targeted drug delivery (2) neutralizing toxins and removing bacteria simultaneously. First application of nanobots in the field of drug delivery discusses how introduction of enzyme enhanced nanobots in the body can efficiently deliver anti cancerous drug i.e. doxorubicin (dox) to the targeted tissue minimising the side effects on the nearby tissues and successfully overcoming the limitations of chemotherapy. The second application focuses on hybrid RBC-PL nanobots that are prepared by coating the hybrid membranes of two cell types i.e. RBC and platelets over the gold wired nanobots. These are introduced into the bloodstream to remove bacteria and neutralize the toxins in gram positive infections that can be life threatening to human beings.

Keywords: Nanobots, drug delivery, RBC-PL robots.

PP-27

GUT CENTRIC VIEWS OF METABOLIC SYNDROME AND HERBAL INTERVENTION

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Metabolic syndrome has reached at highest level in every sociodemographic group of developing and industrialized societies due to the adaptation of modern and baleful lifestyle. Most of the world is dealing with health issues because of improper diet and polluted environment. Human body is a home for the vast number of microorganisms including bacteria, viruses, and archaea known as human microbiota. The main harbour site of microbiota is gut while other sites include skin, inner side of nose and ear, opening of mouth. The gut microbiota is influenced by various factors like environmental sources, diet, genetic variation and many more. Numerous studies have demonstrated the significance of gut microbiota critical for human health. Whereas, dysbiosis of gut microbiota may lead to a variety of diseases including metabolic syndrome. Emerging evidences have shown that interaction between gut microbiota and herbs provide potential therapeutic effects. Herbal products may help to modulate the disease specific gut microbiota by altering the composition of gut microbiota and influence human health through microbial metabolites. The microbiome field and herbal intervention elicit a greater hope to prevent metabolic syndrome.

Keywords: Metabolism, Disease, Gut microbiota, Herbs, Therapeutics.

PP-28

WATER POLLUTION AND ENDOCRINE DISRUPTORS

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The endocrine system is the signaling mechanism that regulates the level of hormones released by mainly nine glands in humans. Any perturbations in the functioning of one of the gland, particularly hypersecretion or hyposecretion of any hormone and tumor of the endocrine gland, may lead to austere endocrine and metabolic disorder. Due to the closely regulated nature of endocrine system, there are a range of conditions that can result in endocrine disorders such as aging, stress and chronic diseases. However environmental factors called endocrine disrupting chemicals (EDC) are known to disrupt the regular operation of the endocrine glands in a number of ways. Water contaminated with ECDs can leach into soil and groundwater, and make their way into the food chain by bioaccumulating in tissues thereby serving as one of the major sources of entry of these chemicals in the body. Exposure to exogenous chemicals can affect endocrine function at multiple sites and through numerous specific modes of action, which may have far-reaching effects on human health and development. ECDs are also known to cause various endocrine disorders including increasing incidences of reproductive cancers, neurological and developmental disorders. Recent studies link human EDC exposure with obesity, metabolic syndrome and type 2 diabetes. This review summarizes the detrimental effects of ECDs along with prevalence of presence of ECDs in India.

Keywords: Diabetes, Obesity, Dyslipidemia, Endocrine disrupting chemicals (ECDs).

PP-29

ROLE OF NASAL MUCOSAL GRAFT IN DRUG DELIVERY- RECENT ADVANCES AND FUTURE PERSPECTIVES

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About 2 billion people are affected worldwide with CNS disorders and occurrence of cerebral metastases or brain malignancies is increased. Survival rates in most cases are of the order of months due to their high lethality compared to other cancers. The blood–brain barrier (BBB) is considered a biggest challenge for efficient delivery of therapeutic agents for the treatment of brain malignancies and CNS disorders, since it may affect drug delivery and penetration. For this reason, many pharma companies are moving away from such fields of innovative research because of the high risk of failure associated with CNS medicines. The blood–brain barrier (BBB) is responsible for physiologically protecting the brain from exposure to toxins and ill effects and play a fundamental role in maintaining the homeostasis of the brain. Several physico-chemical and pharmacological strategies recently developed to cross the BBB which enables efficient drug delivery to the brain like invasive techniques, such as temporary disruption of the BBB, as well as noninvasive techniques. In humans, the intranasal route of administration actually provides enhanced targeting to the CNS, compared to the systemic route. The permeabilization of the BBB via nasal mucosal engrafting can offer new potential opportunities. Nasal mucosa allows fast onset of action, enhanced bioavailability and patient compliance due to permeability to very large and polar molecules. Nasal mucosal grafting enables drug delivery in regions CNS Middle turbinate, inferior turbinate. The use of nasal floor free mucosal graft was recently proposed due to its various advantages like accessibility, ease of placement, less morbid method and able to reconstruct many skull base defects due to its high take rate.

Keywords: BBB (Blood-brain barrier), CNS (Central Nervous System), intra-nasal, homeostasis, Nasal mucosal grafting, middle turbinate, inferior turbinate.

PP-30

ADVANCEMENT OF PEPTIDE BASED THERAPEUTICS FOR THE TREATMENT OF NEUROLOGICAL DISORDERS

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Peptides are small molecules composed of amino acids linked together by peptide bonds. The targeted action of these peptides along with their magnificent ability to reach locations in body that are complicated to access, is being considered of tremendous potential in disease modifying therapies. Synthetic as well as natural peptides like Carnosine are currently under research for treatment of neurodegenerative disorders (NDs). Peptide based vaccines are currently under immense research for diseases like dementia. Toxicity of peptide based drugs towards eukaryotic cells due to their increased haemolytic activity is of major concern and this is being tackled by introducing modifications into the peptide structure. Some crucial peptide inhibitors currently in use for neurodegenerative disorders include Aβ (16-20) KLVFF for Alzheimer's, NAPVSIPQ (NAP) for Parkinson's, towards eukaryotic cells Vasoactive Intestinal Peptides (VIP) for Huntington's, Polyglutamine Binding Peptide-1(QBP1) for Dentatorubral-paiidoluysial atrophy (DRPLA). Certain peptides are involved in inhibition of mitochondrial permeability transition (MPT) which is known to play a crucial role in the manifestation of NDs, one such example of peptides being Ba-V which is obtained from Bothrops atrox snake venom. New therapeutic peptides are being identified using bioinformatics tools like high throughput screening (HTS). These tools are being used to explore potential immunogenicity, selectivity, stability, metabolism, and toxic side effects of peptides. Apart from neurodegenerative diseases, the potential of bioactive peptides is also being tested against cancer, diabetes and microbes. The present article discusses the recent advances in the area of pepetides used for the treatment of neurological disorders.

Keywords: Peptides, ND, MPT, Parkinson's, Alzheimer's.

PP-31

ADVANCES IN THERAPEUTICS FOR MULTIPLE SCLEROSIS: CLASSIC AND ADVANCED DRUG FORMULATIONS

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Multiple sclerosis (MS) is characterised by demyelination of axons in the central nervous system. It is a autoimmune disorder with chronic inflammation, which results in neurodegeneration and axonal impairment. Major causes behind MS were identified to be the European and Scandinavian ancestry, presence of HLA DR15/DQ6, IL-2RA and IL-7RA genes, previous infection with Epstein-Barr virus, vitamin D deficiency due to lack of sun exposure and cigarette smoking. Till date, multiple sclerosis remains incurable; though a number of disease modifying therapies (DMTs) including 12 FDA approved drugs are currently available in the market. These drugs are either administered orally (Glatiramer-acetate, Teriflunomide, Fingolimod, Cladribine, Siponimod, Dimethyl- fumarate) or through subcutaneous injection (interferon beta-1a, 1b) or intravenous infusion (Alemtuzumab, Mitoxantrone, Ocrelizumab, Natalizumab). Currently available DMTs mainly focus on management of symptoms in order to prevent further deterioration in the course of disease progression and reducing disability in patients. Most of these DMTs target on Relapse Remitting MS and very few drugs like Ocrelizumab are in the market for the Progressive form of the disease. Apart from the FDA approved drugs, few alternative like drug based modification of endogenous stem cells to improve their reparative potential, cell based therapies, like {I/AHSCT} i.e. immunoablation succeeded by autologous haematopoietic stem cell transplantation, or replacing impaired or lost mylelin producing oligodendrocytes cells by transplantation of oligodendrocyte progenitor cells (OPCs) or OPC-like inducible pluripotent stem cells (iPSCs) are currently under research. The present article discusses traditional and advanced formulations available in the market for the treatment of MS.

Keywords: MS, DMTs, I/AHSCT, OPCs.

PP-32

ANTI-AGING THERAPIES

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Senescence has been the focus of research for many centuries. Aging is a process in which the human metabolism slows down and mechanism of body gets deteriorated. Many theories of aging have evolved to understand the system of degeneration in our body. Therefore, strategies to delay aging are invented for maintaining better health in old age. Researchers are engaged in basic science at all levels of analysis, from molecular to social, to understand the processes of aging. To develop new interventions for the prevention, early detection, diagnosis, and treatment of aging related diseases, disorders, and disabilities, we must first understand their causes and the factors that place people at increased risk for their initiation and progression. This help us to investigate new therapies to delay effect of aging.One novel approach which is discovered recently is senotherapy which targets cellular senescence through therapeutics. Different kind of flavonoids and antioxidants have been tested to form these therapeutic. In the recent years, Fisetin has come out as a seno-therapeutic which suppresses senescent markers and drug like metformin which are repurposed to slow down metabolism of aging. At a molecular level, metformin increases AMP-activated protein kinase activity and increases antioxidant protection, resulting in reductions in both oxidative damage accumulation and chronic inflammation. Our results indicate that these actions may contribute to the beneficial effects of metformin on healthspan and lifespan. These findings agree with current epidemiological data and raise the possibility of metformin-based interventions to promote healthy aging.

Keywords: Aging, Senescence, Metformin

PP-33

ROLE OF METFORMIN AND VITAMIN D3 IN CANCER

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Cancer is a disease where cells in a specific part of our body divide in uncontrollable manner. These cancerous cells can invade, sometimes spread and destroy surrounding healthy tissue including organs. To halt this disease new therapies need to be discovered. For this purpose specific drugs like metformin and vitamin D3 are repurposed to prevent different types of cancer. However Metformin is an anti-diabetic drug also has emerged as an anticancerous drug by targeting the function of complex I of mitochondria whereas Vitamin D3 is a fat soluble vitamin which shows a cytotoxic effect on cancerous cells. Large-scale clinical trials are able to attest the antitumor effects of metformin and vitamin D3, this drug may become an alternative cancer adjuvant therapy, providing a novel approach for cancer prevention and treatment. These two compounds if combined together will give more competent impact to preclude cancer invasion. Therefore to accomplish this effect, dose optimisation of both the compounds is required through multiple experiments which will help us to find out the lethal dose to kill the cancerous cells. In recent findings synergistic treatment may enhance the curative effect of and reduce the adverse reactions associated with chemotherapy.

Keywords: Cancer, Mitochondria, Metformin, Vitamin D3, Antitumor.

PP-34

DRUG DELIVERY VIA RGD MODIFIED POLYMERS AND LIPOSOMES NANO-VEHICLES IN CANCER THERAPEUTICS

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The demand for cancer treatment has increased and plenty of rational treatment options and specifically targeted nano-vehicles have been developed. Newly-developed technologies should ensure that they can achieve the maximum effect of cancer treatment with avoiding the appearance of resistant relapses. Nanotechnology has developed rapidly over the past ten years. For decades, chemotherapy has been a main and effective approach to treat cancer. Most therapeutic agents, including doxorubicin and paclitaxel, kill primary tumor cells effectively, however their effect on metastatic cancer cells is limited. Integrin receptors targeting are one of the most frequently used approaches because it is highly expressed in cancer cells. Integrins are heterodimeric receptors formed by α and β subunits and are primarily responsible for mediating the mutual adhesion of cells to cells, cells to extracellular matrix. When the interaction between cells and extracellular matrix occurs, integrin receptors may produce corresponding transmembrane signals due to changes in the external environment, thereby affecting adhesion, differentiation, growth, and proliferation. The arginine-glycine-aspartic acid (RGD) peptide and its derivatives are used as ligands to enhance direct targeting capabilities of integrin. Recent researches are focused on the RGD-modified polymer and liposome nano-vehicles for drug delivery and cancer therapeutics where polymers and liposomes act as nano-vehicles. The main highlights are the recent advances in cancer therapy in recent years concerning the RGD-modified liposome and polymer nano-vehicles to highlight its successful designs for improving cancer therapy and discuss the current challenges as well as the possible development prospects.

Keywords: Cancer, nanotechnology, chemotherapy, integrin, RGD peptide, extracellular matrix, liposome nano-vehicles, drug delivery.

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CAR T CELL THERAPY: APOTENTIAL TOOL FOR THE TREATMENT OF SOLID TUMORS.

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Chimeric antigen receptor T cell therapy (CAR-T cell) is one of the latest developments in the field of cancer treatment. This method involves the in vitro modification of T cells that have been acquired from patient's blood. The gene that produces proteins binding to specific receptors on cancer cells are added in the laboratory and later these cells are transferred in patient's body via infusion. CAR-T cells have been successfully used for the treatment of blood related malignancies such as leukemia but for the treatment of solid tumors its role is still being evaluated. It has been observed that the low success rate in the case of solid tumors maybe due the immunosuppressive nature of tumor microenvironment. The studies have demonstrated that various tumor associated antigens such as type III variant EGFRvIII can act as target antigens for CAR-T cells. The other targets that have shown positive response for CAR-T cell binding are mesothelin (MSLN) human epidermal growth factor receptor 2 (HER2). The third generation CAR-T cells have shown an improved persistence and cytotoxicity because of the modifications done in the CAR structure. The positive responses from various clinical trials have open up a window for the use of CAR-T cell therapy as a potential treatment against various solid tumors. The present article discusses how CAR T cell therapy can be utilized as a potential tool to treat solid tumors.

Keywords: Cancer, solid tumors; cell therapy; CAR-T.

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HUMAN PAPILLOMAVIRUS AND DEVELOPMENT OF HPV VACCINE FOR CERVICAL CANCER

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In developing countries cervical cancer is the most common cancer affecting women which is caused by a virus Human papillomavirus (HPV) of high-risk genotype, which infects them persistently. The vast majority of cervical cancer contain HPV type and approximately contain 70% of HPV type 16 or 18. 90% of genital wart is caused by HPV type 6 or 11. HPV vaccine neither clears HPV from the body nor treats HPV disease but it only provides prophylactics. A woman has to be vaccinated with this vaccine before the onset of sexual activity as, it is found to be more effective in this way and then it also helps in providing long term protection. These prophylactic vaccine are based upon virus like particle (VLP) obtained by auto assembly of L1 under clinical trial. Two vaccines were generated CERVAXIA bivalent vaccine against HPV 16 and 18 and another was GARDASSIL quadrivalent vaccine against 16 18 6 & 11. If in any women there is no past or current infection with the HPV genotype in the vaccine both the vaccine shows more than 90% protection toward HPV infection up to 5 year after vaccination. 9 to 15 year old are given two doses of vaccine for 6 month or 1 year and for women above 15 year, three doses of vaccine is recommended. HPV vaccines reduce abnormal screening test colposcopies and excision HPV exhibit specific tropism upon the squamous epithelium of a skin and mucosae evade local immune system. The present article describes basic mechanism of cervical cancer and development of HPV vaccine as a preventive measure for cervical cancer.

Keywords: Cervical cancer; HPV; Virus; Vaccine

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TRANSDERMAL THERAPEUTICS FOR THE TREATMENT OF CANCER

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There are various classic therapies available in the market for the treatment of cancer such as the chemotherapy, UV radiation therapy and others. Since, these therapies are highly expensive, invasive and have toxic side effects, scientist all over the world are exploring new harmless, non-invasive, economic, patient compliant and targeted therapies. In this journey there is major focus on transdermal delivery of the drugs to target the site in a less invasive, targeted and slow release manner. The treatment methods of cancer through the natural products are shown to be much for effective for basal cell carcinoma. So far it has been observed that patches developed with the natural ingredients cause very mild side effects such as: mild itching and redness etc. These patches can be of both types the transdermal as well as the injectable polymer rod. The transdermal patches are directly placed over the skin to treat skin cancers. The ointments or the gels are soothing form of treatment but as they barely penetrate the skin in that case the syringe or the injectable polymer are being used. The herbs such as: Gingko, Kava kava, Grape fruit, St John's wort etc. have been worked upon to be used as therapeutic agents with patches and gels. The present article discusses various approaches, ingredients and their effectiveness of the currently developed dermal therapeutics for the treatment of cancer.

Keywords: Chemotherapy; Cancer; Transdermal; Polymer

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DNA VACCINE AS A NEW STRATEGY FOR CANCER IMMUNOTHERAPY

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The DNA vaccines are proving to be the milestone stop the cancer immunotherapy. In last few year, some major issues like needs for increasing immunological tolerance, loss of MHCs & antigen of tumor cells etc. have been raised. DNA vaccine most successfully vaccine used as a vaccine on cancer models where oncogenic cells are foreign viral gene. DNA vaccine represent a promising to induce a specific and long lasting immune response against tumor antigens (TAs). DNA vaccine could be combined with recent technology or targeted therapies that are able to mediate tumor cell antigen release and could be enhancing T cell brief. Scientists discussed on structurally deigned synthetic DNA vaccine, that to simultaneously target multiples types of protein that are specifically excessive expression in several types of cancer cells. Some studies have showed that direct administration of DNA vaccine (plasmid) in epidermis & muscles led to transfection of epidermal keratinocytes and lengerhans cells. Also the intramuscular injection of plasmid led to transfection of myocytes. DNA vaccine are could be able to trigger innate immune response, and on their designs, delivery sites, DNA vaccine elicit the best immune response when highly active expression vectors are used. DNA vaccine require much improvement in antigen expression and delivery method to make them sufficiently effective in clinical purpose (like cancer treatment). This review will deal with the DNA vaccine thus act as an important platform for clinical application.

Keywords: Tumor antigen, DNA vaccine, Cellular immune response.

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EMERGING NOVEL THERAPEUTICS TO TARGET HUMAN GLIOBLASTOMA

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Glioblastoma Multiforme (GBM) is a well-known fatal brain tumor. Though the treatment options have evolved with the advancement in therapy but still poor progress has been observed in the overall survival of a glioma patient. The current standard medication involves possible complete resection of the GBM tumor followed by radiotherapy as well chemotherapy with temozolomide. The impact of this therapy resulted in overall survival only from 12-14 months. To date, there is no potent anti-glioblastoma drug available that can exceed the effect of temozolomide.In-spite of various clinical trials, there has been certain drawbacks which limits the applicability of a drug to act on the GBM tumour mainly due to the blood–brain barrier (BBB). Moreover, radiotherapy and chemotherapy eliminates most of the cancer cells but they fail to influence the cancer stem cells which have a potential to regenerate the whole tumor thus resulting in recurrence and further exhibiting resistance to the therapy as well.Furthermore, aggressive invasion of the GBM cells into the surrounding region of normal brain cells is promoted by Matrix metallo-proteinases which also becomes more challenging. Therefore, this necessitates the development of novel strategies against the glioblastoma which includes MMP inhibitors, oncolytic virus therapy, dendritic cell therapy, etc. So, the present review emphasizes the various emerging therapeutics to target the human Glioblastoma.

Keywords: Glioblastoma, matrix metalloproteinases, temozolomide, therapeutics.

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EVALUATION OF DIAGNOSTIC BIOMARKERS FOR ACUTE MYOCARDIAL INFARCTION

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We present a comprehensive review of diagnostic biomarkers for Acute Myocardial Infarction (AMI). Cardiovascular Diseases (CVDs) are one of the leading causes of death worldwide. Among various CVDs, AMI is more prominent and requires early diagnostic interventions to reduce fatality rates. Currently, used biomarkers like cardiac Troponin I/T, CK-MB, AST, LDH and myoglobin, display elevated serum levels. A systematic analysis of the time of elevation after onset of pain, peak time and clearance time is tabulated to understand pros and cons of each and preferred diagnostic assay(s). Among these time of elevation is one of the most crucial parameter that dictates their suitability for Point-of-Care diagnostic device. Among these Troponin I based POC device are considered as current Gold Standard. Recent reports have shown micro RNAs (miRNAs) – miR499, miR208, miR1, miR133, which are released after the damage of cardiomyocytes, as a promising diagnostic marker for AMI. These miRNAs are present in stable form in blood, serum as well as plasma and can be used as diagnostic as well as prognostic biomarkers. Combination of a sensitive diagnostic technique and early expression of these miRNAs can prove to be a turning point in AMIdiagnosis/prognosis.

Keywords: Cardiovascular Diseases, Acute Myocardial Infarction, POC device, Biomarkers, micro RNAs.

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TECHNOLOGICAL ADVANCEMENTS OF NUCLEIC ACID BASED BIOSENSORS

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This review presents technological advancements in the field of Nucleic acid based electrochemical biosensors. DNA based biosensors employing various techniques and limitations thereof for disease diagnosis are presented. Later, label-free electrochemical detection strategies replaced the labelled DNA biosensing methods thereby removing the post processing of the sample or trained manpower requirement. A major drawback of the nucleic acid biosensor employing DNA or RNA is requirement of single stranded DNA samples for hybridization with the probe molecules on sensor surface. This was addressed by asymmetric polymerase chain reaction, however the preprocessing and laboratory requirements limits its use to labs only. Another alternative of heating of the sample was explored, that took care of preprocessing but led to reduced sensitivity. A major breakthrough came with the advent of aptamer technology that led to design of hassle-free biosensors with high sensitivity. We also present the advantages of using peptide nucleic acid instead of DNA/RNA for biosensing.

Keywords: DNA based Biosensor, Asymmetric Polymerase Chain Reaction, Hybridization, Aptamer

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BOTULINUM TOXIN – A MIRACLE POISON

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Botulism could be a serious unwellness caused by the neurotoxin specifically (A, B, E and F) symptoms includes flaccid paralysis, weakness or slackness in various muscles. Neurotoxin is one among the deadly organic phenomenon substances best known, could be a toxin prove by the microorganism eubacteria bacterium *Clostridium botulinum.* It is routinely found in soils and marine sediments throughout the globe. Though it is harmful but nowadays, botulinum toxin is used to treat a number of remedial evidences. Botulism toxins play a very notable role in the executives of a strabismus and focul dystonias, hemifacial spasm and disorder like hypersalivation, hyperhidrosis. The list of possible new sigh quickly embellishing. The cosmetological implementation include correction of lines, wrinkling all over the face, chin, neck and chest to dermatological applications such as hyperhidrosis. The main motive of our paper is to underscore the convenience of Botulinum toxin.

Keywords: Clostridium botulinum, neurotoxin, hypersalivation, cosmetology.

PP-43

LYCOPENE: A SWORD AGAINST NEURODEGENERATIVE DISORDERS

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This study was performed to investigate the mechanisms of neuroprotection offered by lycopene besides analysing its antioxidant potential and morphology in stressed PC-12 cells and cells treated with lycopene. Total antioxidant capacity of lycopene was confirmed by DPPH scavenging assay and FRAP assay using TPTZ. Lipid peroxidation measurements were done using TBA. A morphological study in stressed PC-12 cells and cells treated with Lycopene was done by SEM studies which revealed the appearance of large number of dead cells upon treatment with 6-OHDA which was decreased considerably upon co-incubation with lycopene. Lipid peroxidation was significantly higher in stressed cells but was considerably lower in lycopene treated cells. DPPH scavenging activity and ferric reducing ability was significantly increased in cells treated with lycopene. To verify apoptosis in stressed cells, DAB staining was done in all the sets of cells. The dark brown spots appeared in slides of cells treated with 6-OHDA alone but were reduced in slides of cells treated with 6-OHDA as well as lycopene. Studies with caspase assay kit showed that the level of Caspase 3 and 9 was increased in cells treated with 6-OHDA alone but it were decreased in cells treated with 6-OHDA as well as lycopene. Levels of caspase 8 were unaltered which showed that extrinsic pathway is not involved but intrinsic pathway is involved in apoptotic mechanisms.

Keywords: Lycopene; Apoptosis; Caspase; DPPH

PP-44

ANIMAL VENOM AS A CHEMOPREVENTIVE AGENT: A REVIEW

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Cancer is regarded as one of the foremost reasons for death across the world. Considerable work has been done towards the understanding of its development and treatment. Various treatments that are available for cancer possess harmful side effects, which demands requirement of alternative method to solve this problem. Chemoprevention is an alternative method which is associated with consumption of synthetic or natural compounds that are able to block carcinogenesis. It is an alternative way to manage cancer. Animals produce pharmacologically active compounds which are capable of protein synthesis inhibition, induction of angiogenesis and apoptosis. Venoms that are isolated from various animal sources such as wasp, honey bee and scorpionn are composite mixtures of various peptides, protein, enzymes, toxins and nonproteinaceous secretions. They possess membrane binding, cytolytic and growth inhibition properties and can be utilized for new therapeutic agent development. The objective of this review is to create a comprehensive resource of chemopreventive agents from animal source which would foster pharmacogenomic studies and development of cost-effective cancer medicines. Active molecules that are obtained from various animal sources can be utilized clinically for treatment of cancer patients. Information of different animal toxins has been compiled after panoramic literature survey.

Keywords: Cancer, Natural Agents, Venoms, Clinical Trials.

PP-45

ANTIRETROVIRAL DRUG INDUCED ADVERSE REACTIONS: A RETROSPECTIVE ANALYSIS

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Antiretroviral (ARV) drugs have saved the lives of HIV infected patients. However, there are several, life threatening adverse drug reactions (ADRs) associated with ARV. The aim of the study was to characterize spontaneously reported ARV drugs associated ADRs in adult and pediatric patients. Retrospective cross-sectional study was conducted to analyze ADRs collected from the Ethiopian national pharmacovigilance centre during the 5 year period (May/2014 to 2019). A total of 142 ARV drug induced ADRs were reported. Of this, 77.5 % (n=110) were adults and 22.5 % (n=32) were pediatric patients. The most frequently reported ADRs in adult patients were anemia 16.6% (n=44) followed by hepatotoxicity 6.8% (n=18). On the other hand, anemia 16% (n=13) followed by skin rash 12.3% (n=10) were reported in pediatric patients. Zidovudine based regimens were the most commonly implicated drugs in both adult (69%) and pediatric patients (90.6%). Zidovudinenevirapine combinations caused >70% of drug induced anemia in both adult and pediatric patients. Skin rash were caused by nevirapine containing regimen and hepatotoxicity was mainly caused by nevirapine containing regimen co-administered with ant-tuberculosis drugs. ADRs contributed 69% (n=98) for drug discontinuation and 63% of ADRs were serious. It is concluded that the highest proportion of ADRs is caused by zidovudine containing regimen and ADRs contributed a lion share for ARV drug discontinuation. This suggests that ADRs is a hidden threat for HIV treatment success and special focus should be given to early prevent adverse reactions in HIV-infected patients to achieve the 90-90-90 goal by 2020 in LMICs.

Keywords: Antiretroviral drug, adverse reaction, Ethiopia, adult, Pediatrics, Retrospective study.

PP-46

BIOSENSOR AND THEIR APPLICATION – A REVIEW

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This device is having a biocatalyst that can detect a biological element and a transducer which convert the combination event of the biocatalyst to the biological element which can be detectable parameter. It's very cost-effective device, sensitive and ecofriendly. There are various types of biosensor such as enzyme-based, tissue- based, immunosensors all these are highlighted here to tell you about various applications of this field. Some of the popular field which implement the use of biosensor to check the quality of food in industry and is also used for saccharification process to precise the glucose concentration .The fluorescent biosensor play vital role in drug delivery and in medical science biosensor have include in early stage detection of human interlukin -10 which cause heart disease. In plants use to detect the missing links required for metabollic process. This review paper is all about the various applications of the biosensors which are used now days.

Keywords: Biosensor, Enzyme based, Tissue based, Immunosensors.

PP-47

EVALUATION OF PLANT EXTRACTS AS POSSIBLE PHYTOTHERAPEUTICS FOR THE TREATMENT OF ASTHMA – A REVIEW

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Asthma is a chronic inflammatory disorder of the respiratory system characterized essentially by hyper responsiveness of the immune system due to escalation in the number of immune cells. Asthma is considered as a major cause of deaths worldwide with a mortality rate of 1000 per day and nearly 235 million people currently suffering with the disease, thereby being related with an increase in the socio-economic burden and morbidity. The current medications for asthma and the related respiratory disorders are inadvertently associated with severe side effects including hyperkalaemia, bone loss, formation of cataract and suppressed function of adrenal gland. With the recent advancements in phytotherapeutics, the contribution of herbal medicines is reported to be nearly 70%-80% in the global therapeutic market. With the recent trend of herb medication especially in the developing countries, plant extracts were analyzed and examined to be potential cure for asthma and its associated symptoms. Their application is also reported as a part of traditional knowledge for treating many ailments and also proved effective in treating respiratory disorders. Plant extracts from Napoleona vogelii, Datura stramonieum and Neuracanthus sphaerostachyus etc. traditionally known for their potent remedial effects in related diseases and provided scientific evidences by reporting mechanism to lower the immune response accelerated by eosinophils and blocking IL-5 and related mechanism. The present review covers information to the best of the available data regarding phytotherapeutics for the treatment of asthma.

Keywords: asthma, respiratory disorders, phytotherapeutics, plant extracts, immune response.

PP-48

SIZE CONTROL SYNTHESIS OF THIOL FUNCTIONALIZED MONODISPERSED GOLD NANOPARTICLES

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Nanotechnology has become one of the most interesting and advanced areas of research and applications. In recent past, engineered nanoparticles (NPs) have extensively been used in drug delivery, imaging, diagnostics, solar cells, electronics, and agriculture & food industry. Among nanoparticles, gold nanoparticles (AuNPs) demonstrate their potential applications in surface enhanced Raman spectroscopy (SERS), sensor, drug delivery, CT contrast agent and many others. Their ease of synthesis, chemical stability, unique physico-chemical properties, small size and high surface area- to-volume ratio make them robust and application friendly. In the present study, we have synthesized highly monodispersed AuNPs using citrate reduction method and their surface has been functionalized using three different thiol based linkers i.e. 3-Mercaptopropionic acid (3-MPA), 11-Mercaptoundecanoic acid (11-MUA) and L-cysteine. The synthesized nanoparticles and conjugates were characterized using Transmission Electron Microscopy (TEM), UV-Vis Spectroscopy and Fourier Transform Infra Red (FTIR) spectroscopy. The absorbance peak observed at 520nm in Uv-Visible spectrum indicates presence of spherical AuNPs which further corroborated by TEM micrographs showing the formation of spherical, monodispersed AuNPs of size 15±2nm. The absence of peak corresponding to sulfhydryl stretch (-SH) at 2600 cm^{-1} in FTIR spectra of 3-Mercaptopropionic acid (3-MPA), 11-Mercaptoundecanoic acid (11-MUA) and L-cysteine functionalized AuNPs due to the interaction of AuNPs with thiol group, indicates the formation of corresponding thiol layer on to the surface of AuNPs. These thiolated AuNPs may find application in designing smart drug delivery systems.

Keywords: Gold Nanoparticles, Monodisperse, Nanotechnology, Targeted drug delivery.

PP-49

SYSTEMATIC REVIEW ON LIABILITIES OF ANTIBIOTICS

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Vaccines and antibiotics have considerably contributed to enhance health and conjointly to extend the longevity of people.The fast-acting result of antibiotics makes them indispensable to treat infected patients, antibiotics seem to be the sole therapeutic choice. Although, vaccines have caused to the eradication of variation of the leading deadly infectious agents widespread, and are able to induce collective immunity.Development of new vaccines appears to be a promising solution to these issues. Indeed, with the advent of new discovery approaches and adjuvant, to make vaccines virtually against every pathogen. In addition, vaccine-resistant bacterium has not been apparently, assemble literature is providing proof that vaccination will scale back the raise of antibiotic resistant shear by decreasing their use.There is appreciable evidence that the overuse of antibiotics is a major cause for the emergence of resistance in respiratory pathogens in the community which must take each of these factors into consideration.Prescription of antimicrobial drugs for viral infections, inadequate dosage, use of long-acting macrolide and broad-spectrum antibiotics, and accessibility of antibiotics in many countries are the main drivers of increasing resistance. Spreading awareness to the physicians and also the public on the correct use of antibiotics, and reliable laboratory methods to distinguish between viral and bacterial infections, to the pharmaceutical industry to develop new drugs appear with this serious public health problem. Vaccines can oppose Anti Microbial Resistance through multiple pathway and also reduces the incidence of acceptive and opposition to infections.It jointly reduces every applicable and inappropriate use of antimicrobials by reducing overall illness incidence, as well as infections caused by prone pathogens and by viruses (such as influenza) that square measure often inappropriately treated with antibiotics.

Keywords: Macrolide, Vaccine, Prone, Adjuvant, Resistance.

PP-50

REMEDIATION OF NEURODEGENERATIVE DISORDERS BY INDUCING NEUROGENESIS MECHANISM

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With the increasing population, the burden of Neurodegenerative disorders (NDDs) has been increasing with the age leading to elevated risk factors in the population. An average annual mortality rate of 6.8 million has been noted on account of NDDs and this is figure is expected to increase with time. It is due to the cause, that routinely regeneration of the brain cells is crucial for ameliorating the NDDs. Evidently, the neurons and the other brain cells are degenerated routinely. The cells undergo the process of apoptosis. During an ischemic stress or in case of NDDs, the caspase enzyme is activated; the enzyme is responsible for the apoptotic cell death of brain cells, especially neurons. Neurogenesis refers to the formation of new neurons in the brain from the neural stem cells.Neurons are formed in hippocampus per day corresponding to an annual turnover of 1.75%, which decline with aging. Various intrinsic and extrinsic factors like proliferation and fate determination of neural progenitor cell progenies, differentiation, migration and maturation of adult neurons affects the process of neurogenesis. Neurons are generated in two regions of brain, the olfactory bulb and dentate gyrus of hippocampus. Hippocampus plays a crucial role in formation of episodic and spatial memory and is associated with many neurodegenerative diseases. The spatial memory function and capacity for pattern separation are implicated with dentate gyrus and CA3 region of hippocampus, these functions are decreased with age. Neural stem cells are retained in subventricular zone (SVZ) and subgranular zone (SGZ) of dentate gyrus. There are five modulators of neurogenesis, including signalling transduction pathways, the vascular and immune systems, metabolic factors, and epigenetic regulation. The alteration in these modulators during adult neurogenesis may be related to the development of neurodegenerative diseases. This review highlights the strategies for maintenance of new-born neurons in early stage of neurodegenerative diseases for halting or reversing the symptoms.

PP-51

ADULT STEM CELL THERAPY: A REVIEW

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A stem cell is a cell with the distinctive ability to change into specialised cell types within the body. In the future they may be used to replace cells and tissues that have been damaged or lost due to disease.Stem cells are characterised by the ability to stay undifferentiated and to self-renew. Embryonic stem cells derived from blastocysts are pluripotent (able to differentiate into many cell types). Adult stem cells, that were ancient thought to be monopotent multipotent, or tissue restricted, have recently also been shown to own pluripotent properties. Adult bone marrow stem cells are shown to be capable of differentiating into skeletal muscle, brain microglia and astroglia, and hepatocytes. Stem cell lines derived from both embryonic stem and embryonic germ cells are pluripotent and capable of self-renewal for long periods. Therefore embryonic stem and germ cells are wide investigated for their potential to cure diseases by repairing or substitution broken cells and tissues. Studies in animal models have shown that transplantation of vertebrate, embryonic stem, or embryonic germ cells could also be ready to treat some chronic diseases. In this review, we tend to focus on recent developments in the use of stem cells as therapeutic agents for three such diseases: diabetes, Parkinson disease, and heart disease. We also discuss the potential use of stem cells as gene therapy delivery cells and the scientific and ethical issues that arise with the use of human stem cells.

Keywords*:* Adult stem cells, embryonic germ cells, embryonic stem cells, multipotent cells, pluripotent cells, stem cell, telomerase, telomere, teratoma, totipotent.

PP-52

ROLE AND SIGNIFICANCE OF PHARMACOGENOMICS IN DRUG DEVELOPMENT: A REVIEW

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Pharmacogenomics and genetics are two major rising trends in life science that influence the success of drug development and medical speciality. The effect of drug target polymorphism on drug response can be assessed and identified. The variation in drug response can be better studied with the wider application of pharmacogenomics method like genome wide scans approaches. It deals with the effect of genetic variation on drug response in patient by correlating the gene expression with the, pharmacokinetics parameter i.e. absorption, distribution metabolism and excretion. Pharmacogenetics also plays important role in the study of effects of multiple genes in the pharmacological action of drug. This special issue of antineoplastic resistance is intended to supply an outline of the role of genetics and pharmacogenomics in cancer treatment. Many pharmacogenomics testes are available, but testing has not been recommended for most drugs. This fast-technological development for genetic analyses reveals that the amount of genetic variant with vital for drug action is far higher needs attention to several of rare mutation.

Keywords: Pharmacogenomics, Polymorphism, Pharmacogenetics, Antineoplastic, Genetic variant.

PP-53

EVALUATION OF LEPIDINE AS ANTI-OVULATORY AGENT IN FEMALE RATS

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Combinedoralcontraceptives(COCs)areprepareusingsyntheticprogesterone,estrogenand serve as most convenient, safe, effective, and reversible method of contraception. Due to their side effects in most women, herbal medicines have been proposed as alternatives to these contraceptive methods. The present study was aimed at evaluating the antifertility effects of lepidine, isolated from *Lepidium sativum*, via *in-silico* and *invivo* experimentation on female *Rattusnorvergicus*(Wistaralbinorats).HumanhomologofProgesteronereceptor(Pgr),which is95.4%identicaltotheratPgr,wasretrievedfromtheProteinDataBank(PDB)formolecular docking evaluation. Schrödinger Suite was used for protein and ligand preparation. Schrödinger Glide with XP calculations were carried out to calculate the Glide Score, with humanPgrasreceptorandLepidineasaligand.Tofurtherinvestigatethes*invivo*anti-fertility effects of lepidine on estrous cycle and its correlation with serum progesterone, adult *Rattus norvergicus* (Wistar albino rats) was administered with 10, 20 and 30 mg lepidine/kg body weight dissolved in DMSO: PBS (1:4) vehicle for 15 days. Vaginal smear samples were collected for cytological studies and progesterone hormone level in the serum was estimated through ELISA.*In-silico* observation has shown that lepidine has strong affinity with human progesterone receptors. Serum progesterone level was found to be maintained throughout the estrous cycle.This shows that the lepidine might be working as anti-ovulatory agent by acting as a phytoprogesterone.

Keywords: Lepidine, herbal contraceptives, anti- ovulation, progesterone receptor, docking study

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EFFECT OF HUMAN ENTERIC PATHOGEN COLONIZATION ON SPECK DISEASE DEVELOPMENT IN SOLANUM LYCOPERSICUM

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Colonization and infection of *Pseudomonas syringae* pv. *tomato*is governed not only by host resistance but also by its interactions with other phylloplane bacterial colonizers. In the present study, reduced disease symptoms were observed as a result of interaction between *P. syringae*pv.*tomato*and*Klebsiellapneumoniae,*apredominanthumanentericpathogencolonising phyllosphere.Tomatoplantsraisedundercontrolledasepticconditionsweredividedinto4groups of 25 plants each and treated as follows: Group 1- inoculated with *P. syringae* pv. *tomato;* Group 2- inoculated with *K. pneumoniae*; Group 3- Combination of *P. syringae* pv. *tomato*and *K. pneumoniae*(1:1);Group4-Distilledwater(control).Sampledleavesfromtheabovegroupswere analyzed at 24, 48, 72 and 96 hours after inoculation for the activity of cytoplasmic Peroxidase (POX), Polyphenoloxidase (PPO) and Phenylalanine ammonia lyase (PAL). Disease incidence was recorded in treated as well as leaves emerging after 2 weeks ofinoculation. Plantstreatedwith*P.syringae*pv.*tomato*hadmaximumdiseaseincidencewhilenoinfectionwas observed in control and those inoculated with *K. pneumoniae* alone. Inoculation of plants with combination of both microbes could substantially reduce the disease severity. The results thus demonstrate that *K. pneumoniae, a* common HEP on plant surfaces, reduces the ability of *P. syringae* pv. *tomato*to colonize thehost.

Keywords-
Speckdisease,*Solanumlycopersicum*,Polyphenoloxidase,Peroxidase,Phenylalanine ammonia lyase, *Klebsiellapneumonia.*

PP-55

IDENTIFICATION OF FUNCTIONAL GENES IN NOVEL X-CHROMOSOMES OF INDIAN *DROSOPHILA ANANASSAE*

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X chromosome holds the position of an active player among both the sex chromosomes in an organism. It has evolved from autosomes under natural evolutionary driving forces and possess faster rate of evolution. This results in the adaptive fixation of beneficial mutations and termed as "faster X effect". X chromosome belonging genes are found to be more active and get up-regulated in nature in order to compensate the degenerative effect of Y. Interestingly, X chromosome shows altered expressions of genes in both sexes. Other than sex regulation, it plays an important role in social-emotional cognition, human intelligence and neurological developmental abilities. *Drosophila* is a versatile model which is widely used in multiple disciplines of biological research. It holds 75% functional homology with human disease associated genes and 60% overall genomic similarity with human. *Drosophila ananassae*, a domestic species holds an important position due to its unique features like hyper-mutability in both chromosomal and extra chromosomal DNA, male recombination, segregation distortion and parthenogenesis. The X chromosome of this species shows unique pericentric inversion of muller A element which shifts it from normal to sub-metacentric chromosome. Present work aims to identify the functional genes of novel X-Chromosome of Indian *D. ananassae* using *D. melanogaster* as reference. The novel X-Chromosome assembly has been generated through next generation sequencing (NGS) on an illumina platform. The functional annotation work was carried out by using software AUGUSTUS and FlyBase database. The information generated will enable better insight for comparative genomics and in understanding the evolutionary aspect of functional genes amongspecies.

Keywords: X chromosome, Next Generation Sequencing, Functional genes, Indian *Drosophila ananassae*.

PP-56

ZYMOGRAPHIC TECHNIQUES TO IDENTIFY OXIDATIVE STRESS TARGETS IN CANCER

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Zymography is a technique which is used to measure proteolytic activity. it is an electrophoretic method that includes substrate with polyacrylamide gel for detection of enzymes and their activity. Separation occurs on the basis of charge and in order to know the protein of interest incubation of the PAGE (Polyacrylamide gel electrophoresis) in substrate is done. It is normally done for enzymes. Usually zymography is used to see if an enzyme activity from a liquid phase assay is caused by single protein or by a group of closely related proteins. Prostate cancer is the major cause of deaths per year and presently it is challenge for improving treatment and survival of cancer patients. Oxidative stress, reactive oxygen species ROS level exceeds the ability to repair the damage, then it increases the risk of developing prostate cancer. Thus, oxidative stress plays a major role in development and progression of prostate cancer. Further, we will study about zymographic technique in cancer as a research tool.

Keywords: Zymography, Proteolytic activity, oxidative stress, detection, polyacrylamide gel, substrate.

PP-57

CLONING AND EXPRESSION OF HOST INTERACTOR FOR nsP2 PROTEIN

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Chikungunya virus (CHIKV) has re-emerged as one of the many medically important arboviruses that has spread rampantly to the world in the past decade. Infected patients come down with acute fever and rashes, and a portion of them suffer from both acute and chronic arthralgia. Currently, there are no targeted therapeutics against this debilitating virus. One approach to develop potential therapeutics is by understanding viral-host interactions. However, to date, there has been limited research undertaken in this area. CHIKV non-structural proteins are key players in viral life cycle as they form the replicase complex that synthesizes progeny viral RNA and are responsible for the cytopathic effects and host responses that are triggered by viral infection. nsP2 N-terminal is a part of RNA polymerase complex and has RNA triphosphatase and RNA helicase activity and its C-terminal section harbors a protease that specifically cleaves and releases the four mature proteins. nsp2 is involved in many important processes like host evasion and viral genome replication. Therefore by targeting the molecules that are interacting with CHIKV nsP2 can help in the drug development. Herein, the focus is on molecular interactions of host with CHIKV nsP2.

Keywords: Chikungunya; Genome; Helicase; Arboviruses; Triphosphatase

PP-58

ANTI-PROLIFERATIVE EFFECTS OF CLOVE OIL ON GBM CELL LINES

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Glioblastoma (GBM) is the most common and aggressive brain tumor, which causes the highest number of deaths worldwide. It is a highly vascularized tumor, infiltrative, and its tumorigenic capacity is exacerbated. All these hallmarks are therapeutic targets in GBM treatment, including surgical removal followed by radiotherapy and hemotherapy. Current therapies have not been sufficient for the effective patient's management, so the classic therapies have had to expand and incorporate new alternative treatments, including natural compounds. Cloves are an important spice with a wide range of traditional uses in non-Western countries, mainly as a medicinal antiseptic, analgesic, and antimicrobial agent We evaluated the effect of main component of clove oil which is eugenol on GBM cell lines. Our results showed that Eugenol have anti proliferative effect as well as anti-migratory effect on U87MG cell line. In future Eugenol might be promising therapeutics for the treatment of this mortal cancer.

Keywords: Glioblastoma; Radiotherapy; Hemotherapy; Eugenol

PP-59

STUDY ON γH2AX AS A GENOTOXIC MARKER FOR RADIOLOGICAL AND CHEMICAL EXPOSURE

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DNA usually got damaged when the body got exposed to physical damage (radiation) or chemical agents (cytotoxic drugs). One of the most dangerous DNA damage is double-strand breaks (DSBs) which poses a serious threat to cell viability, genome stability and are hallmarks of cancer cells. Therefore, a reliable and sensitive genotoxic biomarker is needed to monitor and repair the damage. Over the last decade, γH2AX as a biomarker has become a powerful tool to monitor DNA DSBs in translational cancer research. It is a phosphorylated form of histone protein from the H2A family encoded by the H2AX gene on serine 139, formed for repairing of DNA DSBs. γH2AX levels can be measured directly in cell nuclei by microscopy or fluorescence-activated cell sorting (FACS). Because of its mechanistic, sensitivity and efficiency relevance, the γH2AX assay has great potential as a DSBs biomarker. This review focuses on the usability of γH2AX as a genotoxic marker for the detection of DNA DSBs under radiological and chemical exposure scenarios.

Keywords: γH2AX, Cytotoxic Drugs, Double-Strand Breaks (DSbs), Genotoxic Biomarker, Radiation, Translational Cancer Research.

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GUT MICROBIOME AND CANCER IMMUNOTHERAPY

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Microbiome is believed to be very important for the maintenance of balance between human health and associated diseases. Specially gut microbiome is responsible for this purpose. The gut microbiome can interact with the host's immune system by acting locally and also systematically. Cancer immunotherapy is an assuring way for the treatment of cancer patients. It has been observed that microbiome can affect the therapeutic potency of cancer immunotherapy. The gut microbiome has a tremendous impact on the patients to be response for the cancer immunotherapy. In this we have shown the challenges that affect the therapeutic potency and what is the mechanism of action and what are the possible strategies which can be considered to improve the gut microbiome in the treatment of cancer.

Keywords: Immunity, cancer, gut microbiome, immunotherapy.

PP-61

RECOMBINANT PNEUMOCOCCAL SURFACE PROTEIN A (PSPA) AND CONJUGATION OF RECOMBINANT PSPA WITH POLYSACCHARIDE 6B FROM STREPTOCOCCUS PNEUMONIAE (PS6B-RPSPA1): THE NEW CANDIDATES FOR PNEUMOCOCCAL VACCINE.

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Streptococcus pneumoniae is a major pathogen that cause pneumonia in humans. It has been found significantly lethal in recent few years. Capsular polysaccharides are considered to be the primary basis for the pathogenesis of theorganism.Thecurrentpolysaccharidalvaccineofpneumococcusisprovingtobeineffectiveinlastfewyears. So, there is strong need for a new vaccine. The recombinant pneumococcal surface protein A and a combination of recombinant PspA with pneumococcal polysaccharide 6B have been tested as the new candidates for vaccine preparation in last fewyears. SVLPs (Synthetic Virus Like Particles) loaded with a recombinant PspA prepared by the fusion of B regions from clades 1-5 of Streptococcus families and a conjugate prepared by the combination of recombinant PspA and polysaccharide 6B from *Streptococcus pneumoniae* have proved to be more promising candidates for vaccinepreparation.

Keywords: Capsular Polysaccharide, SVLPs, polysaccharidal vaccine.

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ENGINEERED FIBROBLAST GROWTH FACTORS: THEIR APPLICATION IN TISSUE REGENERATION AND ANGIOGENESIS

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FGFs work as the signalling molecules for the stem cells, which regulates their responses and differentiation processes. The regulatory roles of FGFs includes processes like adhering to the vessel, rate of proliferation, migration in the vicinity and differentiation into soft connective tissues, nerves, epithelium tissue and, bone etc. FGF family includes 22 members in it, out of which acid fibroblast growth factor (FGF-1) and basic Fibroblast growth factor (FGF-2) are of main importance. The present article discusses that how the FGFs acts as signaling molecules for FGF receptors to activate them which in turn triggers the RAS/MAP kinase pathways for cell growthanddifferentiationandalso,discussesthathowtheseFGFscanbeengineeredtoreduceor eliminate their mitogenic properties by N-Terminal truncation, point mutations or combinations for their therapeutic use in tissue regeneration, angiogenesis, regeneration of damaged tissues like cartilage, bone, ligaments, skin etc. It also focuses on the delivery systems of FGFs like – direct continuous administration of FGF to wound site or delivery of encapsulated FGFs to injury site and also, the improvements required in delivery systems.

Keywords: Fibroblast Growth Factor, RAS/MAP kinase pathway, angiogenesis.

PP-63

A COMPREHENSIVE REVIEW ON POTENTIAL OF RNA INTERFERENCE FOR PEST CONTROL

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The invasive human population needs the event of latest agricultural technologies to satisfy consumers´ demand and minimizing environmental impacts. Insect pest's area unit one amongst the most causes for losses in agriculture production, and current management technologies supported chemical application or the employment of transgenic crops expressing true bacteria thuringiensis toxin proteins are facing efficacy challenges. So, there is an urgent need to take up novel approaches to control the pests. So RNA interference (RNAi)is one such new generation approach made which is a gene silencing mechanism triggered by providing double-stranded RNA (dsRNA), that when ingested into insects can lead to death or affect the viability of the target pest and this process basically relies on plants stably expressing double-stranded RNAs (dsRNAs) that target essential genes in pest insects. Recent studies have shown that plant-mediated RNA interference (RNAi) shows great potential in crop protection. A better understanding of the mechanisms that verify the variability within the sensitivity of insects would accelerate the worldwide unleash of business RNAi-based approaches. The purpose of this review article is to discuss in detail the mechanism of RNAi which can help in the pest control Management and also the environmental with biosafety issues concerned within the use of this technology in agriculture.

Keywords: RNAi, double stranded RNA, Gene silencing, transgenic crop, biosafety.

PP-64

ANTIGENIC VARIABILITY OF SEROTYPE A FOOT-AND-MOUTH DISEASE VIRUS

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Foot-and-mouth disease (FMD) is extremely transmissible, restricts trade, and affects poor farmers though the death of animal and loss in animal output, compliant comes from the customer about the efficacy of currently used vaccine. The present study was aimed to isolate and asses the antigenic properties of FMD-virus from clinically diseased cattle. Samples were collected from such animal at the time of FMD outbreak from five areas in Ethiopia during 2018. Total of 28 samples including one vaccine strain and, infectious virus were collected and preliminary detected using BHK-21 cell culture on 24/28 (85.71%). The identification of FMDvirus was carried out using reverse transcription polymerase chain reaction (RT-PCR) and followed by subsequent sequencing. In order to compare and evaluate the antigenic relationship of these field isolate with vaccine strain (r1 value), the in-vitro cross-neutralization was carried out by using A/ETH/6/2000 antiserum. Infectious FMD-virus was isolated from 24/28 (85.71%) of field samples. The sequence analysis showed that all FMD-virus positive samples, which are represented as serotype A, and VP1/1D possess variability of amino acid residue at positions of 28, 42 to 48, 138, 141, 142, 148 and 173 as compared to the A/ETH/6/2000 vaccine strain. Based on the one-way dimensional virus neutralization test, the serotype A isolate have antigenic matching up to 8/12 (66.67%) with the vaccine strain, whereas the isolate A/ETH/40/2018, A/ETH/48/2018, A/ETH/55/2018 and A/ETH/61/2018 had antigenic variation. Therefore, the relationships for most of the identified field serotype A with the vaccine strains was found to have above the cut off r1 value of 0.3. This finding indicates that field virus types A were highly related to vaccine strain. From the present study, it is clear that the good quality of A/ETH/6/2000 vaccine administer with high coverage in the herd as well as the possibility to use of post vaccination sero-surveillance deploy to monitor the use of such vaccine in the animals.

Keywords: Amino acid variability, Ethiopia, FMD virus isolation, RT-PCR, Vaccine matching.

PP-65

ANTIOXIDANT PROFILING AND IN SILICO STUDY OF POLYPHENOLIC FLAVONOIDS OF DEFATTED SEEDS AGAINST RECEPTORS OF ORAL SQUAMOUS CELL CARCINOMA

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Present study was to investigate the antioxidant activity and in silico study of polyphenolic flavonoid of defatted seed extracts of *Momordica charantia*, *Ocimum sanctum* and *Azadirachta indica*. Aqueous and alcoholic extracts were prepared of defatted seeds by using soxhlet method. Thin layer chromatography and HPLC were used to identify the polyphenolic flavonoid in the defatted seed extracts. Antioxidant activity was determined by DPPH free radical scavenging and reducing power assay by observing IC50 of the extracts. In silico studies were observed by molecular docking with receptors of OSCC using Swiss Docking and its pharmacokinetic screening by Swiss ADME. This was found from the presents study that defatted seeds have shown maximum flavonoids, phenol and tannin in acetone extracts. HPLC chromatogram of standard quercetin, rutin and tannic acid were observed in the defatted seed extracts. Antioxidant activity was found to be high in ethanolic and aqueous extract of defatted seeds of *Momordica charantia, Ocimum sanctum and Azadirachta indica.* Molecular docking of bioactive such as quercetin, rutin and tannin acid has shown best binding energy results with EGFR, Beta 2 adrenergic receptor and Keap1/nrf2 receptors of OSCC as compared to standard compound 5-Fluorouracil. We authors would like to conclude that polyphenolic flavonoids were found to be present in defatted seed extracts of *Momordica charantia, Ocimum sanctum and Azadirachta indica* can be utilize as therapeutic purposes for OSCC and further to check anticancerous activities on OSCC cell lines for future perspective studies.

Keywords: Polyphenolic flavonoid; defatted seeds; HPLC; antioxidant capacity; molecular docking.

PP-66

DRUG UTILIZATION AND PHARMACOECONOMIC ANALYSIS OF GERIATRIC PATIENT ATTENDING OUTPATIENT DEPARTMENT OF TIRUNESH BEIJING GENERAL HOSPITAL ADDIS ABABA, ETHIOPIA

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Background and objective: This study was conducted to assess Drug utilization and pharmacoeconomic analysis of geriatric patient attending outpatient department of general hospital. It was cross sectional retrospective study and prescriptions and medical record files were randomly selected at OPD department of Trunesh Beijing general hospital the required data for the study were collected in well-designed data collection form for a period of one month from July 20 to August 20, 2019 and analysis were done accordingly by using SPSS (statistical packages for social sciences) Version 20. Results: Among 400 geriatric patients Male (55%) predominance was observed in comparison to females (45%) The majority of patients were in age group of 65-69y (31. 2%) and a total of 1003 drugs were prescribed with an average of 2.51 drugs per prescription.91.62% drugs were prescribed by their generic name. The percentage of prescribed drugs from NLEM (national list of essential medicine) was found to be 91.53%, prescriptions with an antibiotic was 27.75% and encounter with injection was 16.25%. Only for 10.8% of geriatrics patients more than 5 drugs were prescribed the highest cost were for gastrointestinal drugs which is 904 Birr, Cardiovascular drugs 752 and 748 for Ant-infective drugs the least cost spent were for Vitamins and minirales71 Birr. Most of the drugs prescribing indicators result were slightly deviated from the standard values developed by world health organization (WHO) and the rate of Polypharmacy is minimal. For those vulnerable geriatric patients Prescription guidelines should be followed to prevent further health problems.

Keywords: Drug utilization, Geriatric, Pharmacoeconomics, Polypharmacy.

PP-67

EFFECT OF FOLATE IN MODULATING MTOR EXPRESSION AND ITS DOWNSTREAM TARGETS IN HUMAN HCC CELLLINE

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Hepatocellular carcinoma (HCC) is the most predominant kind of primary liver cancer and is the third most common cause of cancer related deaths in Asian-Pacific region. The disease still remains a major public health concern due to substantial associated mortality. Folate, an important dietary component not only acts as a methyl donor but might also play functional roles in nutrient sensing. As the harmony between nutrient sensing and metabolism is extremely important for cancerous cells to survive, we hypothesized that folate might have a role in modulating mTOR expression which further might lead to altered expression of its downstream targets (ATF4, SREBP1-c and HIF1α) in HCC cells. HepG2 cells were cultured in MEM medium and three groups of cells were maintained; folate deficient, folate normal and folate over supplemented in triplicates. After treatment for 7 days, cells were collected, total and free folate estimated followed by isolation of protein and RNA. mRNA expression for the three downstream genes was analyzed by Real-Time PCR. SREBP-1c and ATF-4 was upregulated by almost 10 and 25 folds respectively after folate deficiency treatment. Increased triglyceride levels in the cell lysate further substantiated the result for SREBP-1c. Both HIF1α and mTOR were upregulated with folate over-supplementation at mRNA level. Thus, we concluded that high levels of folate functions as a nutrient sensor in cancer and activates mTORC as well as HIF1α which might assist cancer cells to survive. However, increased ATF4 and SREBP expressions in folate deficient cells might be due to folate deficiency induced ER stress mechanism which is also reported to aid cancer cells for survival in stressed conditions. Hence folate modulations promote cancer cell survival by following multiplepathways.

Keywords: Hepatocellular Carcinoma, folate, mTOR, nutrient sensing.

PP-68

HIGH GLUCOSE-INDUCED DYSREGULATION OF VISFATIN SYNTHESIS AND SECRETION IN 3T3-L1 DERIVED ADIPOCYTES

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Adipose tissue, especially the adipocytes, plays central role in the development of obesity and secrete several cytokines and adipokines including visfatin, which alters the physiology and induce metabolic disorder. Altered glucose homeostasis is one of the main causes of inflammation and adipocyte dysfunction during obesity, yet its role in visfatin regulation is not very clear. We have investigated the mechanism of high glucose –induced dysfunction of adipocytes that leads to increased visfatin synthesis and release. The post differentiated 3T3- L1 cells, that show adipocyte phenotype as determined by the oil red o staining, were exposed to high-glucose and dose- or time-dependent effects on visfatin mRNA and protein expression were measured. MTT assay was performed to assess cell growth at the different doses of high glucose. ELISA was performed to measure visfatin secretion at different doses of high glucose. The qPCR was performed the access the mRNA level of visfatin and Western blotting was performed to assess expression of proteins. Our results showed that high-glucose promoted hypertrophy and hyperplasia in adipocytes. The concentration of visfatin increased with increase in glucose level up to 35mM, but visfatin mRNA and protein levels decreased when the glucose concentration increased to 45mM and 55mM. Bax/Bcl-2 ratio decreased suggesting increased survival of adipocytes at higher glucose concentration. The high glucose level modulated ERK/NFκB pathway in adipocytes, however, NFκB inhibition had no effect on visfatin expression. In conclusion, our results suggest that the high glucose induced overexpression of visfatin is independent of NFκB pathway. Further, high glucose (up to 35mM) promoted adipocyte growth and visfatin secretion but at very high concentration (45mM or more) led to glucotoxicity leading to adipocytes dysfunction.

Keywords: Glucose, Adipocytes, Visfatin, Dysfunction, ELISA

PP-69

PHYSIOLOGICAL AND BIOCHEMICAL ANALYSIS OF TAGETES ERECTA UNDER ZINC STRESS

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Heavy metals are the main pollutants which are present in all ecosystems and contaminant in urbanized societies. Heavy metal pollution has developed into a major worldwide problem. The heavy metals toxicity is gradually increasing in the soil and water. Among all heavy metals, Zinc (Zn) is essential element but higher concentration it is harmful to human beings as well as plants. Phytoremediation is the green technology for the removal of heavy metals from the soil and water. Zn Concentration are rising unnaturally due to industries activities. The present study is focused on removal of Zn from contaminated soil using *Tagetes erecta*, a hyper accumulative plant species. Pot experiments were conducted on 10 days old seedlings of *T. erecta* which were treated with different concentrations of Zn (0, 10, 30, 50, 100 & 300ppm). After 20 days morphological, biochemical parameters and enzymatic activity analysis were studied. Concentration of Zn in various plant parts were estimated by atomic absorption spectrophotometer. This study showed maximum accumulation (168.56ppm) of Zn in the root and Minimum accumulation (56.452ppm) in shoot. Polyphenol and proline increase with increasing concentration of Zn were maximum (1.187mg/g) and (2.26µmoles/g). Antioxidant enzymatic activities were reported with increased concentration showed APX (42.34µmolg-1), CAT (12.65µmolg-1) POD (0.852µmolg-1) & SOD (4.67µmolg-1) at 300ppm. These results suggested that *T.erecta* can be adopted in phytoremediation of contaminated soil.

Keywords: Zinc, Heavy metal, *Tagetes erecta*, Accumulation, Phytoremediation.

PP-70

STUDY ON THE ASSOCIATION OF MIR-500A, STAT-3 AND CERVICAL CARCINOMA

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Cervical cancer is the second most leading cancer in women. MicroRNAs are small, non-coding regulatory regions about to 20-25 nucleotides. miRNAs involved in post-transcriptional regulation and binds to the complementary genes and silence the target genes or degrade them. miRNAs may play as strong tool for prognosis, therapy and diagnosis of malignant tumor. Through various ways. Here, we analyzed the association between mir-500a, its target STAT3 in cervical cancer. Blocking STAT3 signaling inhibits tumor growth, angiogenesis and metastasis generally it does not affect the normal cells. STAT3 works as a potential target for cancer therapy. Methodology: SiHa cell line (Human cervical carcinoma cell lines) were used. SiHa infected from HPV16 cells transfected with miRNA-500a inhibitor along with positive and negative control. MTT assay was done after 48 hours of transfection**.** Western Blotting for STAT3 protein amongst control and transfected cell lines. Results: We got 30-40% inhibition by miR-500a at the concentration of 250nm.Western blotting was done to check the expression of STAT3 which is the target protein of miR-500a. The expression of Stat-3 was down-regulated in presence of transfected cells as compare to non-transfected one. Conclusion: STAT3 was downregulated in the presence of mir-500a which shows the possible role of miR-500a in the regulation of STAT3 expression. Although this is a preliminary finding, further studies are warranted to establish the exact mechanism of the regulation of STAT-3 by miR-500a.

Keywords: Cervical Cancer; Angiogenesis; Metastasis; MTT; Western blotting

PP-71

THE ROLE OF IMMUNE CELLS AND ANIMAL MODELS TO UNDERSTAND THE MECHANISM OF TUBERCULOSIS GRANULOMA

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The biogenesis of granuloma is one of the fundamental components of immune reactions to Mycobacterium tuberculosis. Mycobacteria are enclosed by granulomas and in this way restrict the infection. However, some bacilli can remain alive in these structures for quite a while in a quiescent state. Once the immune system gets weakened, clinical disease develops as bacilli will reactivate in 10% of latently affected individuals. The reactivated bacilli then escape the granuloma and spread infection all over the body. The major population of immune cells which are mainly involved in granuloma formation are macrophages, multinucleated giant cells, epithelioid cells, neutrophils and foamy cells Each of these cells are being enveloped by the edge of lymphocytes. Many different cytokines and chemokines are also involved in the granulomatous response. Furthermore, TNF-α and IFN-γ play a significant role in the synthesis of granuloma. Various animal models ranging from zebrafish to nonhuman primates have been investigated to determine their similarity of biological symptoms during M. tuberculosis infection with comparing human conditions. Each of these animal models imitates various medical and pathological conditions found in human TB patients. Information picked up from these investigations can help in inventing more powerful approaches to tackle TB in humans. In this review, we elucidate the role of various immune cells involved in granulomatous formation. We additionally analyse the different animal models accessible to examine this entrancing immune structure.

Keywords: Tuberculosis, mycobacteria, Granuloma, immune cells, animal models.

PP-72

SYSTEMS BIOLOGY STUDY ON MTRAB PROTEIN-PROTEIN INTERACTION NETWORK OF MYCOBACTERIUM TUBERCULOSIS

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The world's second-biggest killer infectious disease is Tuberculosis, which usually affects the lungs. *Mycobacterium tuberculosis* is a pathogenic bacteria and causative agent of tuberculosis. Two-component systems (TCS) are considered potential targets for developing antibiotics. MtrAB is the only TCS which found in all mycobacterial species and the most essential. Here we used the network theory methods, using MtrAB proteins, and identified important potential drug targets for *Mycobacterium tuberculosis*. The network demonstrated a hierarchical protein-protein interaction network. Rv1364c, regX3, gltB, dosT and devS were recognized as five key regulators. regX3 connection among other 4 four hubs found to be important for regulation because it's the only that interacts with all hubs. regX3 hub regulates the MtrA protein via MtrB and *Rv1364c*, this four-node motif is crucial for the network. Surprisingly, MtrA not found in any of the modules, revealing that this protein is indirectly interfered with modular properties and activities also, with a possibility to cross-talk among the modules via these hubs. In the future, designing a common drug against Rv1364c and regX3 proteins could be a protentional cure for Tuberculosis.

Keywords: Tuberculosis; Protein-protein; Network; Antibiotic

PP-73

EFFICIENT DELIVERY DEVICES APPROPRIATE FOR INTRA NASAL DELIVERY OF THERAPEUTIC AGENTS ACROSS THE BLOOD BRAIN BARRIER (BBB)

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Intranasal delivery of drugs targeting the central nervous system (CNS) is currently an area of great interest since it allows us to overcome the Blood-Brain Barrier (BBB). Thus defying the issues related to effectiveness that arises as a result of the inability of parenterally administered macromolecules to cross the BBB and deliver drugs to the brain. Since, the nasal mucosa offers numerous benefits as a target tissue for drug delivery, a wide variety of therapeutic compounds may be administered intranasally for local, systemic and central nervous system. The relevant aspects of nasal anatomy, and the biological, physicochemical along with pharmaceutical factors needs to be considered during the process of discovery and development of nasal drug delivery products. Therefore, in this study we aim to summarize and critically analyze the various techniques/devices used to deliver the therapeutic agents to CNS. The devices are designed for being more patient compliant and targeted; they include nebulizers, atomized sprays, nasal inhalers, particle dispersants and nasal pumps etc. The delivery of biomolecules through nasal route and through these devices also needs to be formulated efficiently so that they can cross the biological barriers. Therefore, we will be discussing various formulations that have been utilized so far for CNS-targeted intranasal delivery applications like micro- or nanoparticulate systems, micelles, solid lipid nanoparticles (SLNs), liposomes and emulsions with respect to their delivery through these devices.

Keywords: Central nervous system (CNS), Nasal drug delivery, biomolecules, Nanoparticles, Nebulizers, Liposomes.

PP-74

APPLICATIONS OF MACHINE LEARNING TECHNIQUES IN PREDICTING THE EARLY DETECTION OF PSYCHIATRIC DISORDERS: A REVIEW

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Major depressive disorder (MDD) or depression is among the most prevalent psychiatric disorders affecting more than 300 million people globally with a burden of 4.3% according to World Health Organization (WHO). It is expected to be the leading cause of disease in high-income countries by year 2030. The early detection of disease may be treated effectively hence there is need for a model for an early detection of subjects that are suffering from depression to minimize the impact on public health as well as reducing the escalation of the disease. The dataset is from social media networks to explore various methods for the early detection of MDDs based on machine learning algorithms that use textual and semantic similarity features along with writing features (WFs) to predict a subject's depression condition. The dataset analysis is done to characterize the subject's behavior based on the different aspects of their writings such as textual spreading, time gap, and time span. The frequently used machine learning algorithms used in the early detection includes support vector machines (SVM), general vector machines (GVM), Random Forest, Naive Bayes, K-Nearest neighbors (KNN), etc. These algorithms have major merits as well as demerits subjected to data types leaving the research space and challenges for developing the novel model for effective early detection with an applications of empirical to hybrid methods and technologies besides the deep learning methods.

Keywords: MDD;depression; machine learning; support vector machines; random forest.

PP-75

STRUCTURAL CHARACTERISATION OF PIP BOX OF cdc45 IN LEISHMANIA DONOVANI

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Cdc45 is a component of CMG complex (Cdc45-MCM-GINS), the DNA helicase in the process of replication in eukaryotic DNA. On sequence analysis, it was found that Cdc45 of Leishmania donovani (LdCdc45) harbours a PIP motif which is a signature sequence in PCNA interacting proteins. This study aims to decode the interacting interface of LdCdc45 with PCNA (eukaryotic ortholog of β clamp). A structural model of LdCdc45 was built using Phyre2 and compared with its homologs in other eukaryotes. Although LdCdc45 and human Cdc45 show overall similarity in their structures, the position of PIP box differs. The PIP box in human Cdc45 resides on the MCM2-6 binding face and may be available for PCNA interaction. The PIP box in LdCdc45 lies in an unmodelled region between MCM and GINS binding faces. On structural superimposition of the three eukaryotic Cdc45 homologs, it was evident that the PIP motif in S.pombe is close to the expected position of PIP box in LdCdc45 whereas in the Drosophila homolog, the PIP box is at the C-terminus of Cdc45. So the position of PIP box in Cdc45 homologs from three organisms is variable but available for possible interactions with PCNA. The PIP-box motif peptide from LdCdc45 was modelled and docked using GalaxyPepDock server, where it is predicted to adopt a 310 helical conformation (as seen in the PIP-box structures determined earlier). The findings presented here have formed the basis of investigating interactions between Cdc45 and PCNA in L. donovani.

Keywords: cdc45, PCNA, CMG, Leishmania donovani.

PP-76

CRISPR CAS9 TECHNOLOGY: A VERSATILE TOOL FOR GENE EDITING AND CANCER THERAPY

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The Clustered Regularly Interspaced Short Palindromic Repeats /CRISPR associated protein 9 (CRISPR/Cas9) system have potential benefits of eradicating lethal diseases such as cancer. The delivery of CRISPR to tumours might inhibit tumour growth directly and indirectly. As a diagnosis platform, CRISPR could be used to detect low numbers of cancer cells or rare mutations in clinical samples. The CRISPR/Cas9 system is an adaptive immune system occurring in prokaryotes like bacteria and archaea which acts as a defence mechanism against certain viruses that attack them. It consists of a programmable RNA molecule called as the single stranded guide RNA or gRNA that assists the Cas9 endonuclease protein to cleave both DNA strands in a very sequence specific manner inside the prokaryotic genome, and hence resulting in Double-Stranded Breaks (DSB). As cancer is considered as one of the deadliest diseases of all times and regarded as a genetic disease due to the abnormalities caused by certain changes to the genes, the need to find a cure in today's time is essential. Genome editing can efficiently modify the genome of living organisms in order to curb these anomalies. CRISPR/Cas9 technology has been marked a new revolutionary genome-editing technology of all times. It has potential benefits of eradicating diseases such as cancer, by adding or removing DNA sequences in a sequential manner inside the genome, which could eventually help analyze the mechanism of tumorigenesis. Furthermore, the impact of CRISPR/Cas9 system in discovering cancer cell development and its anti-cancer therapies has been found to be immense.

Keywords: CRISPR/CAS9, Mutation, Genome Editing, tumorigenesis, anti-cancer therapies

PP-77

COMPUTATIONAL PEPTIDE DESIGNING: APPLICATIONS AND CHALLENGES

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Peptides are short linear chain of amino acid, selective and efficacious signalling molecules formed by amide bonds, are usually 2-50 amino acid in length and have been reported in disease therapeutics applications (Cancer, Parkinson disease etc.), because of advantages over different small molecules and drug such as high biological activity, high specificity, low cost and ability of membrane penetration. Naturally occurring peptides functions as channel ligands or anti-infective, growth factors, hormones, Neurotransmitter, and modulator of numerous biological activities and playing an essential role in cell functioning. Peptides bind to specific cell surface receptors, such as G protein-coupled receptors (GPCRs) or ion channels, and triggering intracellular effects. Peptides occurs naturally are generally not suitable for use as convenient therapeutics because of their intrinsic weaknesses, including poor physical stability and chemical stability, and a short circulating plasma half-life. While some of the weakness have been treated already why the help of traditional method of designing by analysis the SWOT (Strength, Weakness, Opportunity, Threads). In order to facilitate suitable peptide for varied drug target the newly synthetic peptide deigning is extremely needed with addressing the challenge of their stability, toxicity, membrane permeability and immunogenicity etc. Most of computational tool/methods are based on physical description of atomic interactions apart from basic features *i.e.* sequential to structural features of various amino acids in peptide designing with the deployment of machine learning and deep learning methods leading to design the unbiased peptide. Challenges lies in peptide designing to understand correctly the free energy calculations in the unfolded and folded states, selection of suitable peptide design feature in machine learning models and correct understanding of protein-peptide interactions etc.

Keywords: Machine learning, Peptide designing, SWOT, cancer.

PP-78

TARGETING PPI FOR THERAPEUTIC INTERVENTIONS

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Critical cellular functions such as replication, transcription and translation along with intracellular signalling and maintenance of cytoskeletal architecture, are all regulated by proteins, often acting in concert with other protein partners through protein–protein interactions (PPIs). It is becoming increasingly obvious that any modulations in these PPIs, be it loss or gain of an essential protein-protein interaction for complex formation at wrong location at an inappropriate time can lead to disease pathology. Modern drug discovery aims to identify specific targets and potent therapeutic interventions, especially in the cancer field. In this context although at infancy, these PPIs are emerging as potential drug targets. However there are several challenges, the most difficult being the ability to address reduced druggability of these protein-protein surfaces as opposed to buried active sites. Last few years have seen progress in confronting some of the issues by using variety of strategies. This review brings forth development of Venetoclax, a small-molecule that selectively inhibits BCL2 and has been approved by USFDA for the treatment of chronic lymphocytic leukemia (CLL) and acute myeloid leukemia (AML).

Keywords: PPIs, therapeutics, Venetoclax, leukemia

PP-79

ANALYSIS OF CORE GENOME AND PHYLOGENETICS IN VARIOUS ANAPLASMA SPECIES USING SYSTEMS BIOLOGY APPROACH

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Anaplasma phagocytophilum, has been observed as emerging human pathogen of public health importance and is commonly transmitted to humans by tick bites. The bacterium *Anaplasma phagocytophilum* has been known from decades to cause the disease, tick-borne fever (TBF) in domestic ruminants and cattles in various areas in northern Europe, China, Russian border and United Kingdom. In recent years, outbreak of *A. phagocytophilum* infection has enhanced multifold and is widely reported in *I. persulcatus* and engorged *D. silvarum* ticks in north eastern regions of China. However, few genome sequences have been completed so far, thus observations on biological ecological, and pathological differences between genotypes of the bacterium, have yet to be elucidated by molecular and experimental infection studies. In current work, a combined approach of *in-silico* comparative genomic analysis coupled with phylogenetic investigation and statistical analysis was applied to assess the underlying evolutionary pattern, ornithology and phylogenomic of this bacteria.The calculation of pan- genome, core genome and singletons has provided an overview of complete genetic repertoire of *A.phagocytophilum* and its genetic lineages at the successive level. Further, we have concluded the significant information about genomic annotation and specific gene subsets of this bacterium. The percentage of sequence similarity about 99% reveals the close proximity to the phylogenetic members indicating the large percentage of share genomics segments. This provides the evidence of increasing susceptibility of the pathogen in host and frequent hospital breakouts. Pan-genome, core-genome and Rcp (ration of core-genome size to that of pan-genome size) were calculated for various *Anaplasma phagocytophilum* genome sequences as 3535, 2657 and 1.02 respectively. Phylogenetic tree constructed usingNeighnour joining method and bootstrapping showed a close evolutionary relationship between the variants of *A.phagocytophilum,* indicating significant evolutionary relationships between these species. The value of Rcp has been found to be close to one in our analysis which depicts close genomic similarity and symmetry in various genome sequences. The open genome extrapolation of pan results indicates sympatric lifestyle of the bacteria and its ability for the acquisition of novel species specific genes related to virulence, metabolism, information storage.

Keywords: Pathogen; Phylogenetic tree; Genome; Anaplasma phagocytophilum

PP-80

COMPUTER AIDED DRUG DESIGN FOR INDUSTRIAL APPLICATION: A REVIEW

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Owing to the rise in freely offered computer code and knowledge for cheminformatics and analysis for computer-aided drug design (CADD) is additional and additional engineered on standard, duplicatable, and simple to share pipelines. Rational drug design- a molecule that binds to a target molecule. The basis of (CADD) computer-aided drug design involves quantum mechanics and molecular modeling structures like ligands-based drug and database searching based on the biological target. A pharmacophore model is able to account for differences in a range of molecules. The modification of an existing peptide, or by designing a similar system that mimics peptides in the development of drug design by peptidomimetic. The structure-based drug design, APIS, PERL in-silico drug design can be achieved for future prospects. Algorithms and applications using fragments-based approaches to increase in accuracy and hardware capability. Molecular docking to virtual screening for lead identification and optimisation. Neurovascular unit (NVU) is a great interest and highlighted in pharmaceutical companies for CNS drug design approaches. Nanocarrier improves the therapeutic efficiency of an antitumor drug by providing preferential accumulation at the target site. Quantitative structure-activity relationship (QSAR) is a mathematical relationship linking chemical structure and medical specialty activity in an exceeding manner for a series of compounds.

Keywords: Computer Aided Drug Design (CADD), Pharmacophore, Molecular docking, Peptidomimetic, Ligand Based Drug, Rational Drug Design, Neurovascular unit.

PP-81

IDENTIFYING PROTEIN TARGETS IMPLICATED IN ALS AND DOCKING THEM WITH LIGANDS SCREENED AS PER LIPINKSI'S RULE OF DRUG-LIKENESS

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Amyotrophic Lateral Sclerosis (ALS) is a progressive neuromuscular disease, resulting in death of motor neurons. This causes paralysis, often, leading to death due to respiratory failure. The disease affects around 16,000 people in the US, with 5,000 new cases being reported every year, as per Centers for Disease Control and Prevention, 2016. Currently, there is no cure or treatment available for ALS. Thus, the need to develop potential therapeutic strategies. To obtain hits, protein targets implicated in ALS were identified using ALSoD, GeneReviews, other databases. Known leads against these targets were obtained from databases, like; DrugBank, OpenTargets Platform, GeneCards, etc. Ligand-similarity search was done using PubChem to identify ligands having 95% structure similarity with known leads against the selected targets. This was followed by high-throughput screening of ligand library as per Lipinksi's Rule of Drug-likeness (RO5) and docking them with the target protein. Gridcentre for protein map files was defined using AutoSite, and ADT command lines were used for preparing files and docking. For this stduy, PFN1 protein was selected as the protein target. It is an actin-binding protein that promotes its polymerization. In case of ALS, M114T mutation in PFN1 is observed, which leads to its loss of function and accumulation of mutant PFN1 aggregates. 221 ligands, obtained from PubChem, having 95% structure similarity with Artenimol, that can target PFN1, were used for docking with wild-type and mutant protein. Ligands showing better binding, as compared to Artenimol, were identified. In a majority of complexes, it was also observed that mutation plays a role in influencing the site of ligand binding. Potential therapeutic molecules that can help in amelioration of diseases, like; ALS can thus, be identified using computer-aided drug design. Followed by Molecular Dynamics Simulations, pharmacological studies can also be used to develop leads from hits obtained. Ultimately, leading to drug development showing potential therapeutic effects.

Keywords: ALS, High-Throughput Screening, Lipinksi's Rule, Docking, ComputerAided Drug Design, Molecular Dynamics Simulations.

PP-82

IN SILICO IDENTIFICATION OF DENGUE INHIBITORS IN GILOY (TINOSPORA CORDIFOLIA)

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Dengue is a viral disease caused by RNA virus belonging to the family Flaviviridae and transmitted by the female Aedes aegypti mosquito. This acute disease has now become endemic in more than 100 countries, with ~400 million infections per year. Although an anti-dengue vaccine Dengvaxia (CYD-TDV) is commercially available, its efficacy varies with age and serostatus of the patient and the DENV serotype causing the ailment. Lower efficacy was observed for DENV 1 and 2 than DENV 3 and 4. This necessitates the search for novel and effective treatment for dengue. The stem and leaf decoction of Tinospora cordifolia (commonly known as Giloy) have been used traditionally to treat dengue fever. The study aims to identify the anti-dengue compounds in Giloy and evaluate the docking behavior of different phytoconstituents in T. cordifolia against different DENV proteins NS2B-NS3 and Glycoprotein-E. The docking procedure was used to predict ligand conformation, orientation within the active sites and the binding affinity of the ligand with amino acid residues of the target protein.

Keywords: Dengue, Giloy, DENV, Tinosponone.

PP-83

STRUCTURAL CHARACTERIZATION OF DRUG-RECEPTOR INTERACTIONS: COMPUTATIONAL AND EXPERIMENTAL STRATEGIES

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Intermolecular interactions with biological macromolecules are essential to the therapeutic outcome of drug use. These interactions are largely non-covalent and reversible in nature. In addition, specific cases of covalent bond formation also exist. the prevalence, type and strength of such bonding patterns are extensively studied to understand the impact of these drugs on biological functions. Several experimental and computational strategies are employed in the study of such non-covalent interactions. Computational strategies such as molecular mechanics calculations, temperature dependent molecular dynamics calculations, quantum chemical calculations, and variants of multiple hybrid calculations are used. Experimental techniques such as biophysical spectroscopic techniques viz., Fluorescence, CD, NMR and X-ray techniques provide valuable details about the structural aspects of drug-receptor interactions. The present review highlights the usability of some of these techniques based on the authors' experience in elucidating the structural details of complexes that are difficult of study using some of the conventional experimental methods.

Anticancer molecules such as Vinblastine sulfate (VLB), and its structural analogues (Indole derivatives) have been studied for their DNA binding ability using the above-mentioned techniques. Molecular mechanics, hybrid QMMM and biophysical spectroscopy (fluorescence, CD and FT-IR spectroscopy) have provided the useful insight into the molecular recognition pattern of VLB and analogues where conventional structural techniques such as NMR have failed. These techniques provide binding affinity, binding mode, bonding pattern and structural orientation of drugs into the binding sites.

Keywords: Drug-Receptor interactions, Structural Biology, DNA, RNA, Biophysical Spectroscopy, Computational Techniques.

PP-84

PREDICTION OF BREAST CANCER USING MACHINE LEARNING METHODS

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Breast cancer is the most common cancer that forms in the cell of the breast. Typically, the cancer forms in either the lobules or the ducts of the chest. It can also occur in the fatty tissue or the fibrous connective tissue within the breast. The breast cancer can be categories into two classes: "invasive" (malignant) and "noninvasive" (Benign)or in situ. Invasive cancer spread from the breast ducts or glands to other parts of the breast, whereas noninvasive cancer don't spread from the original tissue. Radius, distances from the center to points on the perimeter, the standard deviation of gray-scale values, perimeter, area, smoothness, compactness, concavity, concave points, symmetry, fractal dimension these are ten features use to categories the cancer data. In this work, algorithms such as logistic regression k nearest neighbor and support vector machine were used and compared to classify cancer data into its respective class, and their results were compared. Sample data has both malignant and benign patient data. It has 569 data samples 357 (or 62.7%) are malignant, while the rest 212 (or 37.3%) are benign. In this work, 70% of total data is used for the training and rest for validation. Results are comparable but still the outliers and false positive predictions are found to be the challenges in breast cancer diagnosis and yet to researched.

Key words: Breast cancer, Texture, concave points, support vector machine.

PP-85

SOFT COMPUTING APPORACHS IN COLORECTAL CANCER GENOMICS: A REVIEW

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Colorectal cancer is one of the deadliest disease happening to do any population across the world and currently raised to 3rd rank in the disease chart of the world health organisation. The disease appears with selective symptoms such as a change in bowel habit is a more common symptom, Abdominal pain, a change in stool form, Rectal bleeding, blood in the stool, and eventually intestinal obstruction. Colorectal cancer second leading cause of cancer death in the world and it is the third most commonly diagnosed malignancy.

Literature reviews that sedentary lifestyle heavy uses of alcohol and abnormal lifestyle apart from genetic decomposition might be the associated factors of colorectal cancer Emergence of disease usually observed in small intestine and large intestine in inner membrane which become malignant and spreaded across the other body part.

The available treatment for cancer such as Surgery, Radiation therapy, Chemotherapy, Targeted therapy, Immunotherapy it often damage healthy cells and tissues. Is not so effective. The tremendous growth in in multidisciplinary area such as genomics proteomics clinical science and soft computing technologies have offered some hope to reach the good treatment if the available data of biological science have been analysed intelligently and effectively.

List of soft computing method such as supervised machine learning unsupervised machine learning, deep learning methods, Probablistic Reasoning, Belief Network and Evolutionary computation are off current used in Cancer data analytics.

Keyword: Colorectal Cancer, Machine Learning, Deep learning, Belief Network and Evolutionary computation.

PP-86

PHYTOREMEDIATION: CURING AIR POLLUTION WITH HOUSE PLANTS

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In the era of industrialization where pollution levels are increasing exponentially, it is necessary to search for reliable options for indoor air purification. In the past 30 years, a wide range of plant species has been scientifically examined and studied for their capacity to purify air & eradicate the harmful chemicals. Plant species like Spathiphyllum cochlearispathum, Sansenieria trifasciata and Chlorophytum comosum have the ability to remove VOC (Volatile Organic Compounds) and other harmful inorganic contaminants constantly present in the air. Plant parts such as roots, leaves, root hairs and wax layers play an important role in air purification by adhesion to carbon and assimilation by the present microbes. The plants that have low light and water requirements are the future for removal of "Sick Building Syndrome" and are energy efficient at the same time. In the comparative analysis between three different plant species it was found that they only differ in the number of contaminants they utilize, the by-products they release and some of their harmful effects on unusual consumption. Detailed research is required to extrapolate the benefits of several house plants for purification.

Keywords: Industrialization, Spathiphyllum, VOC, adhesion, inorganic contaminants, sick
building syndrome.

PP-87

REMEDIATION OF E-WASTE

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With the ever-evolving technology and new gadgets coming in market the e-waste is enormously rising. E-waste consist of a diversity of discarded electronic devices like computer, refrigerator, mobile phones, television each containing a variety of toxic metals that are hazardous and contaminate the environment. These metals if not disposed properly can enter the food chain and cause environmental and health risks. Thus, with the increasing mound of e-waste there is a need to develop a method to get rid of waste in an environmentally invasive manner. Bioremediation approach is presently considered the best approach.Among various biological method for remediation, phytoremediation is the most accepted method because it is cost effective, eco-friendly and socially admissible. This involves plants for the removal of contaminants from the soil. In this study, the phytoremediation potential of Vigna radiata and Cicer arientinum, two annually leguminous plants to remediate hexavalent chromium, an abundantly found toxic metal in e-waste was assessed and compared. The remediation potential - uptake and accumulation of chromium by V.radiata and C.arientinum was assesed. This study discusses the percentage remediation potential of V.radiata and C.arientinum and toxicity parameters. The bioaccumulation factor and translocation factor were greater than 1, this makes it a good hyperaccumulator.

Keywords: E-waste, bioremediation, hyperaccumulator, heavy metal,

PP-88

PHYTOEXTRACTION OF PRECIOUS METAL

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As the global economies and world population continue to grow at an increasingly fast pace because of advancements in science and technology, the demand for critical materials, including gold, platinum-group metals and rare earth elements, is rapidly rising. This demand comes with a price; the mining of such precious metals causes generate risks to ecosystems and human health. Conventional mining activities can result in the pollution of soils, groundwater and surface waters. Such consequences are further compounded by the tremendous amounts of waste that are generated every day, generally from demolition and construction, industrial and commercial activities and domestic households, leaving a legacy of non-recycled metals in disposal facilities. Phytoremediation offers a 'natural' way of addressing environmental issues ranging from phytoextraction to green phytodegradation processes for industrial, agricultural and municipal effluents and residues.

Phytoextraction is a crucial element in the paradigm of 'sustainable development', which targets goals that include the safe disposal of waste as well as the recovery of materials. Using phytoextraction the precious metals that are present in all kinds of waste from different sources can potentially be recovered from materials that are not economically beneficial by conventional techniques.

Keywords: Phytoremediation, precious metals, phytoextraction, phytodegradation.

PP-89

BIOREMEDIATION OF RADIOACTIVE WASTE

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Radioactive materials in the waste are of concern. The main sources of these wastes are from the by-products of nuclear medicine, fission\fusion reaction, nuclear explosions, etc. These by-products have chronic effects on the environment, humans and wildlife. In order to reduce these radioactive wastes, microbes have proved to be beneficial. These microbes help in the reduction of harmful form of radioactive waste to less harmful form. These microbes can survive in the radioactive environment easily. They have the ability to accept the mutant environment and develop the mutant genes which can be exploited for the remediation of many harmful waste constituents – heavy metals, radioactive elements and hydrocarbons. The integration of radioactive waste in the food chain will cause the dangerous harmful radiations. *Deinococcus radiodurans* is a bacteria which has been used to remediate the radioactive waste. These bacteria are resistant in the radioactive environment. The mechanism of enzyme mediated reduction of harmful waste is discussed in this study. The interaction mechanism of soil and radionuclides and the removal of the radionuclides from the soil is also discussed. Additionally, the mechanisms by which the fission products cesium (Cs), iodine (I) and uranium (U) are removed from a solution by microorganisms in combination with the physical or chemical remediation technique is also described. Biological remediation method when combinates with the physical and the chemical remediation technique give better results. This study discusses the factors affecting bioremediation corelating the major nuclear disasters known in history such as Chernobyl and Fukushima disasters.

Keywords: Radioactive waste, bioremediation, microbes, Chernobyl and Fukushima disaster.

PP-90

PRESENCE OF ANTIBIOTICS IN SOIL AND WATER AND ITS IMPACT ON ANIMALS AND PLANTS

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Antibiotics are the products of rapid innovations in the health sector and their usage has changed the pattern of modern way of living. Their benefits have also been recognized in agriculture, aquaculture, bee keeping, and livestock as growth promoters. Antibiotics are widely prescribed for treatment of infectious diseases in humans and animals. They are used in livestock to increase meat production by preventing infections or outbreaks of diseases. Despite their benefits, a continuous release of antibiotics into the environment and their potential adverse impact on living organism is of great concern. Antibiotic pollution has been detected around the world in almost all compartments of the environment. They enter into the human chain, cause antibiotic resistance and toxicity in all life forms. Major source of antibiotics in local scenario are WWTPs (Wastewater treatment Plants), Drug manufacturing plant and hospital effluents. Therefore, Antibiotic remediation measures can solve the problem upto great extent. Phytoremediation is a cheaper, ecofriendly and feasible sustainable method for removal of pollutants. The plant, plant origin microbes or associated microbiota can be used to take up the contamination from soil or water.

Keywords- Antibiotics, Contamination, Phytoremediation, Remediation.

PP-91

SURVEY-BASED STUDY ON AWARENESS OF CONSUMERS TOWARDS FERMENTED FOOD PRODUCTS CONSUMPTION

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Fermented food products are widely used all across the globe. Fermented food products cure and prevent many health-related problems. The aim of the study is to have knowledge of consumers towards fermented food products consumption using a questionnaire. The data was collected using a questionnaire. The collected data was analysed and conclude the knowledge and attitude of people regarding fermented food products. From the data of 22 respondents 69.6% were men and 30.4% were women with maximum respondents lying in age group of 19-25 years. Hence respondents were mainly aware about consumption of fermented food products. 82.6% were familiar with the word fermented food products out of which only 43.5% consumed fermented food products. For 43.5% of the respondents who have consumed fermented food products, pickles are most favourable fermented food for consumption. 52.2% of respondents felt benefit from consuming fermented food products. Hence fermented food products reduced heart disease risk and helped in digestion and weight loss. 72.7% respondents did not experienced any adverse reactions after consumption so fermented food products are safe for health but some people experienced headache, gas or bloating. 52.4% people think fermented food products improve quality of life and 57.1% people recommend fermented food products to others, which show immense benefits of fermented food products.

Keywords: Fermented food products, respondents, questionnaire.

PP-92

BACTERIAL CELLULOSE: A SUSTAINABLE SOURCE TO DEVELOPFOOD PRODUCTS

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Recent interest has focussed on development and use of biodegradable polymers, owing to growing environmental concerns associated with use of synthetic polymers. Bacterial Cellulose (BC) is an excellent biomaterial produced by different bacteria, including Gramnegative bacteria species such as Acetobacter, Azotobacter, Pseudomonas etc. BC possess unique physicochemical properties including high purity, crystallinity, high mechanical strength, high water uptake rates, and porous fibrous structure, making it superior to plant cellulose. Recently, BC has emerged as an efficient and ecologically sustainable biomaterial in several industries including paper, food, textile, cosmetics, environment, biomedical and pharmaceuticals. BC is a dietary microbial polysaccharide and is approved as a "generally recognized as safe" (GRAS) food by the USFDA. Since it is high in purity and can be moulded into any texture and shape, BC has been used as a raw material in food industry in the recent years. Some of the noteworthy applications of BC in food industry include its use as stabilizing and thickening agent, as immobilizers for enzymes and probiotics, vegan meat, as fat replacer. First use of BC in food industry has been the development of traditional dessert, Nata- de- coco. BC based biocomposites have been developed to enhance BC properties through addition of reinforcement material and are being used as edible and nonedible films in food packaging. Other potential applications in food as mentioned are still being gradually explored.

Keywords: Bacterial Cellulose, food packaging, Biomaterial, Nata- de- coco, bio composites.

PP-93

EFFECT OF PROCESS PARAMETERS ON PRODUCTION OF BACTERIAL CELLULOSE

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In the recent years, the growing environmental and economic issues worldwide have drawn the attention of research to develop sustainable bio based products. Bacterial cellulose (BC), is a sustainable, extracellular polysaccharide produced by some bacteria belonging to genus Alcaligens, Achromobacter, Alcaligens, Rhodobacter, Pseudomonas etc. BC has emerged as an efficient biomaterial and possess improved physicochemical properties such as versatility, resourcefulness, high purity high crystallinity, high mechanical strength, biocompatability, biodegradable and hydrophilicity, which make it a preferred material over plant cellulose in various applications. Owing to these excellent properties, BC finds applications in various industries including food, paper, textile, pharmaceutical, cosmetics, biomedical engineering and environment. There are still certain limitations related to low cost production of BC at industrial scale that need to be overcome to extend its usage across various fields. The yield and purity of BC is affected by many process parameters such as type of bacterial strain, temperature, pH, carbon source and other operational parameters. The study focuses on production of BC from Acetobacter sp. in different culture media and under various process parameters in submerged fermentation. For this purpose, 5 different culture media were used for comparative analysis of BC from Acetobacter sp. A significant variation in BC yield has been observed, when produced in different culture medium. Investigation of Physiochemical properties have revealed that BC produced by Acetobacter has similar chemical composition to commercial cellulose in FTIR, however, difference in the peak intensity and peak shifting have been observed in BC produced in 5 different culture media.

Keywords: Bacterial cellulose, plant cellulose, sustainable, Acetobacter, FTIR.

PP-94

HERBAL PRODUCTS IN DRUG INDUCED TOXICITY

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Drug induced cardiotoxicity is very important cause for developing cardiovascular complications. Supplementing cardio-protective natural compounds with existing cardio-toxic therapeutics may have potential to suppress the side effects of chemical based drugs as well as to improve the cardiovascular health of the individuals. With increasing cardiac patients day by day, there is an urgent need to develop safe and effective therapies with long-term relief and no associated side-effects. Natural products hold a great potential in preventing drug induced cardiotoxicity. The synergistic potential of drug and natural products may also be beneficial for developing future cardiovascular therapeutics. Research should be designed to investigate the effect of natural products against different classes of well-known cardiotoxic drugs such as antidiabetic and anticancerous medications etc.

Therapeutic drugs have gained much considerable attention recently for its enormous importance for curing disease and showing lesser side effects. Thus it has emerged as amelioration and can be explored in different therapeutics potential ways to cure deadly disease like cardiotoxicity caused by different life style drugs. So, there is an urgent need for the intervention of therapeutic herb to reduce the toxicity of life style drugs. Medicinal herbs having both anti-cancerous, as well as cardioprotective effects may hold a great potential in this regard. Also Supplementing drugs with natural products may increase the therapeutic index of drugs in addition to various protective effects.

Keywords: Cardiotoxicity, Therapeutics, Cardio-protective, Natural products, Herbs.

PP-95

FUNCTIONAL FOODS: THE FOODS FOR THE NEW WORLD

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The health and fitness of human body is majorly governed by the consumption of wholesome foods. The health benefits of the food are known since ancient times. Phytochemicals present in the food are known to be associated with numerous health benefits. Functional foods are generally the conventional foods or dietary components which are known to improve the human health apart from primitive nutritional advantages, once they are consumed at effective levels as a part of a varied diet on a daily basis. Common examples of functional foods include probiotic, prebiotics, omega-3 fatty acids & antioxidants etc. Health and digestive wellness are the biggest drivers for growth of functional food market in the recent years. The global functional foods market size is expected to reach USD 275.77 billion by 2025. India and China are the two major countries known for their production of traditional functional food products and nutraceuticals. India is expected to become the fifth largest consumer market in the world by 2025. Scientific evidences have been established the role of functional foods in combating forms of chronic diseases, immunity modulation and in prevention of inflammation. Extensive research is now focused on establishing how functional foods and food ingredients might help prevent chronic disease or optimize health, thereby reducing healthcare costs and improving the quality of life for many consumers. Nutrigenomics is an emerging discipline that will investigate the interaction between diet and disease management based on genetic profile of an individual.

Keywords: Functional Foods, Probiotic, Prebiotics, Omega-3 fatty acids, Antioxidants

PP-96

PHYTOREMEDIATION OF HEAVY METALS USING ENERGY CROPS

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Environmental pollution by noxious heavy metals is increasing worldwide due to rapid industrialization and urbanization. Accumulation of these metals is posing serious threat to all life forms. Exposure to heavy metals takes place by various anthropogenic activities like mining and refining of ores, excessive usage of fertilizers and pesticides, disposal of solid wastes, irrigation with wastewater, vehicular exhaust emissions and other industrial activities. Heavy metals induce various physiological, morphological, biochemical malfunctions in plants and cause drastic effects on their metabolism. Therefore, remediation of contaminated soil becomes imperative. Phytoremediation is an eco-friendly approach to remediate soil. Although, it has some drawbacks which can be avoided by using bioenergy crops for phytoremediation of contaminated land. This approach can be used for biofuel production as well as phytoremediation. It is economically favourable for land owners and generates employment opportunities. This review discusses about utilization of energy crops for remediation of heavy metal contaminated land, various methods of bioenergy production, benefits as well as future prospects and limitations.

Keywords- Phytoremediation, heavy metals, energy crops, bioenergy

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LEGUMES IN CANCER PREVENTION

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Polyphenols are a class of plant metabolites present in various fruits, vegetables, cereals and pulses and are reported to be potent anti-oxidant. They protect against a variety of diseases induced by oxidative stress and show anti-carcinogenic properties. Cancer is a disease which occurs due to abnormal and uncontrolled proliferation of cells. Some ethnic populations who consume polyphenol rich foods have been found to be associated with the reduced risk of different types of cancer, such as gastric, prostate, breast and colorectal cancers Legumes like lentils and soy products also are reported to play preventive role in cancer progression as they have rich amounts of reactive oxygen species which works against different cancers by preventing DNA from oxidative degradation. Lentil seeds have a high polyphenolic content that can prevent the uptake, activation or formation of carcinogens through its chemo-preventive activities. They have been found to bind to cancer cell membranes inducing apoptosis of tumor cells. Experimental evidences shows that isoflavones found in soy products induce apoptosis of cancerous cells by regulating multiple cellular signaling pathways which are found to be deregulated in cancer cells. It also plays an important role in reducing incidence of hormone related cancers. Thus leguminous polyphenols play a vast role in prevention of cancer. This article presents the mechanisms by which cancer prevention takes place and the knowledge will help in the initiation of following a healthy diet that can protect us from cancer.

Keywords: Polyphenols, carcinogens, isoflavone, apoptosis, legumes.

PP-98

ASSESSING REMEDIATION POTENTIAL OF LEAD TOLERANT BACTERIA ISOLATED FROM INDUSTRIAL AREA

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Soil plays a major role in maintaining the well-being of environment and all the life forms. Due to the recent increase in industrialization, the usage of heavy metal has boomed drastically. Excessive use of heavy metal involves increased pollution, and hence impacting the soil. All the anthropogenic activities like mining, smelting, various industrial activities and fossil fuel combustion are majorly responsible for the soil pollution. Increasing pollution caused by heavy metals threatens the ecosystems, surface and ground waters, food safety, and human health. The major heavy metals such as lead (Pb), chromium (Cr), arsenic (As), zinc (Zn), cadmium (Cd), copper (Cu), mercury (Hg), and nickel (Ni) are most commonly found in the contaminated sites. Bioremediation is an ecofriendly technique which uses various agents like bacteria, yeast, fungi, algae and plants. In this study, soil samples were collected from the major Delhi industrial areas and the remediation potential of the selected plant *Vigna radiata* and the Lead tolerant bacteria isolated from these areas was assessed.The results showed that the toxic effects heavy metals on selected plant.There was significant reduction in the shoot and root length whereas *Vigna radiate* plant in presence of microbes showed no impact on the root and shoot length.

Keywords- Anthropogenic, Contaminated, Remediation, Tolerant.

PP-99

GUT-BRAIN-AXIS: PROBIOTICS INTERVENTIONS

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Microbiome–gut-brain axis is a bi-directional communication between the central nervous system (CNS) and the gut-microbiota, connecting the brain's emotional and cognitive centers with peripheral intestinal functions. This communication involves the interplay of neuronal, hormonal and immunological mechanisms and is believed to influence the human health and mental well being. Intestinal microbial population represents one of the richest ecosystems and their role in human health and diseases is highly diverse. This gut-microbiota can be influenced by the functional foods including probiotics, prebiotics, nutraceuticals, etc. Probiotics are food supplements containing live beneficial microorganisms, known to improve functioning of digestive system and modulation of immune system, when consumed in recommended dosage. Probiotics can alter the composition of gut microbiome and confers psychological benefits. Studies have shown that cognitive function of an individual is greatly influenced by gut microbiome, food habits and genetic makeup. Probiotic consumption can boost recovery rates from diarrhoea, increase resistance to intestinal and respiratory infections, promote anti-tumor activity and relieve certain allergic and respiratory disorders. Stress and anxiety is known to have consequence on gut microbiome that communicates to brain. Excessive stress response can cause mental and physical health issues. Probiotics and intestinal microbiota may minimize stress reactivity by modulating the neuroendocrine system and under stressful conditions can have positive effects on behavior and cognitive function (e.g. decreased anxiety, depression, and defeatism).

Keywords: Gut-brain axis, Bi-directional communication, Central nervous system, probiotics, Stress

PP-100

PROFILING OF BIOACTIVE COMPOUNDS FROM MICROORGANISMS

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Characterisation of natural bioactive compounds from microorganism of natural habitats facilitates in understanding their role, mechanism of activity and further modifications in their structures as required. The characterisation strategies are based on many technologies, and start from isolation, purification, and extraction of bioactive compounds. After purification, analyses and characterization of the bioactive compounds is done by different techniques such as GC-MS, LC-MS, and NMR. These technologies cover the field of metabolomics in which study of small molecules is carried out. Metabolomics represents the phenotypic state of molecules. The main advantage of these technologies is that they are unbiased. Qualitative and quantitative results are obtained. These techniques are based on chemometric analyses and target approach. While still expensive, these techniques have revolutionized the field of small molecules study, facilitating large-scale data analysis from a variety of habitats, contributing to applications in diverse fields such as medicine, pharmacology and agriculture.

Keywords: Chemo-metric, Bioactive, GC-MS, NMR, LC-MS.

PP-101

ASSISTING REMEDIATION OF Cr(VI) USING LEGUMINOUS PLANTS: A GREEN APPROACH

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Soil pollution due to mobilization of heavy metals by man through extraction from ores and processing for different applications is becoming a major concern. Since, they are nonbiodegradable, they tend to accumulate in the environment and subsequently contaminate the food chain. This contamination poses a risk to environmental and human health. Heavy metals are carcinogenic, mutagenic, endocrine disruptors and cause neurological and behavioural changes especially in children. Thus, remediation of heavy metal from soil deserves due attention. Phytoremediation is an area of active current research which is ecofriendly and economic. The present study focuses on the use of two legumes; *Cicer arentium* (RP1) and *Vigna aconitifolia (RP2)* to explore their remediation potential towards Cr(VI) with concentration ranging from 100-800 mg kg^{-1} with the growth upto 3 weeks and were assessed for remediation potential and toxicity parameters. Higher percentage of decrease in root and shoot length was found in RP1 as compared to RP2. Chlorophyll content was also found to decrease with increasing Cr stress in RP1 as compared to RP2. Translocation factor >1 was observed in both the plants with maximum value of 2 in RP2 at 600 mg kg^{-1} whereas for RP1 TF 1.35 was observed. Remediation potential of RP2 also exceeded over RP1; which makes *V. aconitifolia* a better phytoremediator as compared to *C. arentium*.

Keywords: Carcinogenic; Heavy metals; Phytoremediation; Soil pollution

PP-102

SMALL MILLETS: GRAINS FULL OF NUTRIENTS YET LARGELY UNDERUTILIZED

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Cereals are an important reservoir of chemical energy that can sustain the basic nutritional needs of mankind; both directly and indirectly as animal feed. They belong to a large family of monocotyledonous grasses called Gramineae. India is one of the largest producers of millets in the world. Millets are a reservoir of organic compounds that offer a number of health benefits. They had been shown to possess antimicrobial, antioxidant, anti-cancerous, anti-diabetic and a number of other health related properties. Besides, they are also gluten-free and therefore can be consumed safely by celiac patients. However, in our country, the main focus is on the cultivation of wheat and rice while the total area of cultivation under millets is gradually decreasing. In addition small millets cultivated in certain regions on a small scale are mainly used as bird feed. Under such a scenario, it is possible that without realizing the true potential of millets we in the near future may totally neglect them. Therefore, it can be concluded that millet offers itself as one of the promising candidate that need extensive research and collaboration to realize its full potential.

Keywords: small millets, antioxidant, anti- cancerous, antimicrobial, secondary metabolites, gluten-free.

PP-103

AYURVEDA INSIGHTS INTO MANAGEMENT OF PARKINSON'S DISEASE

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Neurological disorders are increasingly becoming the cause for disability worldwide and ageing increases the burden of neurodegenerative disorders including Parkinson's disease. The incidence and prevalence of Parkinson disease increases with age, regardless of their gender and approximately 1% of the patients are over the age of 60. More than 5 million people worldwide are living with Parkinson's disease. Parkinson's disease (PD) is a chronic neurodegenerative disorder resulting mainly from progressive loss of dopaminergic neurons in substantia nigra, the part of midbrain. PD is predominantly characterized by bradykinesia or slowness of movement, postural instability, rigidity, resting and patients suffer from tremor etc. Unfortunately, effective treatment for PD is not yet available. The current line of treatment includes L-Dopa for controlling the symptoms of PD. However, this treatment has significant long-term limitations and side effects. Ayurvedic treatment in PD aims to balance the disturbed dosha and restore healthy balances in the mind, body and soul. Modern research on exploring the role of ayurveda in PD focuses on using *Mucuna pruriens*, as a natural source of levodopa which get converted to dopamine in the brain. Other medicines used are *Withania somnifera, Plantago psyllium, Linum usitatissimum, Glycyrrhiza glabra, Nardostachys jatamansi, Convolvulus pluricaulis, Centella asiatica*. Although it is difficult to interpret precisely the ancient texts in Ayurveda and relate the information to modern understanding of medicine, it is important to realize that Parkinson's disease has been known for thousands of years as evidenced by the documentation of symptoms and the remedies used in Ayurveda.

Keywords: Parkinson Disease, Ayurveda, Levodopa, Dopamine, Neurodegenerative disorders.

PP-104

ANTI-OSTEOPOROTIC ACTIVITY OF PROBIOTICS

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Currently, over 200 million people all over the world have succumbed to this chronic disease known as Osteoporosis. Osteoporosis is a metabolic disease that is characterized by extenuation of bone width, reduction of bone mass making them permeable and brittle, enhancing the risk of fractures. It is mainly caused due to the lack of hormone estrogen in women and androgen in men causing emaciation of calcium and bone proteins. This disease is most frequently diagnosed in women belonging to the age group of 50 years and above. It is a reticent disease with no symptoms found when patients of osteoporosis are diagnosed but they may undergo frequent bone fractures, back pain, loss of height and hunched forward posture. The current line of treatment includes medications containing bisphosphonates and estrogen therapies are used to prevent the risk of postmenopausal osteoporosis. Unfortunately, these pharmacological treatments and medications have several adverse effects, however, modern research has developed means to introduce probiotics to treat osteoporosis. Probiotics are live microorganism when taken in adequate amount provides health benefits. The production of bioactive peptides by probiotics is one of the mechanisms behind its anti-osteoporotic activity, which helps in the absorption of calcium to compensate for bone loss. Bacteria mainly from genera *Lactobacillus* and *Bifidobacterium* show anti-osteoporotic activity that is used to treat osteoporosis. Therefore, it may pave the way for an inexpensive and well-tolerated treatment that can help to prevent osteoporosis in older individuals.

Keywords: Osteoporosis, Calcium, Probiotics, *Lactobacillus*, *Bifidobacterium*, Anti-osteoporotic activity.

PP-105

MICROBES AS A SOURCE OF SUSTAINABLE ENERGY

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The quick receding concentration of fossil fuels and the mounting worldwide interest of energy has required the production of alternate fuels to replace the traditional non-renewable energy sources to counter the expanded deposition of greenhouse gases in the atmosphere, which has prompted considerable climatic changes. One approach to overcome this bottleneck is the use of microorganisms to change substrates into biofuels and high value-added products, and at the same time taking advantage of various microbial biomass components to produce other products of interest, as a coordinated process. In this way, it is conceivable to maximize the economic value of the entire process, with the desired reduction of the waste streams produced. It is expected that, this coordinated system makes the biofuel production monetarily economical and competitive in the near future.

Keywords: biofuels, climate change, energy, greenhouse gases, microbial biomass, renewable energy.

PP-106

MORPHOLOGICAL AND BIOCHEMICAL ANALYSIS TO STUDY THE INFLUENCE OF CHROMIUM TOXICITY ON IR-64

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In India, rice is the principal crop and is the staple diet of majority of the population. Widespread use of hexavalent chromium [Cr(VI)] in leather processing, wood preservatives, stainless-steel manufacture, and electroplating industries has resulted in contamination of paddy fields. Cr(VI) toxicity results in growth inhibition and leading to changes in components of antioxidant systems as well as secondary metabolites . We evaluated the comparative short and long term effects of Cr(VI) stress on rice plants to explore the plant defense responses against Cr stress. Rice plants were induced with chromium for different time intervals and there morphological and biochemical effects were studied. Different assays and staining methods including the Evans blue staining methods, Phenolic and Flavonoid content evaluation assays were performed to understand the plant response against Cr(VI) stress. Total phenols and flavonoids were significantly higher in Cr stressed plants as compared to control groups. Under Cr(VI) exposure, significant higher accumulation of proline was observed. Our study concludes that chromium stress leads to over production of free radicals and plant tries to subdue this stress by production of secondary metabolites.

Keywords: Hexavalent chromium, Secondary metabolites, Phenolic, Flavonoid, Proline, Evans blue staining, NGS data, Novel miRNA's.

PP-107

EVALUATION OF THE METABOLITES FROM EXTRACTS OF THE LICHENS OBTAINED FROM FOREST RESEARCH INSTITUTE FOR ANTIMICROBIAL ACTIVITY

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Lichens have been identified for more than 800 active metabolites. These metabolites are also responsible for the medicinal activities such as immunomodulatory effects, antimicrobial activity, antiproliferative activity and many more. This work focuses on the phytochemical analysis of metabolites produced by lichen growing on the bark of various trees. The lichen isolated was identified as *Parmelia saxitalis*. Ethyl acetate extract was prepared and analyzed for the presence of tannin, terpenoids, alkaloids flavonoids, phenol, cardiac glycosides, saponins, and protein. The extract was also evaluated for antimicrobial activity against *Micrococcus luteus, Escherichia coli, Staphylococcus epidermis, Pseudomonas fluorescens, Saccharomyces cerevisiae, Baccilus subtilis*. The preliminary study shows that the lichen produces active metabolites that can be harnessed for their medicinal properties.

Keywords: Lichens, Antimicrobial, Secondary Metabolites, Therapeutic Agent.

PP-108

EFFECT OF DIFFERENT LIGHT COLOUR SOURCES ON GROWTH AND DEVELOPMENT OF PLANTS

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Plants are an integral part of our community as they provide us with plethora of useful substances starting from food, clothes to biofuel.Therefore constant efforts are being made to enhance the yeild of plants by focusing on the factors affecting their growth and development. Light plays an important role in growth and development of plants and affects the quality of plant.Plant yield is reported to significantly increase on exposure to red light supplemented with blue light. There is maximum absorption and thus maximum photosynthetic yield in presence of blue and red visible light spectra. Plants also absorb cyan, orange, yellow, UV and far-red light which also has impact on photosynthetic rates, yield and growth.Hence it can be concluded that white light might be more suitable for plant growth. Different plants such as *Cannabis, Myrtus, Antihirrhinum, and Petunia* have shown the effect of different types of light on growth, weight, leaf area and development.This study highlights the use of different colors for plant growth.

Keywords: Light, Growth, development, photosynthetic yield.

PP-109

REMEDIATION OF NITRATE USING MICROBES AND PLANTS – A REVIEW

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Nitrate contamination of groundwater is a serious worldwide concern that arouses research interest. Chemical fertilizers contain nitrogen which is uptaken by the plants in form of nitrate. Application of chemical fertilizers augments the soil fertility. As it has high solubility and mobility nitrate can easily percolate to unsaturated zone of soil to groundwater. Nitrates are long lasting and accumulate to high level resulting in contamination of groundwater. High concentration of nitrate in water has hazardous effects on animals and humans. In many regions of India, this pollutant has assumed alarming proportions and may rise in forth coming years. According to Bureau of Indian standards (BIS), the maximum contamination level of nitrate is 45mg/l. Besides various physio-chemical techniques, bioremediation and phytoremediation are versatile and highly acceptable techniques which help in treatment of nitrates. These techniques can be implemented both ex situ and in situ. This study focuses on the Phytoremediation methods.

Keywords: - Fertilizers, Bioremediation, Phytoremediation, Pollutants, Nitrate.

PP-110

GREEN BIO-REFINERY: A STRATEGIC APPROACH TO SUSTAINABLE MANUFACTURING AND LOW EXERGY WASTE DISPOSAL

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The advent of globalization and industrialization has imparted an additional burden on depleting natural resources. This has not only reduced the available resources in an unsustainable way, but also imparted additional environmental burden. The existing industrial processes also add on to the pollution, by disposing of high exergy waste by-products. Bio-refineries are an appropriate solution to the ever increasing problem of depleting resources and environmental degradation. Bio-refinery is the sustainable processing of biomass waste into a continuum of marketable goods and resources, as stated by the International Energy Agency (IEA). Green bio-refinery, a kind of bio-refinery, provides an opportunity for minimizing environmental deterioration and is a way for contributing towards sustainable bio-based society. It uses various kind of feedstocks, ranging from agricultural to industrial biological waste and their processing using different techniques, for production of bio-based / derived marketable products and energy. The recent advances of green bio-refinery have provided a solution to environmental deterioration along with production of high value products and bio-products along with disposal of low exergy waste products into the environment, a strategy toward a sustainable society.

Keywords: Globalization; Bio-refineries; Biological waste; Natural resources

PP-111

A REVIEW ON NEGATIVE IMPACTS OF ORGANOPHOSPHATE PESTICIDES

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Organophosphates (OPs) are chemical substances originally produced by the reaction of alcohols and phosphoric acid.They were developed back in 1940s in Germany and played a major role in defense against pests in agricultural crops. They are considered highly toxic. Organophosphates such as Diazinon, Malathion, Ethion etc, enter the environment when they are sprayed in agricultural fields and they fall on ground and get absorbed in the soil which may further contaminate the soil and ground water. They can also be washed off from the soil surface through rains and can contaminate the surface water bodies, natural streams, rivers and other aquatic environments. Their uncontrollable use can contaminate soil and kill non targeted organisms. People in agricultural fields are highly exposed to these chemicals and have high risk of getting affected by pesticide toxicity. Pesticides can enter through inhalation, ingestion and absorption through skin. Once entered, these pesticides would affect an enzyme in the body called acetylcholinesterase (ACE) at the nerve endings thus hampering the nerve signaling in the body. In this study we will be presenting about the mechanism of action of the organophosphate on metabolic pathways, their effect on various environmental factors such as soil, water and then on non-target organisms, particularly in human beings.

Keywords: Pesticides, Organophosphates, Non-target organisms, Nerve Signaling, acetylcholinesterase (ACE).

PP-112

BIOCHAR: CHARACTERISTICS AND ITS ENVIRONMENTAL APPLICATIONS

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Due to the increasing use of chemicals on agriculture land lead to the increase of organic and inorganic contaminants. This has raised a serious public concern for the protection of the environment and human health. Various conventional methods of remediation are reported in literature like phytoremediation and bioremediation and along with that adsorption (using activated carbon), and membrane separation processes are also involve with this phenomena. But these methods likely adsorption and membrane separation are costly and often generate a considerable amount of chemical residues. Nowadays, researchers are frequently focused on biochar for remediation. Biochar has several unique properties, which make it an efficient, cost-effective and environment friendly like reduced availability of toxic metals and decrease the amount of organic pollutants, reduced nitrogen losses in soil and it has a potential effect on pesticide remediation. Therefore, strategic biochar application to soil may provide agronomic, environmental and economic benefits. The main aim of this review is to summarize the recent research on biochar for the effects of physiochemical properties (pH, surface area, temperature) and emphasize its importance in remediation of contaminated soil.

Keywords: Organic, inorganic, phytoremediation, bioremediation, adsorption, membrane separation, physiochemical.

PP-113

SCREENING OF MICROORGANISMS FROM WASTEWATER OF NORTH INDIA

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In the past decade, expansion and growth of hospitals, health care sector, pharmaceutical industries and cosmetic industries has resulted in production of a unique category of pollutants combined called the Pharmaceutical and Personal Care Products (PPCPs), which are released into the environment as by-products as well as due to consumption and use by consumers. These pollutants directly or indirectly affect the quality of water and soil. Some of these pollutants comprise of antimicrobial compounds, beta- blockers, non-inflammatory steroid drugs, paraben, and stimulants. Our preliminary study focuses on estimation of some of these PPCP pollutants in waste water treatment plant, sewage treatment plant, and river. The presence of microorganisms in these sources and their enumeration will be carried out. The results will provide information of microorganisms that can tolerate the presence of these PPCPs, and possibly their ability to remediate these compounds, as also indicate the effect of the wastewater physicochemical parameters on the diversity of the microorganisms present.

Keywords- Pharmaceutical, Personal care Products, Microbial Diversity.

PP-114

PURIFICATION AND CRYTALIIZATION OF CATALASE FROM SPINACH

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Catalase activity is observed in most of material. The quantity of catalase, however, is extremely low and thus the extracted enzyme solution very unstable, compared with other plants and animals. Crystals give an elements of structure in the product and those where crystallization is a separation process. The phosphate buffer was the simplest stabilizer of catalase and therefore the butanol treatment was used to separate enzymes related to insoluble particles and was very suitable to extract catalase. Crystal of plant catalase from spinach were obtained. Purification of the catalases of the spinach leaves was performed by n-butanol and crystrals were obtained. The activity of the spinach leaf catalase was optimum at 15^{o}. These optimum temperatures have resemblance to the circumstances where they grow and are independent of enzyme purity. Analysis the properties of crystal by FTIR.

Keywords*:* Catalase; Hydrogen peroxide; Bioremediation; Food.

PP-115

SURVEY ON PUBLIC KNOWLEDGE AND PERCEPTION ABOUT ANTIMICROBIAL RESISTANCE

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Antibiotic resistance occurs when an antibiotic has lost its ability to control bacterial growth effectively even in therapeutic concentrations and results in emergence of superbugs. AMR has been identified as one of the 10 threats to global health in 2019 by WHO. AMR is a threat to global security and national stability. India is one of the largest consumers of antibiotics in the World followed by China and US. Studies show that out of every 10 patients with infection in ICU, 4 have drug resistant bacteria increasing the mortality risk. India's bacterial disease burden is highest in the world. Large population suffers from diseases like diabetes, cancer and heart ailments making them prone to infections. 40% children in India are malnutrition and at risk of infections. Approximately 30% neonatal sepsis deaths are due to AMR. In this context, a survey was conducted to understand and identify factors influencing pattern of antibiotics use, awareness of rising AMR based on public knowledge in urban areas. Out of total 200 responses received, 79.5 % of people have heard about the term Antibiotic Resistance. 32.5 % of people discontinue antibiotic if they feel better. 88 % of people take advice from Doctor when they take antibiotics. People consider going to pharmacy in their vicinity more reliable than online purchasing. There is a general tendency of buying medicines from pharmacist rather consulting a specialist/doctor.

Keywords: Antibiotics, Antimicrobial resistance, Survey, WHO, Superbugs.

PP-116

MICROBIAL PIGMENT AND INDUSTRIAL APPLICATIONS

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"Microbial Pigment" are the pigments that are extracted naturally from microoragnisms. These pigments contribute significantly in the food production and processing industries. It makes the food more appetizing and informative. Also, if food was without colour it would have been really difficult for all of us to distinguish between the different types of food we consume. The colour not only gives appealing look to our food but it also enhances the quality of food most of the times. Therefore, nowadays people are switching from synthetic colours to natural colours as these biocolorants are safe to consume and have no hazardous effect on human health. Biocolours are obtained from biological sources such as plants, animals and microorganisms. These natural colours appeal society as they are highly organic and have advantageous biological activities such as antioxidants and anticancer agents. Among the natural pigments, microbial pigments are of great interest. The various microorganisms such as genus Micrococcus, Rhodotorula, Sarcina, Bacillus, and Achromobacter are known to produce different types of pigments. Zeaxanthin is a golden yellow colour pigment extracted from Staphylococcus aureus, Prodigiosin is a red colour pigment extracted from Serratia marcecsens. These colours extracted naturally have beneficial properties like anti-cancerous, immunosuppressive, antibiotic, anti-proliferative, bio-degradability etc. additionally; they have wide range of application mainly in food, dairy, printing, textile and pharmaceutical industries etc. Canthaxanthin is an orange to deep pink coloured carotenoid with antioxidant potential. It is isolated from Bradyrhizobium sepp, and is approved as a food colorant and used in a range of foods as well as salmon and poultry feed. Therefore, Microbial pigments would be helpful and have great importance in various industries.

Keywords: Natural colour, pigments, microorganisms, Food Industry.

PP-117

CHARACTERIZATION *OF CLITORIA TERNATEA A* FOR ITS FUNCTIONAL PROPERTIES

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Clitoria ternatea is also known as butterfly pea plant or aparajita. It is well known for its use in medicines,food and beverages. The plant grows in diverse conditions making it available in various regions for example Thailand, India, Malaysia etc. The plant is available mainly as two varieties producing white and blue coloured flowers. In recent times, blue tea prepared from the blue flowered variety, has gained popularity with several proclaimed health benefits such as an antioxidant, anti-inflammatory, memory boosting power and leading to delayed aging. In order to scientifically characterize the blue tea and understand its chemical profile, this work focuses on two types of samples – one commercially available and a locally grown variety. We present results on the phytochemical profile of these types and their antioxidant activity. In qualitative analysis several phytochemicals were identified - protein, saponin, alkaloids, flavonoid, tannin and anthocyanin. The Indian variety had a larger quantity of flavonoid as compared to the commercial type. Quantitative analysis showed that both types exhibited similar antioxidant activity. Dilutions of the blue tea led to decreased antioxidant activity, suggesting that the quantity of flowers and time period contribute to the activity. The results suggest that locally grown varieties have similar antioxidant activity and can fetch good commercial price in the market if cultivated on large scale with good agricultural practices.

Keywords: Blue tea, antioxidant, phytochemical, flavonoid.

PP-118

EDIBLE COATINGS: TECHNIQUE TO IMPROVE SHELF-LIFE OF CUT FRUITS AND VEGETABLES

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In human diet, as fruits and vegetables constitute an essential part and nowadays intake of fruits and vegetables has been increased due to their various health benefits and they can be consumed either fresh or processed. However, the main challenge for fresh-cut industry is to preserve fresh- like characteristics of fresh-cut produce for a prolonged storage time. Fresh-cut fruits and vegetables have a much larger cut surface and shorter shelf-life due to the loss of various quality parameters such as color, juiciness, flavor etc. Moisture loss is a vital factor which deteriorate the quality of fruits and vegetables which may cause wilting, soft texture and loss of nutritional value. Due to the rapid growth of the market segment and the increasing preferences of consumers towards ready-to-use foods and desire towards such products promote the production and consumption of minimally processed foods. To avoid the loss of quality and increase in shelf-life, best postharvest practices are required and alteration in processing, product development and novel packaging designs. Applications of edible coatings for foods have shown potential results in extending the shelf-life of fresh-cut fruits and vegetables and to maintain their quality. Edible coatings are nontoxic method to control moisture transfer and gas exchange. Edible coatings can provide an additional protective coating to produce and prolong the shelf-life and improve the quality of fresh products. By the use of different edible coatings (e.g., polysaccharide, lipids and composite) on fresh-cut fruits and vegetables to maximize their quality and shelf life and also avoid the loss of quality parameters.

Keywords: edible coating, nutrition, oxidation, polysaccharide, lipids.

PP-119

FUNGAL CHITOSAN PRODUCTION AND ITS CHARACTERIZATION IN SUBMERGED CULTIVATION

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Chitosan is natural biopolymers found in shell of crustaceans, exoskeletons of insects and mollusks, as well as in the cell walls of fungi. It is most abundant natural biopolymers after cellulose. Chitosan is copolymer of N-acetyl-glucosamine and glucosamine. It is deacetylated derivative of chitin with degree of acetylation less than 40%. However, due to seasonal variations and discontinuous supply of the raw material from the marine sources, fungi can be an effective and a viable alternative for chitosan production. Fungi contain chitin and/or chitosan as a structural component of their cell wall. Fungi can conveniently be cultivated in the laboratory on economic substrates, and then chitosan can be extracted by treating the fungal mycelia with simplechemicals.
The study focuses on production and extraction of chitosan from *Trichoderma longibranchiatum* ITCC7839 and *Penicillim funiculosum* MTCC2552 cell walls in submerged fermentation, in different culture media. Variations in their doubling time and specific growth rate has been observed. Fungal biomass was harvested and extraction of chitosan was done from two fungal cultures grown in different culture media. Chitosan extracted was characterized using FTIR and XRD. Data has shown that chitosan extracted from fungi has similar chemical composition as commercial chitosan. The data will be presented anddiscussed.

Keywords: Fungal chitosan, Chitosan, Acetylation, FTIR,XRD.

PP-120

POLYSACCHARIDE BASED EDIBLE COATING

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Food is a vital product for the survival of human beings and with passage of time, quality concerns of consumers are rising. Edible films and coatings are thin layers applied on food products to protect them and improve their quality. An edible coating is defined as a thin layer of edible material formed on a food, whereas an edible film is a preformed thin layer of edible material placed on or between food components. Films/coatings are prepared from naturally occurring renewable sources (polysaccharides, proteins, lipids and composites) which we can eat without disposing them. Polysaccharides are naturally occurring polymers, widely used to prepare edible films or coatings including starch, cellulose, pectin and derivatives of all these, pullulan, alginates and chitosan. Polysaccharides are coatings predicted to be an efficient oxygen blocker due to their well-ordered hydrogen bonded network shape. Polysaccharide coatings are colorless, have an oil-free appearance and can be applied to pro-long the shelf life of fruits, vegetables, or meat products by significantly reducing dehydration, darkening of the surface and oxidative rancidity(browning).Polysaccharide coatings are helpful to extend shelf life and maintain appearance and nutritional values during storage of strawberries. Polysaccharide coatings application delayed softening and slowed senescence and decay of strawberries by protecting membrane structure.

Keywords: Edible-coating, polysaccharide, shelf-life, oxidative rancidity.

PP-121

BIOREMEDIATION OF AROMATICS POLLUTANTS

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Aromatic compounds such as naphthalene, flouranthene, phenantrene and others are difficult to degrade because of the benzene ring present in the structure. This ring provides stability to the structure due to resonance of the bonds. The pollutants are toxic substances which can affect the functioning of different ecosystems like soil, water and air. The majority of aromatic compounds are released as by-products of industrial processes. The usage of aromatics, plasticizers, and pesticides in day-to-day life in cosmetic products, edible fruits, vegetables, etc. are one of the major concerns because of their commercial usage and their recognition as potential threats to human health and the ecosystem. While other physical and chemical techniques are available, bioremediation can be one of the best methods to break down the aromatic components as they result in harmless end products. Microorganisms are used in these processes, wherein, they use enzymes to catalyze the breakdown and utilize the aromatic component as energy source and break it down. These methods are considered to be more cost effective in the long run, and also eco- friendly in nature. In this review, we have focused on the steps involved in bioremediation of selected aromatic pollutants which are used in daily household products like cosmetics, pharmaceuticals, pesticides etc.

Keywords: Aromatic pollutants, bioremediation, environment.

PP-122

ADVANCEMENTS IN DETERGENT INDUSTRY

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Here we present a brief overview of advancements in detergent industry. Washing machine technology has evolved over years to reduce the energy and water consumption, however, a parallel development of improvement in detergent formulation is the focus of this review. Liquid as well as powder detergents have been formulated based on usage in textile or other surface cleansing purpose. Research advancements in detergent formulation have been targeted towards temperature, fabric quality and time of cleansing in addition to amount of water. A major problem with first generation detergents was harsh conditions ensuring removal of stains were detrimental for the fabric/hands. Seconds generation detergents incorporating enzymes were able to achieve efficient cleansing at the same time protect the fabric quality. However, the remnants of detergent formulations, leading to allergic reactions of skins are a major problem. This problem has been addressed by third generation detergents using safer enzymes from genetically modified organisms. In the end, we present few of the open ended questions that still need to be addressed.

Keywords: Detergent, Enzymes, Formulation, Genetically modified organisms, Technology.

PP-123

EFFICIENCY OF MICROORGANISMS IN UTILIZING NATURAL TANNINS THROUGH FERMENTATION FOR PRODUCTION OF GALLIC ACID

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The plenteous availability of tannin-containing food and agricultural waste paves a way for biotechnological intervention that can yield value-added products for industrial application. Employing tannase producing microbes for tannin degradation and production of gallic acid can be a significant alternative. Gallic acid, a precursor for the commercial production of an antibacterial drug - Trimethoprim received a great deal of attention towards therapeutic and industrial potential. In nature, these compounds are widely distributed in plants and fruits, and thus they are being used as food stuffs, preservatives, etc. directly or indirectly by human community. Various food and agricultural wastes like peel of pomegranate, spent tea powder, Indian blueberry & Indian gooseberry seeds, tamarind seed powder, taro and elephant foot yam were used as a natural substrate for production of gallic acid through fermentation using both bacterial and fungal isolates. These substrates were used individually as well as in combination based on their nutrient composition and tannin content. Promising laboratory isolates belonging to genus *Bacillus* and *Aspergillus* were used for gallic acid production. Among all these substate, Pomegranate peel (PP) resulted in high content of gallic acid that is 0.56 mg/mL and 0.48 mg/ml at 24 h of incubation period by submerged fermentation in non-optimized conditions using fungus *Aspergillus F1* and bacteria *Bacillus B2.7* which was higher as compared to synthetic tannic acid(0.26mg/ml). Production of gallic acid was dependent not only on the type of substrate, but also on the specific ratio in which the substrates were combined and the microbial isolate applied for fermenting the substrate. Amongst various combination tested, maximum gallic acid content (0.56 mg/ml) was found in combination of peel of pomegranate with Indian blueberry seeds in the ratio 1:1. The study reveals that gallic acid production using food and agricultural wastes through microbial fermentation is more advantageous as these tannin rich organic substates are not only economical (to commercially available synthetic tannic acid) but are also giving a higheryield.

Keywords: Gallic acid, Submerged fermentation, Aspergillus, Bacillus, Trimethoprim.

PP-124

CURRENT STATUS AND FUTURE PROSPECTS OF BIOPESTICIDE FORMULATIONS

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Agriculture is adversely affected by pests (insects, weeds and plant pathogens), which cause annual crop losses of up to 45%. Pesticides have led to increased agricultural production and more than 600 kinds of pesticides are used around the world. On the other hand, pesticide poses a serious danger to human health and the environment. Several studies have shown that most of the pesticides currently in use can have adverse effects on human health both due to occupational exposure unsafe management practice and accumulation of these pesticides in several edible products. The negative impact of pesticides on human health, other non-target species and environment is presently becoming a major concern. Therefore, alternatives to chemical crop pesticides are much needed.

Bioformulations include biofertilizers, biopesticides, nutrients (major and minor), hormones, and plant activators which are environmentally friendly and play an important role in sustainable agriculture production. Bioformulations containing natural biocontrol agents are increasingly favoured over chemical pesticides, due to their safety for human beings, ease of handling, non-toxic to non-target organisms. The importance of these bioagents can be surmised by the fact that specific microbes in the vicinity of the plant can help in plant growth promotion and disease control without causing lasting effects in the environment. Moreover, they have a positive impact on microbial populations which are present in the soil. In this study, we focused on bioformulations which are a safe alternative to chemical pesticides, their current status and future prospects of bioformulations.

Keywords: Bioformulations, human health impact, pesticides, biopesticides, biocontrol agents

PP-125

A STUDY ON THE IMPACT OF ABIOTIC STRESS ON PLANT GROWTH

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Stress is defined as the overpowering pressure that affects the normal functions of individual life or the conditions in which plants are prevented from fully expressing their genetic potential for growth, development and reproduction. Due to global warming and climate abnormalities plants encounter an increase number of abiotic and biotic stress combinations which severely affects their growth and yield.Abiotic stresses are one of the major constraints to crop production and food security in Indian agriculture. Stress due to organic and inorganic pollutants are undoubtedly the two most important stresses having huge impact on growth and productivity of the crops. Salinity is known as the major constraint in sustainable food production in many parts of the world. Also, abiotic stressors like heavy metals above the permissible limit, interfere with the functions of many cellular components, thereby altering the normal metabolism causing cellular injuries, and in extreme cases cause death of plant. The abiotic stressors chosen for this experimental study are: Heavy Metals (Cr, Ni), Pesticides (Carbofuran, Carbendizm) and Salt. To achieve project objective the host plant along with replicates have been treated with the aforementioned stressors. Various parameters analyzed include - Chlorophyll content, root architecture, dry weight and protein estimation for every plant individually and combined effect of these stressors reveal how abiotic stressors impact plant growth.

Keywords: Abiotic stress, Indian agriculture, salinity, heavy metals, Carbofuran, and Carbendizm.

PP-126

HARNESSING THE PESTICIDE DEGRADATION POTENTIAL OF *TRICHODERMA* TO ADDRESS RISKS ASSOCIATED WITH CONSUMPTION OF AGRICULTURAL PRODUCTS CONTAINING PESTICIDE RESIDUES

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Pesticides are important agricultural tools to increase crop yield at affordable prices. According to Food and Agriculture Organization around 40 percent of global crops are lost annually due to harmful insect pests and without pesticides these losses could be double. However, unregulated use of pesticides leads to their accumulation in different ecosystems including agricultural soil. Residual pesticide molecules gets sorbed to soil particles and dissolve in water intercalated in soil spaces, which is subsequently taken up by crop plants through capillary action of roots. Maximum residue levels of predominantly used pesticides range between 0.1-2 ppm; foodstuffs containing pesticides above MRL value are unsafe for human consumption. Researchers across the globe are reporting presence of pesticides dangerously close to MRL and even above it. Onsite pesticide degradation using plant growth promoting microorganisms is an innovative and can be amongst safer and economically viable solution for detoxification of agricultural soil.

Present study deals with the unintended dietary exposure to pesticides its possible impact on health and need to identify safe and reliable solutions to counter the accumulation of pesticides in plant products. One representative pesticide each from oxon (Monocrotophos) and thion (Dimethoate) group of organophosphates have been selected for the study. The tested *trichoderma* isolate has LD 50 value of 1900 ppm and 300 ppm for monocrotophos and dimethoate respectively. Extracellular enzymes reported to degrade organophosphate pesticides viz. *alkaline phosphatase*, *oxygenases*, *esterases* and *OP hydrolases* were present in the extracellular soup. FTIR analysis showed the breakage of P-O and P-S bonds present in pesticides. Pesticide degradation analysis using HPLC showed the test isolate was able to degrade 360 ppm of monocrotophos. Results brought to fore that the test isolate can be employed for production of pesticide residue free food crops.

Keywords: LD50, MRL, Monocrotophos, Dimethoate, HPLC, Extracellular enzymes, *Trichoderma*.

PP-127

PRODUCTION AND CHARACTERIZATION OF BACTERIAL CELLULOSE FROM *Acetobacter sp.*

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Cellulose is the world's leading biopolymer and composed of glucose unit of a linear polysaccharide of β (1→4) and is present in plants. Certain bacteria have also been reported to produce cellulose extracellular. Bacterial cellulose is an excellent biomaterial, secreted by bacteria and yields a high purity cellulose network. . Strains belonging to *Komagataeibacter* (*Gluconacetobacter*) genus have been widely used as they have the capacity to produce BC in a wide range of carbon and nitrogen sources. The molecular form of plant cellulose and bacterial cellulose is the same $(C_6H_{10}O_5)_n$, however, they differ in their physical and chemical properties. BC exhibits various excellent physiochemical properties such as BC displays novel physico- chemical properties, that include high crystallinity, nanofibrous network structure, purity, degree of polymerization, higher water absorption and holding capacity, superior tensile strength, good biocompatibility, resistance to chemical and heat shock, selective porosity. The unique properties make this an excellent candidate for applications in fields of food, biotechnology, electronics, textile and paper. Considering all these valuable features, pure BC has certain drawback which prevents its use in some areas. Therefore BC has been developed through several artificial processes to meet the demand and economic value of market thus leading to material with different physical appearance and structural features. The aim of this analysis is to study the effect of media components and culture conditions on bacterial cellulose production from *Acetobacter sp.* and its physiochemical characterization. The results will be presented and discussed.

Keywords: Bacterial cellulose, *Acetobacter*, Biomaterial, biocompatible, Biodegradable

PP-128

FUSARIUM OXYSPORUM R1 INVASION DURING CORM ROT DISEASE IN *CROCUS SATIVUS* L. (SAFFRON)

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Crocus sativus L., commonly known as saffron, is a corm bearing plant, wherein corm is a unit of reproduction and storage. Saffron suffers from corm rot disease caused by, *Fusarium oxysporum*, resulting in severe yield loss in several parts of the world. In this study, previously isolated pathogenic F. *oxysporum* R1 (referred to as Fox R1 hereafter) has been identified as f.sp. *iridacearum* race 4 by polyphasic characterization. The mechanism of infection of Fox in saffron is lacking and to study it in real time, Fox R1was tagged with the *green fluorescent protein* (*EGFP*) gene tag. Tagged Fox R1 was used to check pathogen progression and colonization inside corms and roots of saffron. It appears that Fox R1 infects and colonizes, both roots and corms of saffron but injury is must, as no colonization was seen in uninjured plants under similar conditions. Simultaneously the expression of fungal virulence genes was analyzed by fungal transcriptome sequencing in the disease progression. Twenty fungal genes that have been reported to be important for pathogenicity of Fox R1 were identified and their regulation analysed. The virulence genes such as *PacC*, *FGA2*, *SIX3*, *ARG1*, *FOW2*, *FMK1*, *NIRK* and *RENSA* play important role in pathogenicity and conidiation during the pathogen establishment inside the corm were up regulated during infection. This is the first report pathogenesis in saffron - *Fusarium* pathosystem and for the first time suggests corm as a site of invasion by FoX.

Keywords: Pathogenic fungi, *Crocus sativus*, *Fusariumoxyspoum*, ATMT, Transcriptome, Plant-microbe interaction, live cell imaging.

PP-129

STUDY OF THE ROLE OF EXOGENOUS APPLICATION OF SALICYLIC ACID DURING SALT AND OSMOTIC STRESS IN *EUPHORBIA HIRTA*.

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Salt and osmotic stress is one of the important global problems that negatively affects crop productivity. Salinity impairs plant growth and development via water stress,cytotoxicity due to excessive uptake of ions such as sodium (Na^+) and chloride (Cl^-) that results in nutritional imbalance. Additionally, salinity is typically accompanied by oxidative stress due to generation of Reactive Oxygen Species (ROS). Salicylic Acid has been shown to alleviate the adverse effects of different environmental stresses in plants.

The present study has been designed to investigate the effects of exogenous application of salicylic acid in *Euphorbia hirta* under salinity and osmotic stress. Plant samples were grown under saline and osmotic conditions. The effect of salicylic acid on the seedlings of *Euphorbia hirta* were observed by analyzing physiological changes and biochemical tests. Stress tolerance and physiological conditions were evaluated by proline estimation experiments, chlorophyll content estimation, protein isolation and an antioxidant defense system represented by Catalase (CAT), Superoxide dimutase (SOD), and Peroxidase (APOX and GPOX). Varying levels of NaCl (25mM, 50mM, 100mM) and of PEG (5% & 10%) were examined with and without 100µM SA. From the study it was observed that SA improved Growth rate of plant seedlings under stress and increased relative chlorophyll content, reduced salt stress injuries by inhibiting increases in proline content, and the antioxidant enzymeactivity.

Keywords: Morphological Parameters, Physiological Parameters, Salinity, Salicylic Acid, Euphorbiahirta.

PP-130

A REVIEW ON PLANTS AS AN ANTIBACTERIAL AGENT

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With the ever expansion and evolution of microbial strains, the need for new pharmaceuticals remedies is urgently required. Due to continuous exposure with standard antibacterial agents, new strains have emerged with good amount of resistance, due to which pharmaceutical industries are facing challenges to tackle this situation. A shift in interest is seen in the past decade, from allopathic medicines or man-made remedies to natural remedies. Plant based drugs are something world is looking into as natural remedies. Antimicrobial resistance is the phenomenon causing challenge in new drug formation via conventional methods. Plants are capable of developing immunity against microbes much faster than animals that is why they have been survivors for a significantly larger time scale than humans have survived. Natural products offer less side-effect with comparable results to the conventional antibacterial agents. Natural phytochemicals produced by different plants gives the hope to counter ever growing problem of microbial infections. Each and every plant has a different composition of phytochemicals which in turn gives a remedy to suppress a wide range of microbial strains. Most commonly studies microbes that showed inhibitory response to the plant compounds include Escherichia coli, Staphylococcus sp., Klebsiella, Streptococcus sp., etc. Here, an account of various plants and their characteristic compounds is given which are proven to successfully suppress the infections and are potential targets for pharmaceutical industry.

Keywords: Natural product, plants, phytochemicals, bacteria, antimicrobial.

PP-131

A STUDY ON BIOTRANSFORMATION OF VINBLASTINE AND AJMALICINE USING MICROBES ISOLATED FROM SOILS

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Vinblastine and vincristine are well known as potent anticancer compounds whereas ajmalicine and serpentine is used in the treatment of circulatory diseases, obstruction of normal cerebral blood flow and hypersensitivity. These alkaloids are mainly produced by *Catharanthus roseus* and *Rauwolfia serpentina*, however their yield is very poor. Microbial biotransformation processes offer great promises for improvement of yield of valuable secondary metabolites. Here, we carried out biotransformation of vinblastine and ajmalicine into vincristine and serpentine using microorganisms isolated from soil samples. A total 38 unknown bacteria were isolated from sixteen soil samples collected from specific locations. Toxicity assay was performed to check the tolerance of bacteria against vinblastine and ajmalicine using different concentrations 25 to 100 µL. Toxicity assay was also conducted for known bacteria *Pseudomonas putida*, *P. fluorescens* and fungi *Fusarium*, *Aspergillus*, *Alternaria brassicicola*. Results indicated that all bacteria were found to be resistant to vinblastine and ajmalicine. Biotransformation assay was conducted using broth dilution method in a flask containing 50 ml liquid nutrient media, 25 µL vinblastine/ and ajmalicine and 25 µL bacterial/and fungal cultures for a chase period from 3 to 7 days. Products of biotransformation were isolated using methanol at regular intervals of 24 h and subjected to thin layer chromatography and spectrophotometric analyses. Results revealed that two out of eight known bacteria and three known fungi showed capabilities to transform vinblastine and ajmalicine into vincristine, serpentine and other unknown products. Hence, the biotransformation system developed here has potential of transformation of two most valuablealkaloids.

Keywords: Vinblastine, Ajmalicine, Vincristine, Serpentine, Biotransformation, toxicity assay.

PP-132

ALPHA AMYLASE ENZYME PRODUCTION BY NORMAL FLORA OF HUMAN BODY

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The purpose of the present was to investigate the amylase enzyme production from normal flora of Human body. Human belly button, ear, nasal and armpits were use as source to observe the microbial load. Biochemical test, molecular characterization (16S rRNA Gene sequencing), phylogentics analysis were used to determine the gram positive and gram negative bacteria of normal flora of human. For screening of amylase enzyme producing normal flora, starch hydrolysis test, enzyme assay, optimum temperature and optimum pH were performed. Isolates of Enterobacter sp., Bacillus sp. were found to be prominent normal flora present in human belly button, ear, nasal and armpits that were biochemically and molecularly characterized. Their 16S rRNA gene sequences were submitted to NCBI Gene Bank and accession number were listed down. Only Enterobacter hormaechei (MK503501 & MK503447), Bacillus mycoides (MK503615) and Bacillus subtilis (MK503496) has shown enzyme production and their optimum pH & temperature were studied. 25℃ was found to be optimum temperature of .Enterobacter hormaechei (MK503501) and Bacillus mycoides (MK503615), whereas Enterobacter hormaechei (MK503447) and Bacillus subtilis (MK503496) has shown 50℃ optimum temperature, respectively. As far as optimum pH wad concerned, specific enzyme activity was found to be present in between pH 5 to 7. Authors would like to suggest using normal flora of human body for the industrial purposes and further to check the pharmaceutical properties like antioxidant and bacteriocin production for future purposes. Keywords: Normal flora, amylase enzyme production, 16S rRNA Gene sequencing, Enterobacter sp. and Bacillus sp.

PP-133

APPLICATION OF BIO-GENIC SILICA NANOPARTICLES IN AGRICULTURE CROP MANAGEMENT

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The excess use of hazardous pesticide has led to pollution and serious health issue. Random dumping and burning of agricultural waste cause environmental pollution. Agricultural wastes were investigated for potential use for synthesis of silica nanoparticles. The nano-formulation from agro-waste may overcome the problems of chemical pesticides application. This study explores the two directions in which nanoparticles can be utilized in agriculture field (As an antifungal, antibacterial, insecticides agent, and fertilizer) and other we are focusing on agriculture waste management. In this study, we describe synthesis and evaluation of anti-phytopathogenic activity of bio-silica nanoparticles against fungus, bacteria and insects. There is a growing interest in the development of alternative strategies in plant disease management to reduce dependency on synthetic chemicals. The silica nanoparticles have broad spectrum to reduce various fungal, bacterial and insect diseases in Legumes, Taramira, Tomato, Sweet potato, Banana and other economic plants. The development of nano-fungicides could open up novel application in plant disease management.

Keywords: Nanoparticles, Anti-phytopathogenic, Bio-genic, Pesticide.

PP-134

APPROACHES OF ARTIFICIAL INTELLIGENCE TO MODIFY THE CRISPR-CAS9 TECHNIQUE

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Genome editing is a technology which gives scientists the ability to change an organism's DNA by altering, removing or adding the genetic material at a particular location in the genome. Crispr-cas9 is the well-known approach of this technique. Crispr's are specialized stretches of DNA and cas-9 is an enzyme that acts like a pair of molecular scissors. This technique is still the matter of research for the scientist's, as this technique causes some unwanted mutations. This problem can be solved by merging crispr cas9 technique with the artificial intelligence. Artifical intelligence is a branch of computer science which deal with the development of intelligent machine and software. This paper focuses on the fact that artificial intelligences can be used to modify the crispr cas-9 technique and it also creates a new relationship between the two fastest growing technologies that can be a boon to the science arena.

Keyword: Genome editing, crispr-cas9, Artificial intelligence, DNA.

PP-135

BEAUVERIA BASSIANA AS A POTENT BIOPESTICIDE FOR CONTROL OF LOCUST: A REVIEW

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*Beauveria bassiana*can be used as a biological insecticide to control a number of pests such as locust, whiteflies, termites and other insects. Its use in the control of mosquitoes which transmit malaria is under investigation. It is spread on affected crops as an emulsified suspension. As a species, *Beauveria bassiana* parasitizes are highly wide range of arthropod hosts. However different strains vary in their host ranges, some having narrow ranges, like strain Bba 5653 which is very harmful to the larva of locust. Beauveria bassianais a cosmopolitan fungus that grows naturally in soil and act as a parasite on numerous species of arthropods, which causes White Muscardinae disease, and thus it belong to entomopathogenic fungi. This fungus is cultured in laboratories under in-vitro conditions and spores are made from this fungus, which are sprayed in crop fields of rice, maize etc. When the microscopic spores of the fungus acquire contact with the body of an arthropod host, penetrate the cuticle after germinating, and grow inside, killing the insects within few days. This is followed by emergence of a white mold from the cadaver which produces new spores. This paper discusses the role of *Beauveria bassiana* as a potent biopesticide.

Keywords:*Beauveria bassiana*, Muscardinae disease, Entomopathogenic fungi, Bba 5653, cadaver.

PP-136

BIOFERTILIZER: A REVIEW

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Plants necessitate various vital nutrients like phosphorous, nitrogen, potassium, etc. for their growth and development. Current soil management policies are mostly dependent on synthetic fertilizers, and these synthetic fertilizers causes severe environmental problems. To overcome this problem concept of biofertilizers has been developed. Exploitation of beneficial microbes as bio-fertilizers has become of supreme importance in agricultural sector due to their potential role in food safety and sustainable crop production. Utilization of beneficial microbes as biofertilizers has become crucial in agriculture sector for soil fertility, food safety and sustainable crop production. Biofertilizers are an outstanding propensity to lessen the need of chemical fertilizers. This eco-friendly approach makes use of plant-growth promoting rhizobacteria like *Rhizobium*, *Acetobacter* and Phosphate-solubilizing bacteria such as *Pseudomonassp*. having the ability of fixing atmospheric nitrogen and solubilizing phosphorous in soil. Therefore, it leads to reduction of both inorganic sources as well as environmental pollution. Utilization of bio-fertilizers leads to enhanced nutrients and water uptake. It increases crop yield, stimulates plant growth and can provide protection against drought and some soil-borne diseases. They are even more economical due to lower market prices. In this review we discuss the details of biofertilizers for the benefit of crop productivity and future prospective of it.

Keywords: Soil productivity, Biofertilizer, Bacteria, Growth.

PP-137

TREATMENT OF WASTEWATER THROUGH BIOREMEDIATION: A REVIEW

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Urbanization, industrialization and other human activities have resulted in the production of myriad of pollutants in the water bodies. Several techniques have been adopted for efficient treatment, but have failed due to various reasons such as poor efficiency, incomplete mineralization and high operating cost. Therefore, an alternative method to solve this problem is required. Bioremediation is an emerging and effective tool for the treatment of environmental pollutants. It is a modern technology, involving organic wastes which are biologically treated, in order to give rise to less toxic contaminants. Also includes use of living organisms to detoxify hazardous substances. Bioremediation strategies consist of in- situ and ex-situ techniques. It involves capability to clear carbon-rich wastes with the help of suitable bacteria, bacterial nitrification to eliminate ammonia from aquaculture, breaking down hydrogen sulphide by photosynthetic benthic bacteria and degradation of petroleum hydrocarbons by oil degrading microbes. Since, it is a natural process, it is acceptable widely as a waste treatment method. It is very useful for complete disintegration of contaminants. In this review paper bioremediation process for different waste waters has been discussed. Further the current challenges related to the bioremediation and its solution has also been discussed.

Keywords: wastewater, heavy metals, pollutants, treatment, bioremediation

PP-138

BIOSAFETY ISSUES ASSOCIATED WITH BIOPESTICIDES: A REVIEW OF REGULATIONS

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The microbial biopesticide market constitutes approximately one ninetieth of total biopesticides and there's ample scope for more development in agriculture and public health sector even though there are multiple challenges. The effort of the global agencies such as the International Organization For Biological Control (IOBC),European And Mediterranean Plant Protection Organization (EPPO) and Organization For Economic And Cooperative Development (OECD) have provided some flexibility to biopesticides regulations, but in comparison to chemical pesticides, which have firm market and established non over-lapping laws, biopesticides lacks behind. A shift in the legal framework from a focus on chemical substances through biological agents would also compliment the countries environmental and sustainability goals. Due attention is needed regarding Azotobacter, Azolla, Acetobacter, Trichoderma, Bacillus thuriengensis and Azospirillum and their applications in various cereals and vegetable crops. In the present article, various regulations associated with biosafety of biopesticides have been reviewed.

Keywords: Microbial pesticides, Biosafety, Regulations, Chrysoperlazastrowisillemi, chemical pesticides, Azospirillium.

PP-139

CARBAPENEM-RESISTANT ENTEROBACTERIACEAE (CRE) IN ENVIRONMENT

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Carbapenems are drugs that are used to treat multi-drug resistant infections. Development of Carbapenem-resistant Enterobacteriaceae (CRE) is an alarming situation. Carbapenemase genes have been reported in the environment on almost every country of the globe. Hospital and municipal wastewater, drinking water, natural waterways, sediments, recreational waters, companion animals, wildlife, agricultural environments, food animals, and retail food products are identified as current reservoirs of carbapenemase-producing bacteria and genes. Environmental reservoirs of antibiotic resistance (AR) are a growing concern that are gathering more attention as potential sources for human infection. Hospital wastewater entering into the canals and water bodies are major source of dissemination of CRE. Extensive surveillance of these water bodies is necessary to gather data for the determining the sites of CRE infection. We isolated 100 antibiotic resistant strains from drains spanning the Delhi-National Capital Region using common antibiotics. 45 high resistant strains were selected on basis of MAR index and tested for susceptibility to 20 antibiotics including Four Carbapenems. Analysis, location and class wise, revealed that Cephalosporins have the widest spread of resistance against it with an average Resistance of 60 percent, while least resistance was found against Aminoglycosides (40 percent) and then Carbapenems (41 percent). Out of the five sites screened (Kalindi Kunj, Hindon , Canal, INA, and Karnal Bypass, Nahjafgarh), Karnal Bypass registered the Highest MAR Values (0.86). Out of 181 strains screened, 17 have a MAR of more than 0.8, with five strains having MAR =1 (for 20 antibiotics screened). Waste water released from hospitals pose greater risk to the public as CRE are released into the environment. This brings the urgency of developing methods to fight spread Antibiotic resistance in the environment.

Keywords: Carbapenem Resisitance, Enterobactereaceae,Environment.

PP-140

DIVERSITY OF COTTON LEAF CURL VIRUS INFECTING COTTON IN INDIA

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Cotton (*Gossypium hirsutum*) one of the important cash crops of India is infected by several pathogens and pests, and among them Cotton leaf curl disease (CLCuD) is the major causes of loss of cotton cultivation. CLCuD which is caused by cotton leaf curl virus (CLCuV) and associated satellites is a devastating disease. The symptoms associated with this disease includes small vein thickening on young leaves of plants, upward or downward leaf curling followed by formation of cup shaped leaf. CLCuV is a member of genus begomovirus (family Germinivirdae), which is characterized by twin quasi-isometric particles on their genome arrangement. Every year, it causes tremendous loss to the cotton growing areas in India, ranges from 30% to 100%. A bioinformatics based comparative study is required considering complete nucleotide sequence to observe the similarity and dissimilarity between the different isolates of cotton leaf curl virus that has infected cotton plant in various region of India. This will help in characterization of Indian isolates and their relation with other species reported from Indian subcontinent. The present study will help in the development of robust strategy against this disease.

Keywords: Cotton Leaf Curling Disease (CLCuD), Cotton Leaf Curl virus (CLCuV) Begomovirus.

PP-141

FUNGAL MEDIATED BIOSYNTHESIS OF SILVER NANOPARTICLES

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Nanoparticles are serving as the fundamental building blocks of nanotechnology (Vahabi et al., 2011). Because of their wide application in numerous areas such as electronics, catalysis, chemistry, energy, and medicine, the commercial requirement of nanoparticles is rising. The nanoparticles synthesized by means of biogenic approach i.e. produced by living organism's shows good polydispersity, dimensions and stability. The biological methods of nanoparticles synthesis would assist to remove ruthless processing conditions, by allowing the synthesis at physiological pH, temperature, pressure, and at the same time, at negligible cost. Huge number of microorganisms have been found competent of synthesizing inorganic nanoparticles composite, either intra or extracellularly. Due to implausible properties, nanoparticles have turned into noteworthy in many fields in the recent years, such as energy, health care, environment, agriculture, etc. Filamentous fungi are more advantageous over the bacteria and algae because fungi having fungal mycelial mesh which can withstand flow pressure and agitation and other conditions in the bioreactors or other chambers. The biological process more advantages which include filamentous fungal tolerance towards metals, their high binding capacity and intracellular uptake of metals. The mass production of fungi is easy for synthesis of nanoparticles. The present investigation focused on isolating, screening, and identifying industrially relevant thermophilic producers of silver nanoparticles from various locations in the Warangal district, Telangana, India.

Keywords: Nano particles, Filamentous fungi, Thermophilic. Silver particles.

PP-142

GREEN PESTICIDES: ESSENTIAL OILS AS BIOPESTICIDES IN PEST MANAGEMENT

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The long-term implementations of synthetic insecticides have resulted in accumulations of residues in different environmental components. They have adverse effects on non-target organisms, eco-systems and human health. Synthetic pesticides which we use in our daily life kills many useful organisms also. Thus bio-insecticides "Green Pesticides" have proposed to be an exciting alternative to synthetic insecticides in agriculture and public health sector. Therefore, the study presented here focuses on prospects of "Essential Oils" as bio-insecticides for insect pest management. In the last decade, much of the research work was done in the area of estimating the botanical insecticides (e.g., EOs) for pest management in both developing and developed countries. The essential oils are a complex of chemical compounds with multiple modes of action that enhances their activity due to the synergistic action between constituents. EO-based insecticides are very important for control stored insects because they are against a variety of insects, are fast penetrating and leave no toxic residues in the treated products. Due to their volatility in nature, essential oils are used as a fumigant against agriculture and stores food insects. The formulation of making nanomedicine rectify problems (e.g.-volatility, oxidation) of EO based insecticides and offer several advantages. They are well-suited with biological control programs and indigenous natural enemies of pests.

Keywords: Nanomedicine, Indigenous, Botanical insecticides, Synergistic, Fumigant.

PP-143

HEAVY METAL DEGRADATION FROM WASTEWATER USING MICROBES: A REVIEW

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Poor quality of water is leading to emergence of new diseases and increased health concerns. In-creasing environmental pollution is one of the major concerns for humans as it is not only affecting our health but also economy and sustainable development. Environmental pollution consists of soil pollution, air pollution and water pollution. Due to rapid industrialisation huge amount of contami- nated water has been discharge to the rivers which leads to cause water pollution. This discharged water contains various pollutants like antibiotics, xenobiotics, heavy metals, etc. consumption of water containing heavy metals cause various health problems. Water pollution can be reduced by controlling the wastewater. Traditional technologies of wastewater treatment have its own demerits and problems. Due to this reason an alternative method to treat wastewater successfully is required. Utilization of microbes for the treatment of wastewater is gaining more importance due to many factors. Microorganisms are small, diverse, metabolically strong, easily available, adaptable to dif- ferent conditions and surroundings, almost able to use all the natural substances in nature, is an ide- al tool for dealing with this problem. Microbes can also be manipulated under various conditions to control environmental pollution. This review discusses the various microbial methods, mechanisms of wastewater treatment and role of different microbes in the elimination of heavy metals. It also provides details about recent developments and challenges in the process.

Keywords: wastewater, heavy metals, degradation, microbes, strategies.

PP-144

INVESTIGATING THE STABILITY OF ABUNDANT FLAVONOIDS AND ANTIOXIDANT ACTIVITY IN PROCESSED V/S UNPROCESSED JUICES OVER A TARGET STORAGE PERIOD

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For decades, citrus juices have been the topic of research for the requisite properties that make them industrially important. In this cutting edge of advancements, researchers delve into the study of processing on the juices. The study focuses on comparing the two major properties of processed and unprocessed citrus juices like flavonoid content and antioxidant property. Citrus sinensis (Orange), Citrus limetta (Sweet lime) and Citrus limon (Lemon) chosen for its high availability. GC-MS method of analysis assigned to estimate total flavonoid in crude methanolic extract of juices. Lastly executed, the antioxidant property by FRAP activity, Catalase activity, and Peroxidase assay. GC-MS result declared that processed and unprocessed juice of the orange, sweet lime and lemon contained 18 and 15 compounds, 18 and 22 compounds also 17 and 34 compounds of flavonoid respectively. Abundantly obtained flavonoids are 5-Hydroxymethylfurfural (59.02% to 46.92% and 66.96% to 42.14%) in orange and sweet lime along with 4-Ethoxycarbonyl-2-methyl-2-oxazoline (48.78%) and Citric acid (1.60%) in lemon juices. Likewise, the conclusion from the antioxidant property was that the unprocessed juices are better antioxidants than processed ones. Thus, the uncovering of this study furnishes touchstone data for further commercial programs.

Keywords: Processed citrus juices, Unprocessed citrus juices, Methanolic extracts, Flavonoids, GC-MS, Antioxidant activity.

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ISOLATION OF CELLULOSE-DEGRADING ENDOPHYTE FROM *CAPSICUM CHINENSE* AND DETERMINATION OF ITS CELLULOLYTIC POTENTIAL

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Plants do not live alone as single entities but closely associate with the microorganisms present in their neighborhood, and especially with those living internally. Endophytes are a group of microorganisms that grow inside the tissues of plants. Endophytic bacteria produce different bioactive compounds, such as alkaloids, diterpenes, flavonoids and isoflavonoids, to increase the resistance to biotic and abiotic stresses of their host plants. Certain endophytic bacteria promote the accumulation of some secondary metabolites (including important medicinal components or drugs) originally produced by plants.

Capsicum chinense is a well-known medicinal plant, which is used in traditional medication as an excellent source for Ascorbic acid (Vitamin C), carotenoid (Provitamin A), tocopherols (Vitamin E), flavonoids and capsaicinoids. To characterize the endophytic population in the targeted plant, different accessions of *C chinense* plant were procured from different agro-climatic zones of North East Region of India. Bacterial endophytes were isolated by using standard protocols. After isolation of the endophytes, biochemical identification study was performed using standard key. Secondary metabolites of these bacterial species were studied for their economic importance. One isolate of cellulose-degrading bacteria (CDB) was isolated from the roots of *C. chinense* from Assam. The test was to indicate the cellulase activity of the organism, diameter of clear zone around the colony, and hydrolytic value on cellulose Congo Red agar media. The enzyme assays for filter paper cellulase (FPC), and cellulase (endoglucanase), were examined by methods recommended by the International Union of Pure and Applied Chemistry (IUPAC).

Keywords: *Capsicum chinense,* Bacterial Endophytes, Secondary metabolites.

PP-146

ISOLATION, IDENTIFICATION OF HALOPHILE FROM SAMBHAR LAKE JAIPUR. AND ANTIMICROBIAL ACTIVITY OF THEIR METABOLITES AGAINST BACTERIAL AND FUNGAL STRAIN

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Bacteria like Extremophile, Archaea, Mesophylls play Important Role in environment. One of them are Halophiles also called salt lovers play important role in day to day life. They are mainly found on high salt concentration area like Salt Lake, sea etc. They have some Application like There Pigment use in Colouring Agent in Food, Metabolites use in Food Preservation, and their Metabolites are also use in making some type of Antimicrobial Drugs. In Previous Study Water Sample Was Collected from Sambhar Lake and Isolate of Halophiles Using Halophilic Agar with 20% Salt Concentration was Done. 16srRNA Sequencing was Perform for Identification of Microbe Results Shown That the Isolate was *Marinococcus tarijensis*. In Addition, Some Activity like Growth Curve, Antibiotic Susceptibility Test, Salt Tolerance Test was Performed. Also, Metabolites was Extracted using different Solvent (Methanol, Ethyl Acetate, Petroleum Ether, Chloroform) for check there Antimicrobial Activity. The solvent Present in Metabolite was Dried in Hot Air Oven at 37º Celsius and dry palate was mix with DMSO. Using Metabolite Antimicrobial Activity was check Against Different Bacterial Strain (E. coli, s. Aureus, Bacillus, Pseudomonas) and Fungal Strain (Niger, Anthrax, Tissera, Candida) by Well Diffusion Method. The Result of Antimicrobial Activity Show that No Inhibition Zone that Mean there is No Any Agent Present in Metabolites of Halophilic that is Further use in Making Antimicrobial Drugs.

Keyword: Bacteria, fungus, Halophile, Halophilic agar, Antimicrobial Activity, 16srRNA sequencing, Metabolites.

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ISOLATION, PURIFICATION, CHARACTERIZATION AND QUANTIFICATION OF THE LIPASE PRODUCING MICROBES FROM VARIOUS OIL CONTAMINATED SITES

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Around 75% of global demand of industrial enzymes is related to Lipases. Today, nearly 12000 enzymes are known, and of these, about 480 are in commercial use. The majority of the industrial enzymes have been traced to have microbial origin. Due to sophistications in understanding of production biochemistry, the fermentation processes, and downstream processing technology, large number of microbial enzymes can be produced at an accelerated and economical pace.Also, advances in methods of using enzymes have greatly expanded demand. Furthermore, because of wide & variant microbial transformations that enzymes can catalyze, the number of enzymes applied in Biotechnology Industries continues to grow at an exponential rate. Lipases (triacylglycerol acylhydrolases, E.C. 3.1.1.3) are ubiquitous enzymes of great physiological significance and industrial potential. Lipases catalyze the hydrolysis of triacylglycerols to glycerol and free fatty acids. In contrast to esterases, lipases are activated only when adsorbed to an oil–water interface and do not hydrolyze dissolved substrates in the bulk fluid. A true lipase will split emulsified esters of glycerine and longchain fatty acids such as triolein and tripalmitin. Hydrolysis of fats and oils, modification of fats, flavour enhancement in food processing, resolution of racemic mixtures and chemical analyses However, the major contributions of microbial lipases are in the detergent formulations. Due to their vital role, Lipases remain as a key subject of focus in many research projects. In our current research work, we have isolated and identified lipase producing microbes from various oil contaminated soils, namely the soil near mustard oil industry, petrol pumps and hotels in Vilaspur area of Uttar Pradesh. After isolation of microbes from soil, biochemical and morphological studies were carried to identify the microbes present in these samples followed by confirmation of lipase producing microbes using TBA test and blue yellow screening. Further, different oils-Olive oil, Mustard oil, Groundnut oil, Rice Bran oil, Soyabean oil, Canola oil, Coconut oil etc were used as a substrate and were incubated for different incubation times after inoculation with lipase producing microbes from these soils. Titration was done to quantify the lipase activity at different incubation time on varying oils substrate. One unit of lipase activity is defined as the amount of required enzyme to release 1micro mol of fatty acids from fat which is present in different type of oils. To quantify the effect of environmental parameters on lipase activity, following factors- pH, temperature, and concentration of oil was varied. Our study has led to significant comparative conclusions on relationship between lipase activity and concentration of oil and type of oil used as a substrate and incubation time for which the medium containing these oils has been incubated.

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LACTIC ACID PRODUCTION BY LACTOBACILLUS SP. ISOLATED FROM FERMENTED IDLI BATTER

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Idli is one of the most popular fermented food products in India. Idli batter was used as a source for isolation of Lactobacillus. Lactobacillus is a gram-positive, rod shaped, non-motile, non-spore forming bacteria with absence of catalase. Bacterial microflora varies successively as fermentation proceeds. In this study, pH, cell growth and lactic acid production were investigated using MRS medium containing 2% glucose with Lactobacillus brevis isolated from fermented idli batter. Cell count increased with time while pH decreased. Viable count increased from 103 to 1013 cells/ml. Stationary phase was reached at 18 hours and lasted upto 24 hours. The pH decreased from 6.5 to 4.5 by the end of 48 hours. Lactic acid was increased from 0 to 21 g/L after 48 hours. This result was compared with standard Lactobacillus plantarum MTCC 1407 strain. Result indicates that probably all the titratable acidity is due to lactic acid.

Keywords: Lactic acid fermentation, Lactobacillus, Glucose, Idli batter

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MICROBES IN THE FIELD OF PHARAMACEUTICALS

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Humans are 'employing' microorganisms for hundreds of years till date and the use of biotechnology has helped the fast- developing business to use the microorganisms specially within the field of prescribed drugs and medical business which led to great discoveries, starting from antibiotics, vaccines to medically used devices. Though microbes are one of the core causes of any infectious diseases, they can also be of great help to fight the diseases. Understanding the principles of biological science associate degree of human cell mechanisms permits pharmacists to get antimicrobial medicine that will stop an escalating variety of communicable diseases. Pharmacists and microbiologists work synergistically to confirm that drug therapies target the expedient microbes while not harming its human host. The most vital contribution of biological science to the pharmaceutical business is the development of antibiotics, that were originally developed from microbe metabolism. The aim of this research is to understand the novel methods in which microorganisms can be used in medicine. Investigations led to the knowledge how bacteria, fungi, and viruses are used to treat ailments that were once thought to be untreatable. The advanced ways that microbes are used lead one to believe that the ailments that presently damage the human population can sooner or later be preventable.

Keywords: Micro-organisms, Pharmaceuticals, Antibiotics, Vaccines.

PP-150

PRESENCE OF MICROORGANISMS IN INDOOR ENVIRONMENTS

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There is the presence of a vast indoor microbiome containing several species of microorganisms (where some may by potentially pathogenic). It has been found that exposure to them has a strong influence on human health. Thus, it is important to study and understand the causal links existing between microbial exposures in indoor environments and their health impacts. The main aim of this experiment was to determine the populations of gram positive and gram-negative bacteria present in different indoor environments (i.e., schools/colleges, elevators etc.). Samples were collected from elevator buttons from several locations and confirmatory tests (gram staining, growth on selective media, carbohydrate tests, catalase tests etc.) were performed to identify microorganisms found and analyse their biochemical characteristics. The population of microorganisms found was also determined by colony counting technique and was recorded in cfu/cm2 . Colonies for both gram positive and gram-negative bacteria were obtained. A larger number of gram-positive colonies were found in samples collected from elevators which were found to be used by people more frequently.

Keywords: Indoor microbiome, Human health, Confirmatory tests, Microbial exposure.

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SEAWEEDS AS BIOPESTICIDE: A REVIEW

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With the rising popularity of organic farming, due to adverse impact of chemicals, the seaweed fertilizer trade is growing speedily worldwide. Seaweeds act as natural plant growth stimulator and modify the plants to resist drought, sickness or frost. Root diseases of tomato and helianthus caused by root rotting fungi, Fusarium spp., Rhizoctonia solani and Macrophomina phaseolina, and root knot roundworm, Meloidogyne spp., are the most important constraints in tomato and sunflower production. In our studies, ethanol and water extracts of many seaweeds showed important nematicidal activity against Meloidogyne javanica. In this study, effectiveness of three seaweeds Spatoglossum variabile, Melanothamnus afaqhusainii and Halimeda tuna was compared with a fungicide Topsin-M and a nematicide carbofuran both in screen house and under field condition. Seaweed and pesticides showed more or similar suppressive effect on root pathogens of tomato and sunflower by reducing fungal root infection and nematode's galls on roots and nematode's penetration in roots. However, mixed application of S. variabile with carbofuran caused most reduction in nematode's penetration in roots and produced greater fresh shoot weight, root length and most yield of tomato under field condition. Seaweeds offer a non-chemical means of disease control, which would also protect our environment from the use of hazardous chemical.

Keywords: Biopesticide, Seaweeds, Growth stimulator, Root diseases, S. variabile, Carbofuran.

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STUDY OF THE ROLE OF EXOGENOUS APPLICATION OF SALICYLIC ACID DURING SALT AND OSMOTIC STRESS IN *EUPHORBIA HIRTA*.

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Salt and osmotic stress is one of the important global problems that negatively affects crop productivity. Salinity impairs plant growth and development via water stress,cytotoxicity due to excessive uptake of ions such as sodium (Na^+) and chloride (Cl^-) that results in nutritional imbalance. Additionally, salinity is typically accompanied by oxidative stress due to generation of Reactive Oxygen Species (ROS). Salicylic Acid has been shown to alleviate the adverse effects of different environmental stresses in plants.

The present study has been designed to investigate the effects of exogenous application of salicylic acid in *Euphorbia hirta* under salinity and osmotic stress. Plant samples were grown under saline and osmotic conditions. The effect of salicylic acid on the seedlings of *Euphorbia hirta* were observed by analyzing physiological changes and biochemical tests. Stress tolerance and physiological conditions were evaluated by proline estimation experiments, chlorophyll content estimation, protein isolation and an antioxidant defense system represented by Catalase (CAT), Superoxide dimutase (SOD), and Peroxidase (APOX and GPOX). Varying levels of NaCl (25mM, 50mM, 100mM) and of PEG (5% & 10%) were examined with and without 100µM SA. From the study it was observed that SA improved Growth rate of plant seedlings under stress and increased relative chlorophyll content, reduced salt stress injuries by inhibiting increases in proline content, and the antioxidant enzymeactivity.

Keywords: Morphological Parameters, Physiological Parameters, Salinity, Salicylic Acid, Euphorbiahirta.

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SYNBIOTICS: PROPERTIES, ACTIONS AND COMBINATIONS (A REVIEW)

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The human gastrointestinal tract houses a huge number of micro-organisms, termed as "micro-biota". *Actinobacteria, Proteobacteria, Firmicutes* and *Bacteroidetes* and the two bacterial phyla *Firmicutes* and *Bacteriodetes* gives 90% of total population of the gut "micro -biota". Even a minor variation in the population affect the human health. Probiotics often called good and helpful bacteria like *Lactobaciluss, Bifidobacterium, and Saccharomyces* which promote gut health. Oligosaccharides (non-digestible dietary fibres) for example fructo-oligosaccharides and inulin stimulate the activity of the health promoting bacteria selectively, hence they give some "Synergistic" effects. Since 1995, there has been a lot of growth in the field of "Probiotic" and "Prebiotic" as well. With the consideration of the several performed experiments and their results, "Synbiotics" and its potential has been a topic of a discussion. Also, both constituents play pioneer role in epithelial barrier enhancement, immune system modulation and in production of feed for animals and aquaculture. Although some major agencies do not confirm the existence of these kind of effects, as latest reports say. But globally, the research work on this subject is going on. This article gives an overview about the historical importance, mechanism of action and different combinations of "Probiotics" and "Prebiotics", showing the "Synergistic" effects.

Keywords: Probiotics, Prebiotics, Synbiotics, Synergistic Effects, Micro-biota and Gastrointestinal tract.

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THE USAGE PATTERNS AND KEY APPLICATIONS OF MICROREMEDIATION IN MICROBIAL TECHNOLOGY FOR ENVIRONMENT DETOXIFICATION AND DEVELOPMENT

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Now days with the adoption and integration of enormous products in the agriculture as well as related segments, the environment is getting adulterated and contaminated. These are required to be processed and should be avoided so that the overall ecological equilibrium can be maintained. For implementation of this, the microremediation that also refers to mycoremediation is integrated to detoxify the environment and assorted elements with the use of fungi. It is basically the bioremediation-based approach that is used for decontamination of soil, agriculture land as well as enormous other key points of environment. The fungal types which are involved in this process integrates the micro fungi, macro fungi with the association of substractors and high-performance detoxifying perspectives. Mycoremediation is widely used as the key tool for the overall sustainable development and management. The uses and implementation patterns of such approaches are adopted for the refining as well as removal of toxic key points for assorted applications. The approach of microbial technology is widely used for the genotoxicity, agro industrial waste management and many others. This work is having the key focus on the implementation patterns and scenarios whereby the microremediation in the microbial biotechnology in assorted cases.

Keywords: Microremediation, Microbial Biotechnology, Microbial Approach, Sustainable Development

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USE OF TRICHODERMA SPS. AS BIOFERTILISER FOR CONTROL OF MACROPHOMINA PHASEOLINA CAUSAL AGENT OF CHARCOAL ROT

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Trichoderma spp. are effective biocontrol agents for several soilborne fungal plant pathogens including Macrophomina phaseolina causal agent of charcoal rot. Macrophomina phaseolina, is one of the most destructive and widespread diseases of crop plants such as soybean, sorghum, cowpea etc. Management of charcoal rot disease is difficult due to nature of pathogen and rejection of chemical control methods owing to environmental and health issues. Hence Trichoderma is considered as effective method for the control of charcoal rot disease.

Trichoderma species are saprophytic, widely distributed, quick grower, with high population densities in soils and plant residues and are easy to culture. Trichoderma were evaluated against Macrophomina phaseolina by dual culture techniques.

Keywords: Charcoal rot disease; saprophytic; Biocontrol agents

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VITAMIN D ENHANCEMENT AND NUTRACEUTICAL POTENTIAL OF MUSHROOM MYCELIA

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Mushrooms and its mycelia are good source of vitamin D2 (ergocalciferol). They contain ergosterol (provitamin D2) in their cell membrane which is precursor for vitamin D2. Ergosterol can be transformed into vitamin D2 by UV-B exposure. Vitamin D helps in maintaining the calcium and phosphorus homeostasis in the body. Vitamin D deficiency has been reported to be associated with cancers, heart diseases, obesity, diabetes, arthritis. The deficiency of vitamin D can lead to osteoporosis. In humans, vitamin D3 is formed in the skin from its precursor 7- dehydrocholesterol by exposure to sunlight. In case of insufficient sun exposure vitamin D2 can be a good alternative. Mushrooms are also good source many nutraceuticals. Currently, commercial production of medicinal mushrooms are mostly obtained through the fieldcultivation of the fruiting body which is labour intensive, time consuming and prone to contamination. Submerged cultivation of the mushroom mycelia has received much attention as a promising alternative for efficient production of the biomass of medicinal mushrooms and their active metabolites. However, in order for the production to be successful at industrial scale, various technical problems need to be solved, including characterization of the variations that occur during the submerged cultivation of mushrooms in bioreactors and their effects on growth and product formation. Besides exposure of UV for optimized production of vitamin D2. This review focuses on production of mushroom mycelia under submerged culture conditions and thus effect on neutraceuticals along with vitamin D enhancement strategies.

Keywords: mycelia, submerged cultivation, vitamin D2, ergosterol, nutraceuticals.

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CRYOPRESERVATION AND REGENERATION OF *PICRORHIZA KURROA*

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Picrorhiza kurroa belongs to family Scrophulariaceae and is a perennial herb. It is additionally known as Kutki, Katui in Sanskrit. It is one of the prehistoric plants mentioned in Ayurvedic and Unani systems of medicines carrying plethora of medicinal properties. The plant is endemic to Indian Himalayan Region and available in the regions of Himachal Pradesh, Uttarakhand and Kashmir etc. It is used for treating malaria, hepatic fibrosis, bronchial asthma, constipation, and jaundice. The plant is listed endangered in Red Data Book, so in order to reclaim its natural population many alternative technologies along with conventional cultivation techniques were applied. In order to have long term germplasm conservation of some novel accessions of *Picrorhiza kurroa* cryopreservation can be applied and its regeneration potential can be explored. So this study was carried out for the development of somatic embryo(SE) on optimized MS media supplemented with growth hormones like IBA and KN. Selected torpedo shaped or heart shaped SE were selected and encapsulated in sodium alginate beads, followed by using osmoticum (sucrose 0.3M) ,air-drying and direct immersion in liquid nitrogen (LN-196°C) for cryopreservation. These one-month old cryopreserved SE were first thawed and warmed rapidly in waterbath at 37^0 C and kept in regeneration medium having MS IBA, KN and GA. Some of the beads had been potted in greenhouse at 25°C temperature and humidity ranging from 70-80% in potting mixtures having vermiculite, perlite and cocopeat for direct regeneration. The regeneration was observed in cultures forming shoot primordial after 2 weeks of incubation under optimized tissue culture conditions. So, this technique would be very useful for long time conservation and preservation of commercially important medicinal plants.

Keywords: Cryopreservation, Somatic embryos and *Picrorhiza.*

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NATIVE SERRATIA MARCESCENS FROM RAT HOLE COAL MINES- A POTENT BIOREMEDIATOR OF HEAVY METALS

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Coal mining in Meghalaya (India) carried out using rat-hole coal mining approach is one of the core industries that contribute to the economic development of the state which parallely is contributing to environmental degradation as coal contains biologically toxic heavy metals like Aluminium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel and Zinc, hence remediation of such metals is needed. Bioremediation by microbes is a cost-effective method for removing heavy metals from soil and water. A bacterial isolate isolated from the native coal mine site showed high metal tolerance which were selected to assess its potency for bioremediation of the heavy metals. 16S rDNA analysis revealed the isolate to be Serratia marcescens. The growth kinetics of the bacterium in presence of metals showed it growth in nutrient broth supplemented with 100 ppm of metals.The growth pattern under 100 ppm Pb showed similar growth pattern as the control while the growth in 100 ppm Fe and Mn showed longer lag phase. When Serratia marcescens was grown in nutrient agar plate in increasing heavy metal concentrations, it showed MTC upto 1400, 830 and 500 ppm for Pb, Mn and Fe respectively. For bioremediation study, Serratia marcescens were grown in batch culture with 20 ppm concentration of heavy metals for 24 hours. The removal percentages for the metals were 83%, 72.5% and 12.5% for Pb, Mn and Fe respectively. From this study, it can be concluded that Serratia marcescens can be used for bioremediation of Pb and Mn, but does not appear to be promising bioremediator of Fe.

Keywords: Rat-hole coal mines, Heavy metals, Serratia marcescens, Maximum Tolerance Concentrations, Bioremediation.

PP-159

REVIEW ON MULTIPLE POTENCY OF KARANJ

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India facilitates the growth of large variety of medicinal plants because of its climatic condition. Rural and urban community consume traditional foods, and make use of home remedies following health customs based on the principles of traditional systems of medicines. One such multipurpose tree with immense medicinal and economic value is karanj plant. The *Pongamia pinnata* is both a saline and drought tolerant species. It belongs to family Fabaceae. It is a medium sized evergreen tree and native in tropical and temperate Asia. All plant parts like Root, Stem, bark, seed flowers, and fruits have found immense medicinal and thus economical values. They can cure cold, cough, diarrhoea, keloid, tumours, abdominal tumours, rheumatism arthritis, scabies, and whooping cough. These show Antiinflammatory, anthelmintic, antipyretic activity anti-plasmodial, anti-hyperglycaemic, anticancerous, antibacterial as well as anti-viral activity which has been reported in Ayurveda. All plant extract are flavonoids, carbohydrates, glycosides, steroids, tannins, etc. *Pongamia pinnata* L. contains many alkaloids ex. glabrin, pinnatin, pongamal, fatty acids, sterol and disaccharides. Aqueous methanol extracts from bark, leaves and seeds show presence of protocatechuic, ellagic acid. Ferulic, gallic acid in the bark; sorbic, fenulic, salicyclic and p-coumaric acids in the leaves. Karanjin, which is responsible for curative effect in skin diseases. Pongamia pinnata ethanolic bark extract also show wound healing property.

Keywords *Pongamia pinnata* Fabaceae, traditional medicinal plant.

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TRENDS IN THE USE OF EDIBLE STARCH FILMS AND THEIR COATING IN HORTICULTURE

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Edible films and coatings are thin layers of edible materials applied on food products that play an important role on their conservation, distribution and marketing of highly perishable products. They protect the product from mechanical, physical, chemical and microbiological damage Other functional attributes like improving mechanical properties (flexibility, tension), optical properties (brightness and opacity), the barrier effect against gases flow, structural resistance to water are improved. Hydrocolloids (proteins and polysaccharides) show excellent mechanical and structural properties and show a poor barrier capacity against moisture transfer which is their draw back. Beeswax and carnauba wax have hydrophobic properties and display good barrier capacity against moisture transfer, but they have high melting points. Edible coatings and films made of protein, polysaccharide and lipid based layer created between food ingredients or on food surface maintain quality, prevent spoilage, prolong the shelf life and protect sensory properties of food. They improve quality of food products like fruits and vegetables, reduce the respiration rate, delays ripening and prolongs their shelf life. Entrapping bioactive agents like Antioxidants, nutraceuticals, antimicrobials, flavors and probiotics in edible coatings can provide beneficial health effects to the consumer.

Key Words: Edible films, Coatings, Functional attributes, Health benefits.

PP-161

BAST FIBRE- STUDY OF COMPOSITION, RETTING METHOD, SURFACE STRUCTURE AND APPLICATION.

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There is an increasing demand of natural fibre over synthetic fibre because of increasing environmental consciousness and removal of traditional composite structures, usually made of glass, carbon or aramid fibres being reinforced with epoxy, unsaturated polyester, or phenolics, are considered critically. Natural fibres are cheap and biodegradable offering scientists a possible solution to waste-disposal problems associated with traditional petroleum-derived plastics. Degradation and analysis of retted fibres is the most important step in the processing of flax fibres and it directly affects quality attributes like strength, fineness, and homogeneity.
Major components of natural fibre like Cellulose, hemicellulose, lignin, pectin and ash needs to be determined by chemical analysis as well as different microscophic technique like light and polarized microscopy, Pyrolysis , mass spectrometric analysis. SEM, TEM, FTIR, Thermogravimetric Analysis (TGA) etc. of fibres are widely used in textile industry.

Keywords*:* SEM, TEM, FTIR, *Thermogravimetric Analysis (TGA).*

PP-162

COMPARATIVE ANALYSIS OF COMMERCIALLY AVAILABLE MILK

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Milk is a nutrient rich food produced by the mammary glands of mammals. It is the primary source of nutrition for infant mammals. The milk consists of 87.7% water, 4.9% lactose (carbohydrate), 3.4% protein, and 0.7% minerals which are generally ash content. Its composition varies depending on the species (cow, goat, sheep) and breed (Holstein, Jersey). They may differ by density also. In the present study comparative analysis of commercially available milk was done using different parameters such as presence of glucose, detergents formalin and protein content. Protein content of milk was analysed by Bradford assay. Qualitative analysis of glucose was done by Barfoed test. Presence of formalin and detergent was also tested in different milk samples. The milk contains fat, vitamins, proteins of which the essential part that we consume are the milk proteins. Concentration of protein was almost same in all milk samples. Presence of formalin was observed in all samples while detergent was present in all samples except cow milk. Presence of detergent and formalin was observed in commercially available milk.

Key words: Bradford; Protein; Barfoed; formalin.

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NATURAL PIGMENTS FOR TEXTILE DYEING

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The food industry releases considerable amounts of wastes which contain natural dyes. Such wastes could serve as a sources for the extraction of natural dyes for textile-dyeing operations. The extraction of brilliant yellow and red colours from fruits and vegetables is of particular interest. Wastes, e.g. pomegranate peel (Punica granatum) , orange peel (Citrus X sinesis) , marigold flowers(Tagetes erecta) and rajma(Phaseolus vulgaris) and test dyeings on cotton cloth were performed. Colour strength, shade and fastness properties of the dyeings have been tested. The extracts were applied as direct dyes and in the presence of mordants. The results prove the potential of such wastes as a source for natural dyestuff extraction. To obtain textile dyes with acceptable fastness properties, however, rigorous selection of dyes and development of suited processes is required. A considerable number of red natural dyes need further research to optimise the low level of fastness to light.

Keywords: Textile dyes, cotton cloth, wastes, fastness properties, mordants.

PP-164

EFFECTS OF HEAVY METALS AND ABIOTIC STRESSES ON DIFFERENTIAL EXPRESSION OF miRNA IN IR-64

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In India, rice is the principal crop and is the staple diet of majority of the population. Widespread use of heavy metals (aluminum, copper, cadmium, chromium, arsenic or mercury) in leather processing, wood preservatives, stainless-steel manufacture, and electroplating industries has resulted in contamination of paddy fields. Heavy metal toxicity and some abiotic stresses (high temperature, salt concentration etc) result in growth inhibition and leading to changes in components of antioxidant systems as well as secondary metabolites that damage lipids, proteins, and DNA. The plants response to metal toxicity involves several biological processes that require fine and precise regulation at transcriptional and post-transcriptional levels. MicroRNAs (miRNAs) are 21 nucleotide non-coding RNAs that regulate gene expression at the post-transcriptional level. miRNA, incorporated into a RNA-induced silencing complex, promotes cleavage of its target mRNA that is recognized by an almost perfect base complementarity. In plants, miRNA regulation is involved in development and also abiotic stress responses. Present study is designed to explore novel advances in identifying miRNAs related to metal toxicity responses and their potential role according to their targets.

Keywords: Heavy metals, Toxicity, abiotic stresses, miRNAs, NGS, Novel.

PP-165

PRODUCTION OF PLATFORM CHEMICAL XYLITOL FROM INDIAN AGRICULTURAL RESIDUES

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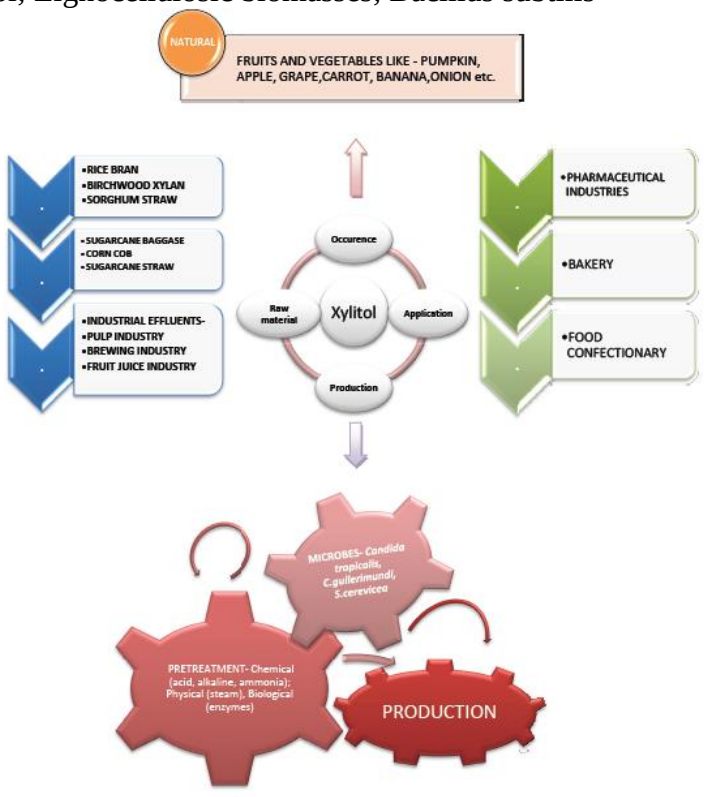
Xyltiol, a penta-hydroxy sugar, existing in trace amounts in fruits and vegetables, is a potential sweetener that dissolves readily in water. It finds varied applications in food, pharmaceuticals, confectionaries, etc. and studied suggest its considerable increase in global market demand with the augment of health and hygiene conscience among new generation. Commercial production of xylitol includes both chemical and biochemical methodologies. Numerous biochemical approaches for the same have been studied, which includes plethora of microorganisms (Candida tropicalis, Candida maltose, Bacillus subtilis, Debaromyces hansenii, etc) producing xylitol from lignocellulosic biomasses and industrial effluents under defined physico-chemical parameters. In the present study we report isolation, screening and identification of seven potential fungal and slime isolates capable of producing xylitol from abundantly available Indian agriculture from a total of 231 indigenous isolates with a maximum xylitol production of 2.013 mg/ml. These organisms also have capability of producing xylitol from xylose containing effluents for which work is under progress.

Keywords: Xylitol; Lignocellulosic biomasses; Bacillus subtilis



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MICROORGANISMS AND GENETICALLY ENGINEERED MICROORGANISMS APPLICATION IN BIOREMEDIATION

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Bioremediation, is defined as a process of using either naturally occurring or deliberately introduces microorganisms to consume and breakdown environmental pollutants, in order to clean a polluted site. Before understanding the process of bioremediation, understanding of microorganisms that makes the process work is required. Over the past few years, the global pollution continues to rise at an astonishing rate which directly or indirectly causing different environmental pollution i.e. an accumulation of soil, water and air pollution. Microorganisms are essential for a key alternate solution to overcome challenges. Microorganisms transform the substrate through metabolic or enzymatic processes. The process involved degradation, eradication, immobilisation, or detoxification different chemical wastes and physical hazardous materials from the surrounding through microorganisms action. The main principle is to degrade and transform pollutants. The total of 1.3 billion tonnes of waste is generated every year worldly, the majority of which is stored in landfill sites or dumped into the oceans. Currently researchers focus is on the use of microorganisms to reduce pollution through the biological degradation of pollutants into nontoxic and reusable substances. There are two types of factors these are abiotic and biotic conditions that determine the rate of degradation. Currently, different categories and strategies of bioremediation techniques are; in situ land treatment for soil and groundwater that includes biostimulation, bioaugmentation, bioventing, biopiles and bioattenuation; biofiltration of air and bioreactors. This review summarized the advantages of microorganisms and genetically engineered microorganisms and their application in the treatment of a wide variety of environmental contaminants such as synthetic dyestuff, heavy metal, petroleum hydrocarbons, polychlorinated biphenyls, phenazines and agricultural chemicals which will include herbicides, pesticides, and fertilizers.

Keywords: Bioremediation; Bioaugmentation; Hydrocarbons; Polychlorinated biphenyls; microorganisms

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ANTIBACTERIAL POTENTIAL OF BIOACTIVE COMPOUND EXTRACTED FROM TEPHROSIA PURPUREA ROOTS AGAINST METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA) ISOLATED FROM CLINICAL SAMPLES OF PATIENTS FROM RAJASTHAN

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Methicillin Resistant Staphylococcus aureus is a versatile pathogen capable of causing a broad spectrum of human diseases. MRSA infection may begin as a skin sore or pimple, before becoming serious, harmful, and sometimes fatal. MRSA is a form of contagious bacterial infection that is resistant to numerous β-lactam ring containing antibiotics including methicillin, amoxicillin, penicillin, and oxacillin. Annually, about 23,000 people die due to antibiotic-resistant bacterial infections. In less than a year after the introduction of methicillin, strains of S. aureus were reported to be methicillin resistant and gradually these strains spread globally. This resistance makes it challenging to treat infections. Due to the rising antimicrobial drug resistance, research has begun on the use of medicinal plants as alternative medicines to treat infections. This study was focused to screen the antibacterial potentials of various bioactive compounds from Tephrosia purpurea roots. The Methanolic and ethanolic extracts of Tephrosia purpurea roots were screened for their antibacterial potentials against 11 clinical isolates of MRSA isolated from the clinical samples of the patients reported to Dr. B. Lal Clinical Laboratory Pvt. Ltd, Jaipur for routine diagnosis. The extracts were further screened for the presence of the phytochemicals qualitatively and quantitatively. The results showed that in case of Tephrosia purpurea roots show better antibacterial potential against MRSA. Of the two solvents (Methanol, Ethanol) used for extract preparation, results have shown that best antibacterial activity was observed with ethanolic extracts. As per the quantitative estimation, the total flavonoid content in ethanolic extracts of Tephrosia purpurea roots was more than the other phytochemicals. The results of this study can lead to the development of novel therapeutic agents capable of controlling or curbing the problem of drug resistance.

Keywords: MRSA; Tephrosia purpurea; Antibacterial; Bioactive compounds; Drug resistance

PP-168

GREEN SYNTHESIS OF SILVER NANOPARTICLES FROM TOBACCO STEM FOR WOUND HEALING

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The purpose of the present study was to investigate antimicrobial and antioxidant activity of synthesis silver nanoparticle from extract of tobacco stem for wound healing. For green synthesis, bioreduction method was used to synthesis silver nanoparticles by using extracts tobacco stem. Nanoparticles were characterized by UV-Vis Spectra Scanning, DLS, AFM & SEM. Antimicrobial activity was screened by Broth dilution method and Mode of action was evaluated by Cellular membrane leakage assay. Antioxidant activity of nanoparticles was observed by electron transfer assay, enzymatic and non enzyme content. It was revealed from present study that silver nanoparticles synthesized from extract has shown spherical shape with size between 75.9-105nm. Antimicrobial activity was found to be high as the concentration of nanoextract increases against both gram positive and gram-negative bacteria. Antioxidant activity of silver nanoparticles found to be high with respect to extracts of tobacco stem. We would like to conclude from the present study that synthesize nanoparticles found to be efficient antimicrobial & antioxidant agent and can be utilized as herbal remedy for wound healing purposes.

Keywords: Ag-NPs, Extracts, SEM, Antimicrobial activity, Antioxidant activity.

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TRANSITION STAGES DURING METASTASIS

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Metastasis is the method by that cancer cells travel to distant locations within the body. The bulk of death related to cancer is because of the metastasis of the initial tumor cells. Metastasis is the major reason behind cancer-related deaths; so, the interference and treatment of metastasis are basic to rising clinical outcomes. epithelial mesenchymal transition (EMT), associate evolutionarily preserved developmental program, has been concerned in carcinogenesis and confers pathological process properties upon cancer cells by enhancing quality, invasion, and resistance to apoptotic stimuli. Moreover, EMT-derived tumor cells acquire somatic cell properties and exhibit marked therapeutic resistance. Given these attributes, the complicated organic process of EMT has been publicized as a key hallmark of carcinogenesis, and targeting EMT pathways constitutes a good strategy for cancer treatment. Therefore, thinking about the purposeful role of EMT in metastasis remains an area of active investigation

KEYWORDS: Cancer Stem Cells; Collective Migration; Epithelial Mesenchymal Transition; Lineage Tracing; Metastasis; miRNA; resistance; Therapy

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EXTREMOZYMES IN TEXTILE INDUSTRY

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Extremophiles are the microorganisms that are able to live under extreme conditions like temperature, pressure, salt , lack of nutrition, alkalinity or acidity. Based on the parameters they are classified as thermophiles, halophiles, acidophiles, alkaliphiles etc. These microorganisms are able to thrive in harsh environment due to the presence of special enzymes called extremozymes thus these enzymes have found importance in various biotechnological and industrial applications. Cellulase is the third largest industrial enzyme as it can degrade cellulose the most common found natural polymer. They are also involved in the conversion of lignocellulose into glucose units which are further used in the production of bioethanol, biostoning of denim, biopolishing, biofinishing, increasing softness, lustre of textile fibers. Extremophiles like *Dictyoglomus thermophilum*, *Thermophilum pendens*, *Sulfolobus acidophilus*, *Thermotoga maritime*, *Thermus brockianus*, *Thermus thermarum*, *Bacilus pumilus* are producers of Cellulase, Lipase, Xylanase the lipolytic enzymes find application in the hydrolysis of fats, removal of lubricants, thereby increasing the absorbency and level of dyeing by pigments , reducing cracks and desizing of denim. bioscouring, removal of starch, bleach textile. Use of extremozymes in textile industry is very beneficial as they are non-toxic and environment friendly.

KEYWORDS: Extremophiles; Extremozymes; Cellulase; Biostoning; Lipase; Xylanase; Bioscouring; Textile industry.